

[ 2 ]

Calibrate the given milliammeter.

OR

Determine the ballistic constant.

OR

Study the regulated power supply as a voltage regulator.

OR

Draw the static characteristics of a triode.

OR

Draw the static characteristics of a transistor.

2. Viva-voce. 12

3. Record. 8

V-3-0.5

**VI-UG-Phy(H)-XIV (Pract)**

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Determine 'Y' by vibration of a cantilever. 30

OR

Determine the surface tension of mercury by Quinck's method.

OR

Determine the coefficient of viscosity by Searl's method.

OR

Determine thermal conductivity of rubber in the form of a tube.

OR

Determine the resolving power of a plane diffraction grating.

OR

**SECTION -B (Afternoon Session)**

4. Assess the level of adaptation and coping skills of the 'self' by administering 'Adaptation' questionnaire and 'coping' check list.

OR

Determine the creative abilities of children (at least 3) selected from grade-VI by administering 'teacher's' rating of children's creativity scale.

OR

Demonstrate experimentally the phenomenon of 'Negative Transfer of Training' using mirror tracing apparatus.

5. Viva-Voce. 6
6. Record. 4

V-2-0.5

**2015**

Full Marks - 40

Time - 6 Hours

The figures in the right-hand margin indicate marks  
Answer *all* questions from each of Section A & B

**SECTION -A (Morning Session)**

1. Demonstrate experimentally the 'Serial position effect' of materials in learning a list of Nonsense syllables. 10

OR

Administering the revised Home Scale, assess the quality of the home environment of a pre-school child by home observation and parent's interview. Make suggestions to parents for improving the quality of their home environment for effective child rearing. 10

OR

Experimentally compare the recognition score of your subject for nonsense materials under similar and dissimilar context. 10

2. Viva-Voce. 6
3. Record. 4

V-2

[Turn Over

- c) Submission of Economic important plant products. 3
- d) Submission of permanent slide. 2
6. Viva-Voce. 6
7. Class Record. 3

V-5-0.5

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Dissect, draw and describe in technical terms the specimen 'A' and 'B'. Underline the diagnostic characters. Write floral formula, draw floral diagram. Identify the genus and species. 9 + 9
2. Make permanent preparation of specimen 'C'. Identify and comment on its anomalous characters. 6
3. Identify on spot :  
Write the Botanical name and family name of supplied specimen 'D' and 'E'. 3
4. Write the Botanical name and economic importance of the following specimen 'F' and 'G'. 2 × 2
5. a) Submission of field study note. 2  
b) Herbarium collection (25 minimum) 3

[ 2 ]

4. Identify the given permanent microscopic slides.  
(Two slides be given from Frog and two slides from chick)  $1\frac{1}{2} \times 4$

OR

Prepare a W.M. of chick embryo.

OR

Any other experiment prescribed in syllabus.

5. Practical Records and Sessional preparations. 5
6. Viva-Voce. 4

V-6-0.4



**VI-UG-Zool(H)-XIV (Pract)**

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Conduct the experiment as per the instructions of the examiners (Two physiology experiments be given as per syllabus).  $10 \times 2$
2. Determine the concentration of DO in supplied water sample. 10

OR

Estimate the  $\text{CO}_2$  in the supplied water sample.

OR

Determine the pH of the supplied water samples (at least 4 water samples be given)

3. Identify the Blood Group (A/B/O/AB) of human blood (preferably the blood of the candidate be used). 5

OR

Verify whether your blood is having Rh factor.

7. Write a 'C' function to sort a list of integers using quick sort. 10

**GROUP - B**

7. Viva-Voce. 12
8. Record. 8

V-7-0.5

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer any *three* questions from Group-A

Group-B is compulsory

**GROUP - A**

1. Write a 'C' function to sort a list of integers using insertion sort. 10
2. Write a program in 'C' to insert a new node in a Binary Search Tree. 10
3. Write a program to search a pattern in a given string. 10
4. Write a 'C' program to find the multiplication of two matrices. 10
5. Write a 'C' program for Breadth First Search. 10
6. Write a program to find the longest common sequence between two strings. 10

[ 2 ]

Determine the rigidity modulus of the material of the wire using Maxwell's needle.

OR

Determine the sum of a finite series using C++ language.

- |               |   |
|---------------|---|
| 2. Viva-Voce. | 6 |
| 3. Record.    | 4 |

V-11-0.5



**IV-UG-Phy(H)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks  
Answer *all* questions

- |   |    |
|---|----|
| 1. Determine the co-efficient of cubical expansion of water by Sinker method. | 15 |
|---|----|

OR

Determine the Cauchy's constants.

OR

Calibrate the given source of light using the prism spectrometer and determine the unknown wavelength.

OR

Determine the wavelength of light using biprism and optical bench.

OR

Compare two nearly equal resistances using C F bridge.

OR

Measure a high resistance using any suitable method.

OR

- iv) Remove the table from the database.
2. Write a PL/SQL program to multiply two numbers without using multiplication operator (\*). 2.5
3. Create and invoke the RETURN-SAL function to return the salary of an employee to a host variable. Pass the employee code as parameter. 2.5
4. Create a procedure called UPD\_EMP to update a record of EMP table whose employee code is passed as parameter. Compile the code, Invoke the procedure and then query the EMP table to view the results. 2.5
5. Create a package named Arithmetic for performing all arithmetical operation (+, -, \*, /) and test all the operation. 2.5
6. Viva-Voce. 06
7. Record. 04

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Write the SQL commands for the following : 5
- a) Display the employee name for all employees who have an 'A' in their name.
- b) Create a query that will display the employee name and commission amount. If the employee does not earn commission put "No Commission". Label the column. Comm.
- c) i) Create a EMPLOYEE table based on the following table structure.
- |         |           |               |
|---------|-----------|---------------|
| EID     | number    | 7 primary key |
| NAME    | varchar 2 | 15 Not Null   |
| DESIG   | varchar 2 | 10 Not Null   |
| DEPT_ID | Number    | 4             |
- ii) Insert few records.
- iii) Add a new column PHONE in the above table.

**IV-UG-Bot(H)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Make a permanent preparation of the supplied specimen 'A'. Draw labelled diagram. Comment and identify with reasons. 6
2. Make a permanent preparation of the supplied specimen 'B'. Draw labelled diagram and identify with reasons. 6
3. Identify on spot C, D, E and F with labelled diagrams and reasons. (Each spotting 3 minutes). 4
4. Prepared slides. 2
5. Viva-Voce. 5
6. Class Record.

V-13-0.5



**IV-UG-Chem(H)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Estimate the amount of aniline/phenol present in the supplied solution of aniline/phenol using standard  $\text{Na}_2\text{S}_2\text{O}_3$  solution of strength \_\_\_\_\_  $\left(\frac{N}{10}\right)$ . 17

OR

Prepare and submit 2 gms of pure and dry picric acid/ aspirin/iodoform and determine the np of your sample.

2. Viva-Voce. 5
3. Record. 3

V-12-0.5



V-13-0.5



**IV-UG-Zool(P/EL)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Perform the ecological experiment as per the instruction of the Examiners. 8
2. Identify the Spots (I to VI) with comments. (Dev. Biology-2spots, Resource biology/Economic Zoology-2 spots and Endocrinology-2 spots = 6 spots).  $1\frac{1}{2} \times 6$
3. Answer the statistical question as per the instruction. 3
4. Practical Record and Sessional preparation. 2
6. Viva-Voce. 3

V-19-0.5



**IV-UG-Zool(H)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Conduct the experiment as per the instructions of the examiner (one experiment from Developmental Biology/Endocrinology as per syllabus may be given). 7
2. Identify the Spots (I to VI) with comments (embryological slides of frog and chick –3, slides of endocrine gland)  $1\frac{1}{2} \times 6$
3. Identify the blood group (A/B/O/AB) of human blood (preferably the blood of the candidate be used). 3
4. Practical Record and Sessional preparation. 3
6. Viva-Voce (basing on theory paper-VII). 3

V-14-0.5



**IV-UG-Phy(P/EL)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Determine the rigidity modulus of the given wire by dynamic method. 15

OR

Verify the laws of transverse vibration of string by Sonometer.

OR

Determine the angle of the prism and draw the  $i \sim D$  curve using spectrometer.

OR

Determine the wavelength of light by Newton's ring.

OR

Compare the emf of two cells using potentiometer.

2. Viva-Voce. 6  
3. Record. 4

**IV-UG-Phy(P/EL)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Determine the rigidity modulus of the given wire by dynamic method. 15

OR

Verify the laws of transverse vibration of string by Sonometer.

OR

Determine the angle of the prism and draw the  $i \sim D$  curve using spectrometer.

OR

Determine the wavelength of light by Newton's ring.

OR

Compare the emf of two cells using potentiometer.

2. Viva-Voce. 6  
3. Record. 4

**IV-UG-Psy(H)-VIII (Pract)**

**2015**

Full Marks - 20

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer any one question from Section-A and  
Section-B is compulsory

**SECTION-A**

1. Administering Raven's Standard Progressive Matrices (RSPM) assess the intelligence level of your subject
2. Experimentally show the difference between the level of aspiration and the level of achievement of your subject.
3. Experimentally compare the memory of your 'S' for associated and unassociated pair of words. 10

**SECTION-B**

1. Record. 4
2. Viva-Voce. 6

V-10-0.5



**IV-UG-Edn(H)-VIII (Pract)**

**2015**

Full Marks - 20

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. What is survey method ? Describe different types of survey method and the steps of survey method. 10

OR

Write a report on an educational survey you have conducted during the course of your study.

2. Maintenance of Project Record. 4
3. Viva-Voce. 6

V-9-0.5



**VI-UG-Chem(H)-XIV (Pract)**

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Find out the value of the rate constant for acid hydrolysis of methyl acetate with 0.5N HCL at room temperature using standard NaOH solution of strength\_\_\_\_\_ and show graphically that the reaction follows first order Kinetics. 35

OR

Determine the partition coefficient of iodine between water and  $\text{CCl}_4$  using standard  $\text{Na}_2\text{S}_2\text{O}_3$  solution of strength\_\_\_\_\_ .

OR

Estimate the amount of Calcium and Magnesium present in the supplied mixture solution of their salts using 0.01M EDTA solution.

2. Viva-Voce. 10
3. Records 5

[ 2 ]

- g) Study the effect of different temperatures on the rate of photosynthesis of a hydrophyte.
- h) Compare the rate of water uptake in a starchy, proteinaceous and oily seeds.
2. Study the morphology and anatomy of the specimen 'A'. Comment on its ecological adaptation and identify with reasons. 6
3. Identify on spot the specimen 'B' and 'C' with labelled diagrams and reasons. 3
4. Class Record. 2
5. Viva-Voce. 4

V-18-0.5



**IV-UG-Bot(P/EL)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Perform any *one* of the following experiment choosen by Lot : 10
- a) Determine the Osmotic pressure of the cell Sap of the given specimen by plasmolytic method.
- b) Determine the diffusion pressure deficit of a suitable storage tissue.
- c) Determine the resistance offered by the cuticle to loss of water in a fleshy xerophyte.
- d) Compare the rate of transpiration and absorption of any twig.
- e) Determine the rate of photosynthesis of any aquatic plant in different wavelengths of light.
- f) Study the effect of known concentration of CO<sub>2</sub> on rate of photosynthesis of a hydrophyte.

V-18

[Turn Over

**IV-UG-Chem(P/EL)-VIII (Pract)**

**2015**

Full Marks - 25

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

1. Estimate the amount of Copper present in the supplied  $\text{CuSO}_4$  solution using standard  $\text{Na}_2\text{S}_2\text{O}_3$  solution of strength \_\_\_\_\_  $\left(\frac{N}{10}\right)$ . 17

OR

Estimate the total iron ( $\text{Fe}^{2+}/\text{Fe}^{3+}$ ) present in the supplied solution using standard  $\text{K}_2\text{Cr}_2\text{O}_7$  solution of strength \_\_\_\_\_  $\left(\frac{N}{10}\right)$ .

OR

Estimate the amount of phenol/aniline present in the supplied phenol/aniline solution using standard  $\text{Na}_2\text{S}_2\text{O}_3$  solution of strength \_\_\_\_\_  $\left(\frac{N}{10}\right)$ .

2. Viva-Voce. 5  
3. Record. 3

**VI-UG-Edn(H)-XIV (Pract)**

**2015**

Full Marks - 40

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

1. What is Action Research ? Write down the need and importance of Action Research in education. 10

OR

What is Questionnaire ? What is the place of Questionnaire in action research ?

2. What are the different steps of Action Research ? Write down advantages and disadvantages. 10

OR

Write down the different methods of data for a problem in Action Research with remedial measures for solution of the problem.

3. Preparation and Maintenance of Record. 08  
4. Viva-Voce. 10

**II-PG-Phy-IX (Pract)**

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

1. Study the static and dynamic characteristics of a triode valve. 30

OR

Draw the characteristics of a PNP/NPN transistor in CE mode.

OR

Draw the characteristics of a PNP/NPN transistor in CB mode.

OR

Study the triode as an amplifier.

OR

Study the transistor as a single phase amplifier.

OR

Study the Hartley Oscillator.

OR

Determine the bandgap of the given junction diode.

OR

Draw the characteristics of a zenor diode.

OR

Study the rectifier using different filter.

2. Viva-Voce. 12

3. Record. 08

V-38-0.3



**IV-PG-Phy-XVIII (Pract)**

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

1. Determine the heat capacity using heat capacity kit. 30

OR

Determine the effective 'g' using E.S.R. apparatus.

OR

Determine the magnetic susceptibility by Quink's method.

OR

Determine the magnetic susceptibility by Groy's method.

OR

Determine the magneto resistance of different magnetic material by Fore Probe method.

2. Viva-Voce. 12

3. Record. 8

V-36-0.3



[ 4 ]

**GROUP - F**

21. Viva-Voce. 20

22. Record. 10

V-8-0.5



**IV-UG-Math(H)-VIII (Pract)**

**2015**

Full Marks - 80

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *one* question from each Group of Group-A to E. Group-F is compulsory

**GROUP - A**

10

1. Trace the curve  $x^3 + y^3 = 6xy$ .
2. Trace the curve  $y^2(2 - x) = x^3$ .
3. Trace the curve  $x^{2/3} + y^{2/3} = 4$
4. Trace the curve  $x = 2(t + \sin t)$ ,  $y = 2(1 + \cos t)$

**GROUP - B**

10

5. Find a real root of the equation  $x^3 - 8x - 4 = 0$  correct to 5 decimal places.
6. Find the smallest positive real root of the equation  $x^3 - x - 1 = 0$  correct to 5 decimal places using Secant method.

[ 2 ]

7. Find a positive real root of the equation  $x^3 + x^2 - 1 = 0$  correct to 7 decimal places using fixed point iteration method.
8. Find a positive real root of the equation  $xe^x = 1$  correct to four decimal places using Regulafalsi method.

**GROUP - C**

10

9. Find the approximate value of e correct to 7 decimal places using Maclaurin's series.
10. Determine the value of  $\pi$  correct to two decimal places using Stirling formula.
11. Find the number of primes  $\leq 200$  using Seive method.
12. Solve the initial value problem

$$\frac{dy}{dx} = x + y, \quad y(0) = 1$$

by Euler's method and find  $y(1)$  with  $h = 0.1$ .

[ 3 ]

**GROUP - D**

10

13. Write a program in C to find the roots of a quadratic equation  $ax^2 + bx + c = 0$ ,  $a \neq 0$ .
14. Write a program in C to find the sum of the digits of a number.
15. Write a program in C to check whether a number is a palindrome or not.
16. Write a program in C to find the sum of the series.

$$1 + \frac{x^2}{\underline{2}} + \frac{x^3}{\underline{3}} + \dots + \frac{x^n}{\underline{n}}$$

**GROUP - E**

10

17. Write a program in C to multiply two matrices A and B of orders  $3 \times 3$ .
18. Write a program in C for arrangement of numbers in ascending order.
19. Write a program in C to find the factorial of a number using recursion.
20. Write a program to swap 2 numbers using pointer.

[ 2 ]

Solve a quadratic equation after writing the suitable programme.

OR

Solve a second order differential equation by Runge-Kutta method.

OR

Solve a cubic equation.

2. Viva-Voce. 12

3. Record. 8

V-39-0.3



**II-PG-Phy-X (Pract)**

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Study the given power supply. 30

OR

Calibrate the given CRO.

OR

Verify the truth tables for different GATE circuits.

OR

Solve linear simultaneous equation after writing down the necessary programme.

OR

Generate and print the sum of the first 100 prime numbers.

OR

Find the sum of on AP/GP series.

OR

[ 2 ]

**II-UG-Edn(H)-IV (Pract)**

3. Use of Teaching aids :

- |   |   |
|---|---|
| a) Quality of teaching aid.               | 2 |
| b) Appropriateness of aids.               | 2 |
| c) Use of aids during delivery of lesson. | 1 |

**2015**

Full Marks - 20

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Verification of Practice Teaching Records : 5

- a) Preparation of ten lesson plans and delivery.
- b) Ten teaching aids pertaining to ten lesson plans delivered. Evaluate as a whole.

2. Performance in classroom teaching in final lesson plan (delivery of one lesson) :

- |  |   |
|--|---|
| a) Lesson plan.                          | 4 |
| b) Classroom Management and Transaction. | 4 |
| c) Personality.                          | 2 |

V-21-0.5



**II-PG-Com-X (CAB)**  
(Practical)

**2015**

Full Marks - 50

Time - 6 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) How will you insert horizontal page break and vertical page break while printing a worksheet in EXCEL ? 8
  
- b) What is a range ? How are cell ranges named ? What are the advantages of assigning a name to a cell or, a range of cells ? Can you rename a range or delete a range ? 8.6

OR

- c) How can you insert a graphic image into a word document ? 5
  
- d) Write the steps involved to go to a particular page directly in multi-page document ? 5
  
- e) How can you create a new template based on an existing template ? 6.6

[ 2 ]

2. a) How to copy a slide from one presentation to another ? Write all the steps. 5
- b) How text and graphics objects are animated in a slide ? Write all the steps. 5
- c) Write a program to calculate and display sum of series 5, 10, 15, ..... 100 in FoxPro. 6.6

OR

- d) How to create a table using Database view ? Write all its steps. 5
- e) What is Form-Wizard ? How can you create a form using Form-Wizard ? Write all its steps. 6.6
- f) Write a program in FoxPro to find out factorial of a input number. 5
3. Company starts a new scheme for his retail customers. According to the scheme company maintain a price list as follows. You have to create two prices Level : WHOLESALE and RETAIL. 16.6

[ 3 ]

Maintain price list for Retailer :

<i>Product</i>	<i>Quantity</i>	<i>Rate</i>	<i>Discount</i>
Ponds Cream	< 10	45/-	2.5%
	< 25	45/-	3.5%
	< 50	45/-	4.5%
	> 50	45/-	6%
Lotus Cream	< 15	90/-	2%
	< 25	90/-	3.5%
	> 25	90/-	5%

OR

What is meant by Ledger ? How can you create a single and a multiple ledger ? Create a single ledger of your own. 16.6

**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Give an account of Sommerfield's extension of Bohr's theory of hydrogen atoms. 6
- b) Discuss L-S and J-J coupling scheme for two electrons atoms. 3+3

OR

- a) Define orbital and spin angular momenta of an atom. 1+1
  - b) Give the explanation of normal Zeeman effect on classical theory and obtain an expression for Zeeman shift. 4+6
2. a) Describe Moseley's work on X-rays. State Moseley's law. What is its importance ? 2+1+2
  - b) Discuss Laue's theory for X-ray diffraction. 7

OR

[ 2 ]

- a) Distinguish between X-rays emission spectra and X-rays absorption spectra. 4
- b) Discuss the origin and mechanism of production of characteristic X-ray spectra. Give the theory of X-ray diffraction in detail. 2+2+4
3. a) Obtain an expression for rotational energy levels of a diatomic molecule and the frequency of rotational spectra. 6+3
- b) Show that in rotational spectra, the energy levels are not equally spaced. 3

OR

What is Raman effect ? What are Stoke's and anti-Stoke's lines in Raman spectrum ? Give the experimental set up to study Raman effect with the help of a neat labelled diagram. 2+2+2+5+1

4. a) Give various assumptions made for liquid drop model of the nucleus. Explain salient features of this model. 2+4
- b) Obtain an expression for the binding energy of a nucleus in the ground state based on an semi-empirical mass formula and justify dependence of different energy terms on various factors. 3+3

OR

[ 3 ]

Write explanatory notes on the following with example : 6 × 2

- i) Nuclear fusion reaction
- ii) Nuclear fission reaction.
5. a) Explain clearly the meaning of isospin and strangeness. In what respect are these important in the classification of elementary particles ? 2+2+2
- b) How many possible quarks are there ? Give the charge and strangeness numbers associated with each quark. How do quarks combine to form baryons and mesons ? 2+2+2

OR

Give the principle, construction and working of a linear particle accelerator. State some of its uses in modern science. 10+2

V-40-0.5



5. What are P and NP-complete and NP-hard problems ?  
Explain briefly with suitable example for each class. 12

OR

- a) Assuming modulo  $q = 11$ , how many spurious hits does the Robin-Karp matcher encounter in the text  $T = 314159265589793$  which looking for the pattern  $P = 26$ . 7
- b) Prove that if any NP complete problem is polynomial time solvable then  $P = NP$ . 5

V-44-0.5

**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Find out  $\Omega$ -notation for the function  
 $4n^3 + 2n + 3$ . 4
- b) Explain why the statement, "The running time of Algorithm A is at least  $O(n^2)$ " is meaningless. 4
- c) Discuss the Rules for designing an algorithm. 4

OR

- d) By using the master method to give tight asymptotic bounds for the following recurrences
- i)  $T(n) = 4T(n/2) + n$
- ii)  $T(n) = 4T(n/2) + n^3$ . 8
- e) By using a recursion tree to give an asymptotic tight solution to the recurrence

$$T(n) = T(\alpha n) + T((1 - \alpha)n) + cn,$$

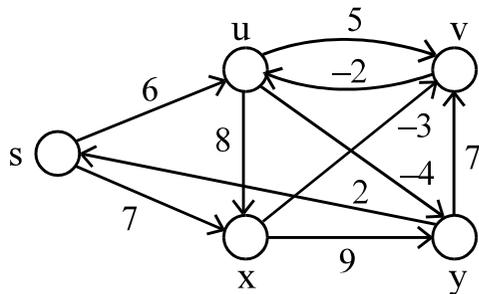
where  $\alpha$  is a constant in the range  $0 < \alpha < 1$  and  $c > 0$  is also a constant. 4

[ 2 ]

2. a) Suppose  $A = \{3, 1, 4, 1, 5, 9, 2, 6, 5, 3, 5, 8, 9\}$  sort the array A using Quick sort algorithm. 6
- b) Explain the operation of HEAP-EXTRACT-MAX on the heap  
 $A = \langle 15, 13, 9, 5, 12, 8, 7, 4, 0, 6, 2, 1 \rangle$  6

OR

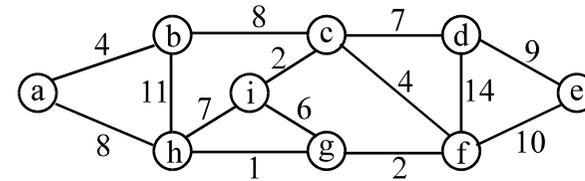
- c) Explain that quick sort's best-case running time is  $\Omega(n \lg n)$  6
- d) Explain the binary search tree in brief. 6
3. Define Bellman-Ford Algorithm. Discuss the Bellman-Ford Algorithm (step-by-step) by using below figure. 12



OR

[ 3 ]

Define Prim's algorithm. Discuss the step by step operation of Prim's algorithm, using below figure : 12



4. a) Briefly describe the Greedy algorithm and its basic structure. Also discuss the elements of Greedy strategy. 6
- b) Consider following instance of the Knapsack problem :  
 $n = 3, w = 50, (v_1, v_2, v_3) = (60, 100, 120)$  and  
weight  $(w_1, w_2, w_3) = 10, 20, 30$ . 6

OR

- c) Construct the Huffman code for the following set of characters : 8  
 $a(26), m(13), n(36), o(5), p(5), q(15)$
- d) Write down the steps for achieving greedy algorithms. 4

[ 2 ]

Highlight the various measures taken by the stock exchanges to protect the interest of investors. 16

4. Discuss the method of trading in OTCEI. 16

OR

Write notes on the following : 8+4+4

- a) Objectives of National Stock Exchange
- b) Sub-brokers
- c) Jobbers.

5. Discuss the guidelines for merchant bankers issued by SEBI. 16

OR

What is meant by credit rating ? Explain the benefits of credit rating. 4+12

V-46-1



VI-UG-Com(H)-IX (FMO)

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks  
Answer *all* questions

1. Show the classification of Indian financial markets in the form of a chart and explain the features of each market. 16

OR

Give the structure of the Indian money market and point out its deficiencies. 16

2. Write an essay on the functions of New Issue Market. 16

OR

Critically examine the role of stock exchanges in the financial system of a country. 16

3. Analyse the main factors that affect investors' interest in general. 16

OR

V-46

[Turn Over

[ 2 ]

IV-PG-Com-XV (ME)

3. What is inflation ? Discuss the different types of inflation. Suggest measures to check inflation. 14

OR

Discuss the nature and different stages of business cycle. Give a note on Samuelson and Hicks Theory. 14

V-90-1



**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Explain the concept of production function with the help of a two input and one output case. 13

OR

When estimating production function, what would be the some of the problems of measuring output and inputs for each of the following ?

- a) An entire economy  
b) A Multiproduct 13

2. Long run cost-output relationship is an envelope of the family of short-run cost curves - Discuss. 13

OR

"The behaviour of Cost is determined by several factors". Elucidate the statement. 13

V-90

[Turn Over

3. Write an essay on history and scope of Immunology and add a note on Immunity.

OR

Write notes on any *two* of the following :

- Acquired/Adaptive Immunity
  - T-Lymphocyte
  - Auto immuno disease.
4. What is Biotechnology ? Give a historical perspective, scope and importance and discuss its trends in India and International sphere.

OR

Write notes on any *two* of the following :

- Cloning
  - Synthesis of gene
  - Restriction Enzymes.
5. Describe the evolution, project goal, achievements and social implication of human genome project.

OR

Write notes on any *two* of the following :

- Transgenic animals
- Hybridoma
- Biotechnology in human welfare.

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Give diagrams wherever necessary*

1. Give an account of transport of Respiratory gases.

OR

Write notes on any *two* of the following :

- Digestion of Carbohydrates
  - Cardiac Cycle
  - Composition of Blood.
2. Describe the various physiological steps involved in the process of Excretion.

OR

Write notes on any *two* of the following :

- Structure of Neuron
- Synaptic transmission
- Corpus Luteum.

3. Describe the family Apiaceae or Rubiaceae with range of floral formula and floral diagram.

OR

Write notes on the following :

- a) Inflorescence of Acanthaceae
  - b) Androecium of Asclepiadaceae.
4. Describe the family Orchidaceae and point out its advanced characters.

OR

Write notes on the following :

- a) Floral structure of Musaceae
  - b) Floral diagram of Cyperaceae.
5. Discuss the origin, distribution, botany, taxonomy and economical importance of Sugarcane.

OR

Write notes on the following :

- a) Medicinal importance of Ocimum with a brief description of the plant.
- b) Economic importance of jute or Rowolfia.

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*Give diagrams wherever necessary*

1. Give an account of Botanical Nomenclature of ICBN type studied by you.

OR

Write notes on the following :

- a) Importance of Herbarium and Botanical Garden
  - b) Principles of Priority and its limitation in Botanical nomenclature.
2. Discuss the principles of classification made by Hutchison.

OR

Write notes on the following :

- a) Merits and demerits of Bentham and Hooker's system of classification.
- b) Takhtajan's system of classification.

5. a) What are purines ? Write the names and structural formula of three derivatives of purines. 2+3
- b) What happens when Citral is oxidised with alkaline  $\text{KMnO}_4$  followed by chromic acid ? 2½
- c) How can you convert adenine to hypoxanthene ? 2½

OR

Establish the structure of Citral. 10

6. Explain briefly the application of following methods in elucidating the structure of Alkaloid.
- i) Hofmann exhaustive methylation method. 5
- ii) Herzog Meyer method. 5

OR

- a) What are essential amino acids ? Give two examples. 1+1
- b) Discuss Gabriel phthalimide synthesis for preparation of amino acids. 4
- c) Write a note on 'end group analysis'. 4

**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) The boiling point of the thioalcohols are less than that of alcohols. Explain. 2
- b) Predict the product :  

$$2\text{CH}_3\text{CH}_2\text{SH} + \text{CH}_3\text{CHO} \xrightarrow{\text{H}^+} ? \quad 2$$
- c) What is Gilman reagent ? Give a reaction where it is used. 2
- d)  $\text{CH}_3\text{MgBr}$  reacts with  $\text{CO}_2$  to produce acetic acid while  $\text{CH}_3\text{Li}$  reacts with  $\text{CO}_2$  to produce acetone. Explain. 4

OR

- e) How is malonic ester prepared ? 2½
- f) Starting from malonic ester, how will you synthesize the following compounds ? 2½ × 3
- i) Crotonic acid
- ii) Isobutane
- iii) a heterocyclic compound.

[ 2 ]

2. a) Establish the open chain structure of D(+)-glucose. 5
- b) What is osazone ? Discuss the mechanism of osazone formation. Explain why osazone formation involves only C<sub>1</sub> and C<sub>2</sub> of both glucose and fructose. 1+2+2

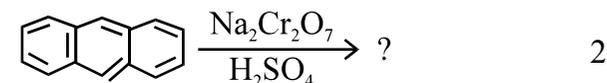
OR

- c) How will you convert glucose to fructose and vice versa ? 4
- d) Unlike-Ketone, fructose being a Keto-hexose give positive test for Tollen's reagent. Explain. 4
- e) Write the mechanism of mutarotation. 2
3. a) Discuss how furan is prepared from 1, 4-dicarbonyl compound. 2
- b) What happens when Quinoline is treated with
- Br<sub>2</sub>
  - NaNH<sub>2</sub>
  - Alkaline KMnO<sub>4</sub> ? 2 × 3
- c) Explain why five membered heterocycles are aromatic in nature. 2

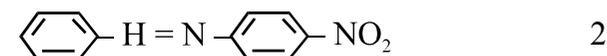
OR

[ 3 ]

- d) Elucidate the structure of anthracene. 5
- e) Justify why electrophilic substitutions in anthracene occur at C<sub>9</sub> preferably. 3
- f) Predict the product



4. a) Discuss how methyl orange is synthesised. Explain why it gives pink colouration in acid medium. 2+2
- b) To which class of dyes malachite green belongs ? Write the structure and application of malachite green. 1+2+1
- c) Identify chromophores/auxochrome in the compound.



OR

- d) Explain the modern theory of colour and constitution with suitable examples, that explains the relationship between colour and structure of compound. 6
- e) Discuss 'bathochromic shift' and 'hypsochromic shift' with examples. 4

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks  
 Answer **all** questions from Group-A and any **one** Section  
 from Group-B selecting either {(a), (b)} or {(c), (d)}  
 from each questions

*The symbols used have their usual meaning*

**GROUP - A***(Differential Equation)*

1. a) Find the power series solution of the equation

$$(x^2 + 1)y'' + xy' + xy = 0. \quad 5$$

- b) Show that  $J_{\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}} \sin x.$  5

OR

- c) If  $P_n$  is the Legendre polynomial of degree n, then show that

$$\int_{-1}^1 P_m(x) \cdot P_n(x) \cdot dx = 0 \text{ if } m \neq n. \quad 5$$

[ 2 ]

- d) If  $H_n(x)$  is the Hermite polynomial of degree  $n$ , then show that

$$e^{2xt-t^2} = \sum_{n=0}^{\infty} \frac{H_n(x)}{(n)!} t^n.$$

for all integral values of  $n$  and real values of  $x$ . 5

2. a) Solve :

$$\frac{dx}{x(y^2+z)} = \frac{dy}{-y(x^2+z)} = \frac{dz}{(x^2-y^2)z}. \quad 5$$

- b) Solve the equation

$$(x^2z - y^3)dx + 3xy^2dy + x^3dz = 0. \quad 5$$

OR

- c) Solve :  $\frac{dx}{z(x+y)} = \frac{dy}{z(x-y)} = \frac{dz}{x^2+y^2}$ . 5

- d) Verify that the following equation is integrable and find its primitive : 5

$$yz(y+z)dx + zx(z+x)dy + xy(x+y)dz = 0.$$

3. a) Form a partial differential equation by eliminating the function of  $f$  and  $g$  from

$$z = f(xy) + g\left(\frac{x}{y}\right). \quad 5$$

[ 3 ]

- b) Find the complete integral of the equation

$$p = (qy + z)^2. \quad 5$$

OR

- c) Find the general integral of the P.D.E.

$$\cos(x+y)p + \sin(x+y)q = z. \quad 5$$

- d) Find the complete integral of the equation

$$p^3 + q^3 = 3pqz. \quad 5$$

4. a) Solve  $(D^2 - DD' - 6D'^2)z = xy$ . 5

- b) Solve  $2xr - ys + 2p = 4xy^2$ . 5

OR

- c) Solve  $q^2r - 2pqs + p^2t = 0$  by Monge's method. 5

- d) Solve  $(D - 3D')^2 (D + 3D')z = e^{3x+y}$ . 5

## GROUP - B

### Section - I

(Number Theory)

5. a) Prove that given integers  $a$  and  $b$ , not both zero, there exist integers  $x$  and  $y$  such that

$$\gcd(a, b) = ax + by \quad 5$$

[ 4 ]

b) Solve the Diophantine equation

$$54x + 21y = 906 \quad 5$$

OR

c) If  $P_n$  is the  $n$ th prime number then prove that

$$P_n \leq 2^{2^{n-1}}. \quad 5$$

d) Solve the equation  $17x \equiv 9 \pmod{276}$ . 5

6. a) Prove that the Mobius function is a multiplicative function. 5

b) If  $n = P_1^{k_1} P_2^{k_2} \dots P_r^{k_r}$  is the prime factorization of  $n > 1$ , then prove that the positive divisors  $n$  are those integers  $d$  of the form. 5

$$d = P_1^{a_1} \cdot P_2^{a_2} \dots P_r^{a_r}$$

where  $0 \leq a_i \leq k_i$  ( $i=1, 2, \dots, r$ ).

OR

c) Prove that for each positive integer  $n$ ,  
 $\mu(n) \mu(n+1) \mu(n+2) \mu(n+3) = 0$ . 5

d) Determine the highest power of 5 dividing  $\underline{50}$ . 5

[ 5 ]

7. a) If the integer  $a$  has order  $k$  modulo  $n$ , prove that  $a^h \equiv 1 \pmod{n}$  if and only if  $k|h$ . 5

b) Prove that there are infinitely many primes of the form  $4k+1$ . 5

OR

c) Solve  $x^2 \equiv 23 \pmod{7^2}$ . 5

d) Prove that for  $k \geq 3$ , the integer  $2^k$  has no primitive roots. 5

8. a) If  $m \geq 1, n \geq 1$  and  $m = qn + r$  then prove that  $\gcd(u_m, u_n) = \gcd(u_r, u_n)$ . 5

b) Solve the equation  $172x + 20y = 1000$  using simple continued fraction. 5

OR

c) Prove that for a prime  $P > 5$ , either  $P \mid u_{p-1}$  or  $P \mid u_{p+1}$ , but not both. 5

d) Evaluate the infinite simple continued fraction  $[3; \overline{6, 1, 4}]$ . 5

[ 6 ]

**Section - II**  
(Differential Geometry)

9. For the curve  $x = a(3u - u^3)$ ,  $y = 3au^2$ ,  $z = a(3u + u^3)$ , show that

$$\tau = \frac{1}{3a(1+u^2)^2}. \quad 8$$

OR

Derive a formula for unit binormal to the evolute of a given curve. 8

10. Prove that the envelope for the plane

$$(u - v)x + (1 + uv)y + (1 - uv)z = u + v$$

where  $u$  and  $v$  are parameters is the hyperboloid  $x^2 + y^2 - z^2 = 1$ . 8

OR

Find the edge of regression of the envelope of the family of planes  $x \sin\theta - y \cos\theta + z = a\theta$ , being the parameter. 8

[ 7 ]

11. If  $\psi$  is the angle between the two directions given by  $P du^2 + Q dudv + R dv^2 = 0$ , then show that

$$\tan \psi = \frac{H\sqrt{Q^2 - 4PR}}{ER - FQ + GP} \quad 8$$

OR

Find the fundamental magnitudes of first and second order for the surface

$$x = a(u + v), \quad y = u - v, \quad z = uv. \quad 8$$

12. Find the principal curvatures and the lines of curvature on the right helicoid

$$x = u \cos\phi, \quad y = u \sin\phi, \quad z = c\phi. \quad 8$$

OR

Show that the asymptotic lines of the hyperboloid  $x = a \cos u \sec v$ ,  $y = b \sin u \sec v$ ,  $z = c \tan v$  are given by  $u \pm v = \text{constant}$ . 8

13. Find the equation to the geodesic on the helicoid. 8

$$x = u \cos v, \quad y = u \sin v, \quad z = av. \quad 8$$

OR

Find the torsion of a geodesic and show that it vanishes in the principal direction. 8

ग) यतिं देवः प्रवता यात्युद्धता  
याति शुभ्राश्यां यजतो हरिभ्याम् ।  
आ देवो याति सविता परावतो-  
ऽप विश्वा दुरिता वाधमानः ॥

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

3. इन्द्रस्य सवितुः वा स्वरूपमालोचयत । 12
4. ऋग्वेदे वर्णितानां सम्वादसूक्तानां आलोचनां कुरुत । 15  
अथवा  
यजुर्वेदस्य महत्वं आलोचयत ।
5. द्वयोः टिप्पणी प्रदेया : 5 × 2  
इशोपनिषद्, निरुक्तम्, ऋग्वेदस्य शाखा, शतपथ ब्राह्मणः ।
6. सूत्र त्रयं सोदाहरणं व्याख्यात : 5 × 3  
क) छनृसिपरेऽपि  
ख) इतश्चलोप परस्मैपदीषु  
ग) चतुर्थर्थे बहुलं छन्दसि  
घ) इदन्तो मसि  
ङ) आज्ञसेरसुक ।

1. ऋषिच्छन्दोदेवता निर्देशपुरःसरं मन्त्रद्वयं व्याख्यात : 8 × 2  
क) अग्निर्होता कविक्रतुः सत्यश्चित्रश्रवस्तमः ।  
देवो देवेभिरागमत् ॥  
ख) सह वामेन न उषो व्युच्छा दुहितर्दिवः ।  
सह द्युम्नेन वृहता विभावरि राया देवि दास्वती ॥  
ग) पुरुष एवेदं सर्वं युदूतं यच्च भाव्यम् ।  
उतामृतत्वस्येशानो यदन्नेनातिरोहति ॥
2. उत्कलभाषया आङ्गलभाषया वा मन्त्रद्वयस्य अनुवादः कार्यः 6 × 2  
क) सुषारथिरश्वानिव यन्मनुष्या-  
न्नेनीयतेऽभिशभिर्वाजिन इव ।  
हृत्प्रतिष्ठं यदजिरं जविष्ठं  
तन्मे मनःशिवसंकल्पमस्तु ॥  
ख) यः पृथिवीं व्यथमानमदृह-  
हाः पर्वतान्प्रकुपितां अरम्णात् ।  
यो अन्तरिक्षं विममे वरीयो  
यो द्यामस्तश्चात्स जनास् इन्दः ॥

[ 2 ]

VI-UG-ODI(H)-VII

୪. ସମାଲୋଚନା ସାହିତ୍ୟର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ ଉପରେ ଆଲୋଚନା କର ।

ଅଥବା

ସ୍ୱାଧୀନତା-ପରବର୍ତ୍ତୀ ସମାଲୋଚନା ସାହିତ୍ୟର ବିକାଶଧାରା ବିଶ୍ଳେଷଣ କର ।

୫. ତୁଳନାତ୍ମକ ସାହିତ୍ୟର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ ସଂପର୍କରେ ଆଲୋଚନା କର ।

ଅଥବା

ତୁଳନାତ୍ମକ ସାହିତ୍ୟର ପ୍ରକାରଭେଦ ସଂପର୍କରେ ଆଲୋଚନା କର ।

V-55-0.5



2015

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

୧. ରସରପ୍ରକାରଭେଦ ଦର୍ଶାଇ ପ୍ରାଚୀନ ସାହିତ୍ୟରେ କରୁଣ ରସର କିପରି ପ୍ରୟୋଗ ଘଟିଛି, ଆଲୋଚନା କର ।

ଅଥବା

ରୀତିକୁ କାବ୍ୟର ଆତ୍ମା କହିବା କେତେଦୂର ଯୁକ୍ତିଯୁକ୍ତ, ଉଦାହରଣ ସହ ଆଲୋଚନା କର ।

୨. ଧ୍ୱନିର ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ ଦର୍ଶାଅ ।

ଅଥବା

କାବ୍ୟ ରଚନାରେ ବକ୍ତୃତ୍ୱର ଗୁରୁତ୍ୱ ବିଚାର କର ।

୩. ଓଡ଼ିଆ କାବ୍ୟ କବିତାରେ ରୋମାଞ୍ଚିକିମ୍ପର ଧାରା ସଂପର୍କରେ ଆଲୋଚନା କର ।

ଅଥବା

ପ୍ରତୀକ ପ୍ରୟୋଗ ଦ୍ୱାରା ଆଧୁନିକ କବିତା କିପରି ଭାବଗର୍ଭକ ହୋଇଛି, ଉଦାହରଣ ସହ ଆଲୋଚନା କର ।

V-55

[Turn Over

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. हिन्दीसाहित्य के इतिहास में विभिन्न कालों के नामकरण की सार्थकता पर चर्चा कीजिए । 13

अथवा

आदिकालीन साहित्य की प्रमुख प्रवृत्तियों का परिचय दीजिए ।

2. भक्ति काल की पृष्ठभूमि की चर्चा कीजिए । 13

अथवा

रीतिकालीन साहित्य की प्रमुख प्रवृत्तियों की चर्चा कीजिए ।

3. आधुनिक काल के उदय में भारतेन्दु युगीन हिन्दी साहित्य की भूमिका स्पष्ट कीजिए । 13

अथवा

छायावाद की प्रमुख प्रवृत्तियों की चर्चा कीजिए ।

4. हिन्दी उपन्यास *अथवा* निबंध के उदभव और विकास की चर्चा कीजिए । 13

[ 2 ]

5. निम्न प्रश्नों के संक्षिप्त उत्तर लिखिए : 5 × 4

क) पृथ्वीराज रासो की प्रमाणिकता ।

अथवा

हिन्दी के विकास में अपभ्रंश का योगदान ।

ख) निर्गुण काव्य की प्रमुख मान्यताएँ ।

अथवा

‘भ्रमरगीत’ की विशेषताएँ ।

ग) खड़ी बोली हिन्दी के विकास में द्विवेदी युग की भूमिका ।

अथवा

प्रगतिवाद कहने से आप क्या समझते हैं ?

घ) हिन्दी के राजनैतिक अथवा ऐतिहासिक उपन्यासों का परिचय दीजिए ।

अथवा

नुकड़ नाटक कहने से आप क्या समझते हैं ?

6. निम्न प्रश्नों के वस्तुनिष्ठ उत्तर लिखिए : (किन्हीं **आठ** के) 1 × 8

क) आदिकाल का नाम वीरगाथाकाल किसने दिया था ?

ख) मुसलमान भारत न भी आए होते तो भक्तिकाल का बारह आना साहित्य ऐसा ही होता - किसने कहा था ?

[ 3 ]

ग) चंदायन किस सूफी कवि की रचना है ?

घ) विनयपत्रिका के कवि का नाम लिखिए ।

ङ) रीतिकालीन कविता अधिकांशतः किस छन्द में लिखी गयी है ?

च) ‘अँधेर नगरी’ किसकी रचना है ?

छ) ‘सरस्वती’ पत्रिका के सम्पादक कौन थे ?

ज) ‘हँस’ पत्रिका के प्रथम सम्पादक का नाम लिखिए ?

झ) मोहन राकेश के एक नाटक का नाम लिखिए ?

ञ) ‘क्या भूलूँ क्या याद करूँ’ किसकी आत्मकथा है ?

V-57-0.3

□□

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. X is a company in which the public are substantially interested. It closes its accounts on 31st March every year. During the current year, it derived the following income :
  - i) Profit from manufacturing unit at Mumbai ₹3,20,000.
  - ii) Profit from trading activities at Mumbai ₹1,00,000.
  - iii) Interest on debenture issued by another company ₹25,000 (Gross)
  - iv) Dividend from foreign company ₹10,000.
  - v) Profit from an approved hotel (started in February 2002) at Kolkata ₹2,10,500. Capital employed being ₹15,00,000 and normal depreciation

[ 2 ]

₹60,000 has not been charged in the calculation of above profit. Company received royalty of ₹2,10,000 from a foreign country.

vi) Brought forward unabsorbed depreciation ₹39,000.

vii) Book profits as per section 115JB is ₹25,00,000.

Calculate total income and tax of the company. 14

OR

Write notes on any *two* of the following : 7 × 2

i) Deduction u/s 80G for donation.

ii) Deduction u/s 80IA for profits from new infrastructure undertaking.

iii) Provisions of set off and carry forward of losses of companies (with hypothetical example).

2. State the circumstances in which a claim for refund of tax may arise. Describe briefly the procedure of claiming a refund. 13

OR

Write a note on Settlement Commission and its power. 13

[ 3 ]

3. State and explain the provision of the Customs Act which relate to grant of exemption from duty. 13

OR

Distinguish between 'drawback' and 'refund'. Under what circumstances may the export duty be refunded ? 6+7

V-95-1



Write short notes on the following :

- a) Termination of an agent's appointment
- b) Unfair practices of the agents.

4. Discuss in details the functions of an agent.

OR

Write short notes on the following :

- a) Procedure regarding settlement of policy claims
- b) Proposal form.

5. Narrate the organisational set up and various departments of an insurance organisation.

OR

Write short notes on the following :

- a) Actuarial Profession
- b) Distribution Channel.

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Define Insurance. Discuss the purpose and importance of Insurance.

OR

Define Agent. State in details the agent's regulations.

2. What do you mean by Fire Insurance ? Describe the various kinds of Fire Insurance Policies.

OR

Describe the features of Life Insurance contract with reference to :

- a) Insurable Interest
- b) Utmost Good Faith.

3. Explain in detail, about the pre-requisite of obtaining a license to be an agent.

OR

[ 2 ]

VI-UG-Com(H)-IX (IM)

Write notes on the following :

- a) Method of international price quotation
- b) Payment terms.

4. Write notes on the following :

- a) Advertising
- b) Trade fairs and exhibitions.

OR

Discuss the selection and appointment of foreign sales agents.

5. Write short notes on the following :

- a) EXIM Policy
- b) Export Documentation.

OR

Write short notes on the following :

- a) Export Procedures
- b) Export Pricing.

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Define international marketing and discuss its nature and scope.

OR

Discuss the procedure of identifying and selecting foreign market.

2. Write an essay on "Product Designing".

OR

Write short notes on the following :

- a) Packaging
- b) After sale services.

3. Discuss the factors influencing international price and discuss the pricing process.

OR

IV-PG-Pol.Sc-XVI

2015

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Discuss Hegel's concept of State. 12

OR

Explain Marx's doctrine of class struggle.

2. Critically examine Gandhi's views on modern civilization. 12

OR

Examine the key elements in political thought of Mao Tse Tung.

3. Write notes on any *two* of the following : 8 × 2

- i) Hegel's views on Freedom
- ii) Cultural Revolution (Mao).
- iii) Gandhi as an anarchist
- iv) Surplus value (Karl Marx)



IV-PG-ODI-XVI

2015

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

୧. ଶବ୍ଦତତ୍ତ୍ୱର ପରିଚୟ ପ୍ରଦାନ କରି ଶବ୍ଦଭଣ୍ଡାର ପରିବର୍ତ୍ତନର ବିଭିନ୍ନ କାରଣମାନ ଉଲ୍ଲେଖ କର । ୧୬

ଅଥବା

ରୂପତତ୍ତ୍ୱର ସାଧାରଣ ପରିଚୟ ଦେଇ ରୂପିନ ଚିହ୍ନିତ କରିବାର ପ୍ରଣାଳୀ ଉପରେ ଆଲୋଚନା କର ।

୨. ବର୍ତ୍ତମାନ ଓ ସମକାଳୀନ ଭାଷା ବିଜ୍ଞାନ ସଂପର୍କରେ ଆଲୋଚନା କର । ୧୬

ଅଥବା

ଓଡ଼ିଆ ଭାଷା ଚର୍ଚ୍ଚା କ୍ଷେତ୍ରରେ ନୀଳକଣ୍ଠ ଦାସ ଓ ଗୋପୀନାଥ ନନ୍ଦଙ୍କ ଅବଦାନ ସଂପର୍କରେ ଆଲୋଚନା କର ।

୩. ଯେ କୌଣସି *ଦୁଇଟି* ସଂକ୍ଷିପ୍ତ ଚିହ୍ନଟି ଲେଖ : ୪ × ୨

- କ) ବାକ୍ୟର ଲକ୍ଷଣ
- ଖ) ତୁଳନାତ୍ମକ ଭାଷା ବିଜ୍ଞାନ
- ଗ) ବର୍ତ୍ତମାନ ଭାଷା ବିଜ୍ଞାନ
- ଘ) ସୁନୀତି କୁମାର ଚାଟାର୍ଜୀ ।



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Answer briefly any *two* of the following :
  - a) Discuss five of the oldest and most common theories of how language began.
  - b) Discuss the major morphological features of Old English.
  - c) Write a note on the major phonological changes that occurred between Old English and Middle English.
  - d) How did vocabulary change between Early Modern English and Late Modern English ?
  
2. Answer briefly any *two* of the following :
  - a) How does morphology form a core part of linguistics today ?

[ 2 ]

- b) i) What is the difference between pure vowels and diphthongs ?
- ii) Write the phonemic transcription of any five :  
apple, beautiful, picture, shower, ring, trouble, junction.
- c) How is verb expressed in terms of tense-modality-aspect ?
- d) What is semantics ? Discuss the difference between literal and figurative meaning of an expression.
3. Briefly discuss any *four* of the following critical concepts :
- a) Archetype
- b) Conceit
- c) Catharsis
- d) Dystopia
- e) international fallacy
- f) fancy and imagination.

[ 3 ]

4. Answer any *four* of the following :
- a) How does a Formalist critic approach a literary text ?
- b) How is the theory of Deconstruction different from Formalism ?
- c) Discuss basic issues facing Modern Feminism.
- d) What are the important features of modernist literary criticism ?
- e) What are the influences on Structuralism ?
- f) Discuss the main issues that Postcolonialism addresses.

- d) Let  $S_n^2$  denote the variance of a random sample of size  $n$  from a distribution that is  $n(\mu, \sigma^2)$ . Prove that  $nS_n^2/(n-1)$  converges stochastically to  $\sigma^2$ . 4
5. a) Let  $X_1, X_2, \dots, X_n$  be a random sample from the distribution having p.d.f.  
 $f(x; \theta_1, \theta_2) = (1/\theta_2)e^{-(x-\theta_1)/\theta_2}$ ,  $\theta_1 \leq x < \infty$ ,  
 $-\infty < \theta_1 < \infty$ ,  $0 < \theta_2 < \infty$ , zero elsewhere.  
 Find the maximum likelihood estimates of  $\theta_1$  and  $\theta_2$ . 4
- b) Let  $Y$  be  $b(300, p)$ . If the observed value of  $Y$  is  $y = 75$ , find an approximate 90 per cent confidence interval for  $p$ . 4

OR

- c) If 8.6, 7.9, 8.3, 6.4, 8.4, 9.8, 7.2, 7.8, 7.5 are the observed values of a random sample of size 9 from a distribution that is  $n(8, \sigma^2)$ , construct a 90 percent confidence interval for  $\sigma^2$ . 4
- d) Let  $\bar{X}$  and  $\bar{Y}$  be the means of two independent random samples, each of size  $n$ , from the respective distributions  $n(\mu_1, \sigma^2)$  and  $n(\mu_2, \sigma^2)$ , where the common variance is known. Find  $n$  such that 4  
 $\Pr(\bar{X} - \bar{Y} - \sigma/5 < \mu_1 - \mu_2 < \bar{X} - \bar{Y} + \sigma/5) = 0.90$

2015

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions selecting either {(a),(b)}**or** {(c),(d)} from each question.

1. a) Compute the measures of Skewness and Kurtosis of the binomial distribution  $b(n, p)$ . 4
- b) Let  $X$  and  $Y$  have the joint p.d.f.  
 $f(x, y) = e^{-2} [x! (y-x)!]$ ,  $y = 0, 1, 2, \dots, j$   
 $x = 0, 1, \dots, y$ , zero else where.

Compute the means, the variances and the correlation coefficient of  $X$  and  $Y$ . 4

OR

- c) The moment-generating function of a random variable  $X$  is  $e^4(e^t - 1)$ . Show that  
 $\Pr(\mu - 2\sigma < X < \mu + 2\sigma) = 0.931$ . 4
- d) If  $x = r$  is the unique mode of distribution that is  $b(n, p)$ , show that  
 $(n+1)p - 1 < r < (n+1)p$ . 4

[ 2 ]

2. a) Compute the measures of skewness and Kurtosis of a gamma distribution with parameters  $\alpha$  and  $\beta$ . 4
- b) If  $X$  has the moment-generating function  $M(t) = e^{2t + 232t^2}$ , then show that  $X$  has a normal distribution with  $\mu = 2$ ,  $\sigma^2 = 64$ . 4

OR

- c) If the random variable  $X$  is  $n(\mu, \sigma^2)$ ,  $\sigma^2 > 0$ , then show that the random variable  $V = (X - \mu)^2 / \sigma^2$  is  $\chi^2(1)$ . 4
- d) Let  $X$  and  $Y$  have a bivariate normal distribution with parameters  $\mu_1 = 3$ ,  $\mu_2 = 1$ ,  $\sigma_1^2 = 16$ ,  $\sigma_2^2 = 25$  and  $\rho = 3/5$ . Determine the following probabilities : 4
- i)  $\Pr(3 < Y < 8)$ .
- ii)  $\Pr(-3 < X < 3 \mid y = -4)$ .

3. a) Let  $X_1$  and  $X_2$  denote a random sample of size 2 from a distribution that is  $n(0, 1)$ . Find the p.d.f. of  $Y = X_1^2 + X_2^2$ . 4
- b) Let  $F$  have an  $F$  distribution with parameter  $r_1$  and  $r_2$ . Prove that  $1/F$  has an  $F$  distribution with parameters  $r_2$  and  $r_1$ . 4

OR

[ 3 ]

- c) Let  $X$  have the p.d.f.  $f(x) = \left(\frac{1}{2}\right)^x$ ,  $x = 1, 2, 3, \dots$ , zero else where. Find the p.d.f. of  $Y = X^3$ . 4
- d) Let  $X_1, X_2, X_3$  denote a random sample from a normal distribution  $n(0,1)$ . Let the random variables  $Y_1, Y_2, Y_3$  be defined by  $X_1 + Y_1 \cos Y_2 \sin Y_3, X_2 = Y_1 \sin Y_2 \sin Y_3, X_3 = Y_1 \cos Y_3$ , where  $0 \leq Y_1 < \infty, 0 \leq Y_2 < 2\pi, 0 \leq Y_3 \leq \pi$ . Show that  $Y_1, Y_2, Y_3$  are mutually stochastically independent. 4

4. a) Let  $X_1, X_2, \dots, X_n$  be a random sample of size  $n$  from a distribution which is  $n(\mu, \sigma^2)$ , where  $\mu > 0$ . Show that the sum  $Z_n = \sum_{i=1}^n X_i$  does not have a limiting distribution. 4
- b) Let  $Y$  be  $b\left(400, \frac{1}{5}\right)$ . Compute an approximate value of  $\Pr(0.25 < Y/n)$ . 4

OR

- c) Let  $Z_n$  be  $\chi^2(n)$  and let  $W_n = Z_n/n^2$ . Find the limiting distribution of  $W_n$ . 4

'Choice of technique is a difficult task before the planning authority in a developing country'. Discuss.

4. Explain the Singer-Prebisch hypothesis. On the secular deterioration of the terms of trade of the less developed countries. On what grounds the hypothesis has been criticised ?

OR

Make an assessment of the need for planning in the post-reform period. Do you think that "Planning has outlived its utility" ? Give reasons.

5. Explain briefly different methods of measuring environmental values.

OR

Explain the concepts of (a) Carrying capacity (b) Intergenerational equity related to sustainable development.

**2015**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Bring out the distinction between economic growth and economic development. What factors contribute to economic development ?

OR

Distinguish between 'Balanced Growth' and 'Unbalanced Growth'. Which of two will you prefer for the development of an underdeveloped country like India ?

2. Critically examine Schumpeterian theory of economic development.

OR

Examine the classical theory of economic development.

3. What is meant by Sustainable development ? Explain the problem of sustainable development in agriculture in the context of application of new technology.

OR

4. Discuss the meaning of class and define the Marxian theory of class.

OR

Critically analyse the place of Tribes in politics.

5. Define Political Socialisation and discuss various agencies of Political Socialisation.

OR

Discuss the various theories of social change.

V-52-1



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Discuss the nature and scope of Political Sociology.

OR

Briefly explain modern approaches to the study of Political Sociology.

2. Define how input-output model works in a political system.

OR

Explain how the communication model is functioning in a political system.

3. Discuss the elite theory of power.

OR

Power, Authority and Legitimacy are interrelated.  
–Discuss.

4. Discuss the consequences of British Conquest of Odisha in 1803.

OR

Discuss the causes and consequences of the Paik RSebellian of 1817.

5. Evaluate the role played by Madhusudan Das in the National Movement in Odisha.

OR

Assess the role of Maharaja Krishna Chandra Gajapati of Paralakhemundi in the process of the creation of separate province of Odisha.

V-51-0.5



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Discuss the career and achievements of Kharavela of Kalinga as depicted in the Hatigumpha inscription.

OR

Estimate the achievements of Subhakaradeva I, as the founder of Bhaumakara dynasty.

2. Discuss the achievements of Ananga Bhima Deva III from 1211-1238 AD.

OR

Write a note on the achievements of Kapilendradeva as an empire builder.

3. Discuss the main features of Mughal administration in Odisha.

OR

Discuss the causes responsible for the Anglo-Maratha Conflict in Odisha.

Describe the concept of Ethics of Gandhi by his five vows or virtues.

4. What is realistic Advaita of Sri Aurobindo ? Explain.

OR

Give an account of Ethics in the field of pleasure and pain, good and evil in Aurobindo's philosophy.

5. Discuss universal Being as the Reality of Dr. S. Radhakrishnan.

OR

How darshana has played the role in the religion of Dr. S. Radhakrishnan ? Explain.

V-53-0.5



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Give the brief picture of Saccidananda after Rabindranath Tagore.

OR

Discuss Tagore's concept of Ethics in his philosophical system.

2. State and explain the dualistic concept of God in Vivekananda's Philosophy.

OR

Give an account of modern theories of religion in the philosophy of Vivekananda.

3. State and explain what is religion and mention the salient features of Gandhi's views on the nature of religion.

OR

[ 2 ]

VI-UG-Soc(H)-VII

4. Examine the causes of domestic violence.

OR

Discuss the effects of divorce in India.

5. Critically examine the causes of poverty in contemporary India.

OR

Define child labour and suggest remedial measures to prevent child labour in India.

V-54-0.3



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Define family disorganisation and discuss its causes.

OR

Discuss the relationship between personal disorganisation and social disorganisation.

2. Discuss briefly the various theories of social disorganisation.

OR

Critically examine Durkheim's theory on social disorganisation.

3. Define delinquency and suggest remedial measures to prevent delinquency.

OR

Define crime and discuss its causes.

V-54

[Turn Over

- a) What is an ideal Basegas ? Derive Planck's radiation formula using the concept of photons and find an expression for specific heat. 2+6+4
- b) What is Bose-Einstein condensation ? 4
3. Explain what is phase transition ? Give an account of the theory of phase transition of second kind. 2+10

OR

- a) How is the order of a phase transition determined from the derivative of Gibb's potential ? 4
- b) Discuss the symmetry changes in a system during phase transition of second kind. 8

V-93-0.3

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) State the postulates of classical statistical mechanics. 4
- b) What is the difference between micro-canonical, canonical and grand canonical ensemble. Show that the grand canonical ensemble is equivalent to canonical ensemble. 3+5

OR

Define partition function. Find out the ideal gas equation for an ideal gas in the light of canonical ensemble. 2+10

2. a) What is density matrix ? Illustrate its use with an example. 4
- b) Obtain the equation of state for Ideal fermi gas. 12

OR

4. Examine various determinants of curriculum. 10

OR

What is meant by curriculum? Differentiate between the curriculum and syllabus. 2 + 8

5. Explain various methods of organisation of syllabus in schools. 10

OR

Write a detailed note on life centred curriculum. 10

6. Explain curriculum framework at secondary level of education. 10

OR

Make a critical analysis of curriculum at the school stage.

V-59-0.5



**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Define guidance. Discuss its nature and scope. 2+4+4

OR

Describe the needs and importance of educational guidance services in schools. 5 + 5

2. Discuss the purpose and functions of vocational guidance. 5 + 5

OR

Explain the meaning and purpose of job analysis. 5+5

3. Describe the personal and professional qualities of a good counsellor. 5 + 5

OR

Narrate various techniques of counselling. 10

Who is a Leader ? Citing suitable examples describe the functions of a leader.

4. Distinguish between Self Concept and Self-Esteem. Explain how self-esteem can be boosted.

OR

Discuss the situational factors involved in prosocial behaviour and describe the relationship between emotion and prosocial behaviour.

5. What is Prejudice ? Suggest Plans and Actions to reduce Social Prejudices.

OR

What is Friendship ? Citing relevant examples, discuss how close Acquaintances lead to friendship.

V-60-0.5



**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Define Social Psychology. Discuss the nature and scope of Social Psychology.

OR

Describe the Experimental and Correlational methods of studying Social Psychology. Point out their merits and limitations.

2. What is Attitude ? Describe the role of Learning and Experiences in the formation of social attitudes.

OR

Can Attitudes be changed ? Suggest various techniques of attitude change.

3. What do you mean by Group-Mind ? Discuss the properties of a group.

OR

V-60

[Turn Over

5102

08 - skra MUF

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- b) The primitive translation vectors of the hexagonal space lattice may be taken as

$$\vec{a} = \left(\frac{\sqrt{3}a}{2}\right)\hat{i} + \left(\frac{a}{2}\right)\hat{j}, \quad \vec{b} = -\left(\frac{\sqrt{3}a}{2}\right)\hat{i} + \left(\frac{a}{2}\right)\hat{j}, \quad \vec{c} = c\hat{k}$$

Determine the primitive translation vectors of the reciprocal lattice. Show that the lattice is its own reciprocal lattice, but with a rotation of axes. 6

5. Discuss the formation of allowed and forbidden energy bands on the basis of Kronig-Penney model. 12

OR

Derive an expression for the binding energy of an inert gas crystal. Hence calculate the value of cohesive energy for crystals of inert gases. 10+2

**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. What are matter waves ? Describe, with necessary theory, the Davisson-Germer experiment for confirmation of matter waves.

Why is the wave-like nature of matter not apparent in our daily experience ? 2+8+2

OR

State and explain Heisenberg uncertainty principle. Describe a thought experiment to demonstrate this principle. Show that the existence of electrons within the atomic nucleus is not consistent with the uncertainty principle. 3+5+4

2. a) Derive time dependent Schrodinger equation in the momentum space. 7

[ 2 ]

b) Show that  $\langle p \rangle^2 \neq \langle p^2 \rangle$  for the wave function

$$\psi(x) = \left(\frac{2}{L}\right)^{1/2} \sin \frac{\pi x}{L} \text{ in the region } 0 < x < L$$

and  $\psi(x) = 0$  outside this region. 5

OR

a) State Ehrenfest theorem and establish the

$$\text{relation } \frac{d}{dt} \langle x \rangle = \frac{\langle p_x \rangle}{m}. \quad 5$$

b) If  $\hat{A}$  and  $\hat{B}$  are Hermitian operators, show that  $\hat{A} + i\hat{B}$  and  $\hat{A} - i\hat{B}$  are not Hermitian. 4

c) Prove that the product of two Hermitian operators is Hermitian if and only if they commute. 3

3. Set up the Schrodinger equation for a particle in a one dimensional square well of finite depth. Solve the equation graphically. Show that there exist at least one bound state irrespective of the depth and width of the well. 12

OR

[ 3 ]

Set up the time independent Schrodinger equation for a particle in a one dimensional box. Hence obtain the energy eigenvalues and eigenfunctions. Plot the wave function and probability density for the ground state and next two excited states. 12

4. a) Show that the interplanar spacing in a cubic lattice is

$$d = \frac{a}{(h^2 + k^2 + l^2)^{1/2}}$$

where the symbols carry usual meaning. 6

b) Draw the schematic diagram for a body centered cubic lattice showing its primitive translation vectors. Find the volume of the primitive cell in terms of the lattice parameters of its conventional unit cell and hence calculate its packing fraction. 6

OR

a) Show that Bragg's law in vector form is expressed as

$$2\vec{k} \cdot \vec{G} + G^2 = 0$$

Where  $\vec{G}$  is the reciprocal lattice vector and  $\vec{k}$  is the wave vector. 6

3. What are the various reasons of anomalous secondary growth ? Describe the mode of secondary growth in the stem of *Bignonia*.

OR

Write notes on the following :

- Ventilating Tissue system
  - Structure of intercellular Air spaces.
4. Give an illustrated account of the process of microsporogenesis in Angiosperms.

OR

Write notes on the following :

- Tetrasporic embryo sac
  - Development of ovule.
5. State in detail the structure and the development of different types of endosperms you have studied.

OR

Write notes on the following :

- Polyembryony
- Totipotency.

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Give diagram wherever necessary*

1. Explain the different theories regarding the organization of shoot apex.

OR

Write notes on the following :

- Apical meristem
- Meristematic Tissue System.

2. What are mechanical tissues ? Explain the principles involved in organization of mechanical tissues.

OR

Write notes on the following :

- Conducting Tissues
- Organization of vascular bundles.

[ 2 ]

VI-UG-Zool(H)-XIII

3. Give an account of development of chick up to 3 germ layers.

OR

Write notes on any *two* of the following :

- Structure of spermatozoan
  - Oogenesis
  - Parthenogenesis.
4. What is the fate map. Describe different methods of fate map construction.

OR

Write notes on any *two* of the following :

- Speman's theory of organisers
  - Nuclear transplantation
  - Stem cells.
5. Describe the structure and reproduction of bacteriophages.

OR

Write notes on any *two* of the following :

- Reproduction in Bacteria
- Microbial diversity
- Industrial microbiology.

2015

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Give diagram wherever necessar*

1. Describe the role of light as an ecological factor. Also add a note about Photoperiodism.

OR

Write notes on any *two* of the following :

- Scope of ecology
  - Biotic component
  - Different kinds of ecological pyramids.
2. What is population ? Describe its different characteristics with suitable examples.

OR

Write notes on any *two* of the following :

- Population growth forms
- Survivorship curves
- Environmental resistance.

- c) Prove the Fuzzy DeMorgan Laws 6
- i)  $(A \wedge B)^c = (A^c \vee B^c)$
- ii)  $(A \vee B)^c = (A^c \wedge B^c)$
- d) Write short notes on the following : 6
- i) Fuzzy composite relations
- ii) Defuzzyfications.

V-65-0.5



**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Differentiate between A\* and Ao\* search procedure. Solve the given problem by using A\* search procedure. 8

-	2	3	→	1	2	3
1	4	6		4	5	6
7	5	8		7	8	-
(Initial)				(Goal)		

- b) Define State space and Search space. 4

OR

Define and solve Missionaries and Cannibals problem. 12

2. Differentiate between Script and a frame. Write a script of a resturant. 12

OR

[ 2 ]

- a) Express the following sentence in conceptual dependency 6  
"John gave a book to Marry at F.M (A)-College yesterday".
- b) Compare and contrast propositional and predicate logic, giving examples. 6
3. a) Write a programme in LISP to find out the factorial of a number. 6
- b) Differentiate between Bottom-up and Top-down Parsing. Parse the sentence "The book is kept on the table" in Top-down Parsing. 6

OR

- Write short notes on the following : 12
- i) TMS
- ii) Pattern Recognition
- iii) Chomsky's Hierarchy of Grammar
- iv) Parsing.

[ 3 ]

4. Draw and explain the architecture of an expert system. Explain how each expert systems and case-based reasoning be used to capture knowledge for a business organisation. 12

OR

- a) Write down various types of learning techniques used in artificial neural network. 6
- b) Write short notes on the following : 6
- i) Artificial neural network
- ii) Working principle of human brain.
5. a) Differentiate between Fuzzy logic and Crisp logic. 2
- b) Let  $X = \{a, b, c, d\}$ ,  $Y = \{1, 2, 3, 4\}$  10  
 $A = \{(a, 0) (b, 0.8) (c, 0.6) (d, 1)\}$   
 $B = \{(1, 0.2) (2, 1) (3, 0.8) (4, 0)\}$   
 $C = \{(1, 0) (2, 0.4) (3, 1) (4, 0.8)\}$   
Determine the implication relations
- i) If x is A THEN y is B
- ii) If x is A THEN y is B ELSE y is C.

OR

- f) Average stock holding in terms of sales requirement-12 weeks
- g) Allow 10% for contingencies. 14

**2015**

Full Marks - 70

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Define finance function in a firm. Explain its importance in the overall process of management. 14

V-69-0.5



OR

A company is considering to purchase a machine. Two machines are available A and B each costing ₹50,000. Earnings after taxation are expected to be as follows :

7 + 7

*Cash Flows*

<u>Year</u>	<u>Machine A (₹)</u>	<u>Machine B (₹)</u>
1	15,000	5,000
2	20,000	15,000
3	25,000	20,000
4	15,000	30,000
5	10,000	20,000

[ 2 ]

Evaluate the two alternatives according to

- a) Return on Investment method
- b) Net present value method.

2. What is cost of capital ? Discuss its uses in financial decision making. 14

OR

A company issues 10,000 10% preference shares of ₹10 each. Cost of issue is ₹2 per share. Calculate cost of preference capital if these shares are issued (a) at par (b) at premium of 10 % and (c) at a discount of 5%. 14

3. What is operating leverage ? How does it help in magnifying revenue of a concern ? 14

OR

A firm has sales of ₹20,00,000, variable cost of ₹14,00,000 and fixed costs of ₹4,00,000 and debt of ₹10,00,000 at 10% rate of interest. What are the operating, financial and combined leverages ? If the firm wants to double its Earning Before Interest and Tax (EBIT), how much of a rise in sales would be needed on a percentage basis ? 14

[ 3 ]

4. What factors should be borne in mind in divising a capital structure of a company. 14

OR

Discuss in detail the determinants of dividend policy of a company. 14

5. Give a lucid account of significance of working capital for a company. 14

OR

Prepare an estimate of working capital requirement from the following information of a trading concern

- a) Project annual sales-1,00,000 units
- b) Selling price - ₹8 per unit
- c) % net profit on sales-25%
- d) Average credit period allowed to customers-8 weeks
- e) Average credit period allowed by suppliers-4 weeks

3. Name important Consumer Behaviour models. Explain 'Nicosia' model of Consumer Behaviour with suitable example.

OR

Write notes on the following :

- a) Cognitive man
  - b) Passive man.
4. What are various cultural, social and personal factors that influences buying behaviour of different section of people. Give suitable examples.

OR

Write notes on the following :

- a) Group influences
  - b) Reference group.
5. What do you mean by globalisation of consumer market ? Explain impact of IT on Consumer Behaviour.

OR

What do you mean by opinion leadership ? Explain the role of opinion leader as an innovator.

**2015**

Full Marks - 70

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Differentiate between Consumer Behaviour and Organisational Buying Behaviour. Explain the implication of Organisational Buying Behaviour.

OR

Write notes on the following :

- a) Scope of consumer behaviour
- b) Extensive problem solving behaviour.

2. How can an understanding of attitudes and attitudinal change help managers be effective ?

OR

Write notes on the following :

- a) Motivation and involvement
- b) Values of life style.

3. Write in brief about the sources of working capital finance. 16

OR

Discuss the maximum permissible limits prescribed for working capital finance by Commercial Banks. 16

4. What do you understand by Leasing ? State the advantages and limitations of Leasing. 6+5+5

OR

Define mutual fund. Give the classifications of mutual fund and explain their operation in India. 16

5. What do you mean by Portfolio Management ? Is it suitable for India ? State the role of a Portfolio Manager. 6+4+6

OR

Define the term Venture Capital. Describe the steps to provide venture capital financing for an industrial organisation. 16

**2015**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Discuss in detail the nature and functions of Merchant Bankers and their role in fund raising. 16

OR

Write a detailed note on Merchant Banking in India. 16

2. Explain the various types of credit rating and state methodology used for it. Also state the cautions you will exercise while credit rating. 6+6+4

OR

Write notes on the following : 8 + 8

- a) Project Life Cycle  
b) Capital Cost and Financial Projections.

- c) Air borne diseases
  - d) In-situ conservation.
5. What is Biodiversity ? Give an account of the methods adopted for conservation of Biodiversity.
6. Write notes on any *two* of the following :
- a) Resource management
  - b) Biodiversity at Global level
  - c) Biogeographical zones of India
  - d) Biodiversity at local level.
7. Give an account of Resource Management for sustainable development.
8. Write notes on any *two* of the following :
- a) Prevention of Cruelty to Animals Act.
  - b) Bio pesticides
  - c) Wild Life Protection Act.
  - d) Alternative source of energy.

**2015**

Full Marks - 50

Time - 2 Hours

The questions are of equal value

Answer any *four* questions

1. Define population and describe the different characteristics of population.
2. Write notes on any *two* of the following :
  - a) Population explosion
  - b) Life table
  - c) Age pyramid
  - d) Mortality.
3. Give an account of different types of food borne human diseases.
4. Write notes on any *two* of the following :
  - a) Environmental Carcinogenesis
  - b) Role of Information Technology on Human health.

- c) Air borne diseases
- d) In-situ conservation.

5. What is Biodiversity ? Give an account of the methods adopted for conservation of Biodiversity.
6. Write notes on any *two* of the following :
  - a) Resource management
  - b) Biodiversity at Global level
  - c) Biogeographical zones of India
  - d) Biodiversity at local level.
7. Give an account of Resource Management for sustainable development.
8. Write notes on any *two* of the following :
  - a) Prevention of Cruelty to Animals Act.
  - b) Bio pesticides
  - c) Wild Life Protection Act.
  - d) Alternative source of energy.

**2015**

Full Marks - 50

Time - 2 Hours

The questions are of equal value

Answer any *four* questions

1. Define population and describe the different characteristics of population.
2. Write notes on any *two* of the following :
  - a) Population explosion
  - b) Life table
  - c) Age pyramid
  - d) Mortality.
3. Give an account of different types of food borne human diseases.
4. Write notes on any *two* of the following :
  - a) Environmental Carcinogenesis
  - b) Role of Information Technology on Human health.

[ 4 ]

VI-UG-Chem(H)-XIII

b) Write notes on the following.  $3 \times 2$

- i) Benzidine rearrangement
- ii) Knoevenagel reaction.

OR

Write notes on the following.  $4 + 3 + 3$

- i) Paper chromatography
- ii) Mannich reaction
- iii) Diel-Alder Reaction.

6. Discuss the use of following reagents in organic synthesis.  $3\frac{1}{2}+3\frac{1}{2}+3$

- i) Na-liq  $\text{NH}_3$
- ii)  $\text{CrO}_3$
- iii)  $\text{B}_2\text{H}_6$ .

OR

Explain how the following reagents are used in the synthesis of organic compounds.  $3\frac{1}{2}+3\frac{1}{2}+3$

- i)  $\text{LiAlH}_4$
- ii)  $\text{OsO}_4$
- iii)  $\text{SeO}_2$ .

2015

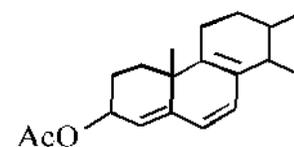
Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Discuss various types of electronic transitions which occur in UV-visible region.  $5$
- b) Explain why butadiene exhibits higher values of  $\lambda_{\text{max}}$  for  $\pi-\pi^*$  transitions than that of ethylene.  $3$
- c) Calculate  $\lambda_{\text{max}}$  value of the following compound.  $2$

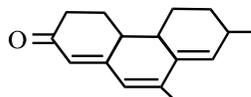


OR

- a) State and explain Beer-Lambert's Law. What are its limitations ?  $5$
- b) Explain why a polar solvent usually shifts the  $\pi-\pi^*$  transition to a longer wave length and  $n-\pi^*$  transition to a shorter wave length.  $3$

[ 2 ]

- c) Calculate  $\lambda_{\max}$  value of the following compound. 2



2. a) Discuss the basic principle of IR spectroscopy. 4  
b) State and explain Hooke's Law. Find out the approximate frequency of absorption of a carbon carbon double bond ( $K = 1 \times 10^6 \text{ dynescm}^{-1}$ ). 4  
c) How can you distinguish between propanal and propanone by IR spectroscopy. 2

OR

- a) Discuss the various factors which influences the IR vibrational frequencies. 5  
b) How many fundamental vibrational frequencies can be observed in water molecule. 3  
c) Write the various IR vibrational frequencies observed in case of aromatic compounds. 2
3. a) What are the factors which influence the chemical shift ? 5  
b) Write a note on 'coupling constant'. 5

OR

[ 3 ]

- a) Explain with examples, the shielding and deshielding effects involved in NMR spectroscopy. 5  
b) Discuss the NMR spectra of the following.  $2\frac{1}{2} \times 2$   
i) ethyl alcohol  
ii) 1,3-dichloropropane.
4. a) Write notes on the following.  $3 \times 2$   
i) Metastable peak  
ii) Parent ion peak  
b) How will you distinguish three isomeric butanol on the basis of mass spectrometry. 4

OR

- a) Discuss in detail the general fragmentation modes in mass spectrometry. 7  
b) In the mass spectrum of toluene, strong peaks are formed at  $m/e$  91 and  $m/e$  65. A broad peak appears at  $m/e$  46.4. Justify the origin of these signals. 3
5. a) Discuss the basic principle of thinlayer chromatography. 4

V-62

[Turn Over

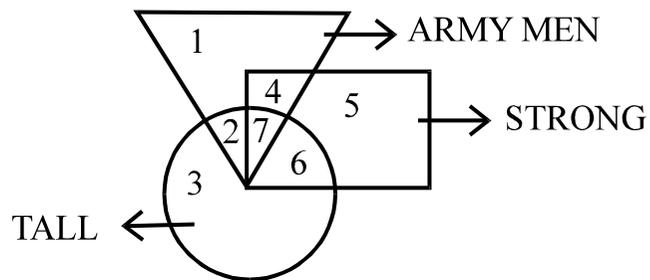
4. Draw graph to show the variation of temperature during Summer season of 2014 at Balasore. 3

Month	Mar	Apr	May	June	July	Aug
Temp.in°C	35	40	45	40	35	30

5. Draw bar diagram to show the income from Revenue in different Financial year. 3

Financial year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Revenue income (₹ in crore)	300	320	340	360	380	400

6. If Tall is equivalent to circle, Army men to triangle and strong to square, then answer the following questions by one integer written in the figure below. 1 × 6



- i) Who are strong and tall, Army men ?  
 ii) Who are strong but not tall, Army men ?

2015

Full Marks - 50

Time - 2 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

1. Answer any **eight** of the following : 1 × 8

- Name two states of India which are closer to Srilanka.
- Name the place where the river Ganga joins with the river Yamuna.
- The hill station Shilong lies in \_\_\_\_ State of India.
- Name the head quarters of Andaman Nicobar Island.
- The western disturbances reach India in \_\_\_\_ season.
- Which part of India get winter rain fall ?
- Name four Union Territories of India.

[ 2 ]

viii) Write the names of four North Eastern States of India.

ix) Name three mountain peaks of the Himalayas.

2. Answer any *eight* of the following :  $1 \times 8$

i) Planning Commission of India has been recently renamed as \_\_\_\_\_

ii) What do you mean by Money ?

iii) What does foreign trade mean ?

iv) Write the full form of (a) DIC and (b) CID

v) NTPC stands for \_\_\_\_\_. Its unit is situated at \_\_\_\_\_ of Odisha.

vi) What are the two main functions of RBI ?

vii) The minister of state with Independent charge of Petroleum in India is \_\_\_\_\_ .

viii) CNG is the short form of \_\_\_\_\_ while OIL is the short form of \_\_\_\_\_ .

ix) The Finance Minister of India is \_\_\_\_\_ while that of Odisha is \_\_\_\_\_ .

[ 3 ]

3. Answer any *twelve* of the following :  $1 \times 12$

i) Who is the Chief Election Commissioner of Odisha ?

ii) Who presides over joint sitting of the Parliament ?

iii) Who is the Speaker of the State Legislative Assembly ?

iv) How many seats are there for Lok Sabha from Odisha ?

v) Who has been elected as M.P. from Balasore Lok Sabha seat ?

vi) Name the Chief Justice of Odisha High Court.

vii) Who is the Vice-Chancellor of F.M University ?

viii) Why is India a Republic ?

ix) Name the only Cabinet Minister in centre from Odisha now. He is in charge of \_\_\_\_\_ department.

x) Who is your District Collector ?

xi) Write the full name of your Principal. To which department he belongs ?

[ 5 ]

- iii) Who are tall but not strong, Army men ?
  - iv) Which Army men are neither strong nor tall ?
  - v) Who are only strong but neither tall nor Army men ?
  - vi) Who are only tall but neither strong nor Army men ?
7. The age of a mother is twice that of the elder son. Ten years after, the age of the mother will be three times that of the younger son. If the difference of ages between two sons is 15 years, calculate the age of the mother. 2

8. Answer any **eight** of the following : 1 × 8

- i) Who established Brahma Samaj ?
- ii) \_\_\_\_\_ country won recent ICC World cup of 2015 Cricket Match by defeating \_\_\_\_\_ .
- iii) 'Bhangara' is an important dance of \_\_\_\_ state of India.
- iv) Name two cities where Indus Valley Civilisation flourished.

[ 6 ]

- v) Mention three doctrines of Jainism.
- vi) Why is Hari Prasad Chaurasia famous ?
- vii) Name two divisions of Jainism.
- viii) A 12th Century Text called \_\_\_\_\_ tells the History of Jagannath Temple.
- ix) Who won Dada Saheb Phalke Award for 2014 ?

5. What is Biodiversity ? Give an account of Conservation of Biodiversity.
6. Write notes on any *two* of the following :
- a) Genetic diversity
  - b) Biodiversity at Local level
  - c) Biofertilizer
  - d) Integrated pest management.
7. Discuss various viable alternatives of energy and water resources.
8. Write notes on any *two* of the following :
- a) Enviromental Education
  - b) Water Act
  - c) Biopesticides
  - d) C.P.C.B (Central Pollution Control Board)

**2015**

Full Marks - 50

Time - 2 Hours

The questions are of equal value

Answer any *four* questions

1. Give an account of the characteristics of Population.
2. Write notes on any *two* of the following :
  - a) Population Growth
  - b) Family welfare programme
  - c) Growth Curve
  - d) Population Explosion.
3. Give an account of the various food borne Human diseases.
4. Write notes on any *two* of the following :
  - a) Role of Information Technology on Human Health
  - b) Hypertension
  - c) Enviromental Carcinogenesis
  - d) Balanced Diet.

5. Discuss the causes and control measures of Environmental Carcinogenesis.
6. Write notes on any *two* of the following :
  - a) Integrated pest management
  - b) Conservation of Biodiversity
  - c) Basic idea on Resource management
  - d) Afforestation.
7. Describe briefly the Air-Act and Water-Act.
8. Write notes on any *two* of the following :
  - a) Environmental Protection Act.
  - b) S.P.C.B (State Pollution Control Board)
  - c) Need for Public Environmental Awareness
  - d) Species Diversity.

**2015**

Full Marks - 50

Time - 2 Hours

The questions are of equal value

Answer any *four* questions

1. Describe the causes, effects and remedial measure of population explosion.
2. Write notes on any *two* of the following :
  - a) Population Growth
  - b) Hypertension
  - c) Family welfare programme
  - d) Age pyramid.
3. Give an account of biogeographical classification of India.
4. Write notes on any *two* of the following :
  - a) Food borne Human diseases
  - b) Ex-situ conservation
  - c) Biodiversity at Global level
  - d) Biosphere reserve in Odisha.

[ 2 ]

In financial reporting how income and liabilities are reported ?

4. Discuss the various economic valuation methods of evaluating human assets.

OR

Describe objections against inflation accounting.

5. What are the regulations relating to non-banking assets of a Commercial Bank ?

OR

Discuss role played by accounting standards in preparation of financial statements.

V-66-1



**VI-UG-Com(H)-X (FSA)**

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Define financial statement analysis and discuss the various types of financial statement analysis.

OR

Discuss limitations of financial statements.

2. Distinguish current ratio from liquid ratio and explain ratios which assess the company's debt capacity.

OR

Write an essay on Common-size and comparative statement analysis.

3. What are the qualitative factors considered in preparation of reports for financial statements.

OR

V-66

[Turn Over

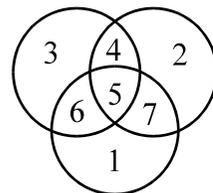
4. Draw a graph representing the rain fall (in cms) at Balasore in different months of the year 2014. 3

Month	May	June	July	Aug	Sept	Oct
Rainfall	10	30	50	70	50	30

5. Draw the bar diagram showing the number of women students admitted into +3 1st year Arts of F.M.(Auto) College, Balasore in different Academic Years. 3

Academic year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Women student admitted	200	210	220	230	240	250

6. In the following diagrams circles represent Businessmen (A), Educated People (B) and Politicians (C). The circles cutting one another give us the numbered species. To which number space each of the following statement refer ? 1 × 6



- Some politicians are educated businessmen.
- Some educated persons are businessmen.

**2015**

Full Marks - 50

Time - 2 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

- Answer any *eight* of the following : 1 × 8
  - Name three states of India lying at the coast of Arabian sea.
  - \_\_\_\_\_ is the capital of Uttarakhand.
  - Name the state of India which has been provided with superfast train communication in February 2015.
  - Which area in India gets winter rain fall ?
  - Name the state having highest literacy rate in India.
  - In which state of India the Hill Station of Gulmarg lies ?
  - Name two groups of islands which are part of India.

[ 2 ]

- viii) Andhra Pradesh has been splitted into two states namely \_\_\_\_\_ and \_\_\_\_\_.
- ix) The gulf of Kutch is situated at \_\_\_\_\_ coast of India.

2. Answer any **eight** of the following :  $1 \times 8$

- i) What are the two primary functions of a Bank ?
- ii) Who is the first Chairman of 'Niti Ayoga' ?
- iii) How will you co-relate the price of a commodity with its demand ?
- iv) What is meant by inflation ?
- v) What do you mean by black money ?
- vi) What is meant by free trade ?
- vii) Write the full form of (i) PPL (ii) IPICOL
- viii) Who is the Chief Minister of Jammu Kashmir ?
- ix) HUDCO stands for \_\_\_\_\_ and IOL stands for \_\_\_\_\_.

3. Answer any **twelve** of the following :  $1 \times 12$

- i) What is the name of the only Agricultural University in Odisha ?

[ 3 ]

- ii) Who presides over Rajya Sabha in India ?
- iii) Name the first women President of India.
- iv) Who is the Chief Election Commissioner of India.
- v) Who appoints Chief Election Commissioner of India ?
- vi) Who is the Chief Justice of the Supreme Court of India ?
- vii) How is the President of India removed from his office ?
- viii) Which two states of India have a common High Court ?
- ix) What does sovereignty mean ?
- x) Why is secret ballot essential ?
- xi) Name four regional parties of Odisha.
- xii) What is the name of the proposed Women University going to be established in Odisha ?
- xiii) IPU stands for \_\_\_\_\_ while PMRY stands for \_\_\_\_\_.

[ 5 ]

- iii) Some businessmen are politicians.
- iv) Some politicians are educated.
- v) Some educated persons are neither politicians nor businessmen.
- vi) Some businessmen are neither educated nor politicians.

7. Meena is twice as old as Reena. Three years ago, she was three times as old as Reena. How old is Meena now ? Explain by calculation. 2

8. Answer any **eight** of the following : 1 × 8

- i) Who composed National Song of India ?
- ii) Dada Saheb Phalke award is conferred for contribution to the cause of \_\_\_\_\_ cultural activity.
- iii) Who established Arya Samaj ?
- iv) Name two famous musicians of Sitar.
- v) Bihu is the important dance of \_\_\_\_\_ state of India.

[ 6 ]

- vi) Name four Vedas.
- vii) Write two causes for the rise of *Budhism*.
- viii) Who is the founder of Maurya Empire ?
- ix) What are the four castes of Hindu society based on occupation ?

V-74-3.5



4. Solve the non-linear programming problem :

$$\text{optimize } z = 4x_1^2 + 2x_2^2 + x_3^2 - 4x_1x_2$$

subject to the constraints :

$$x_1 + x_2 + x_3 = 15$$

$$2x_1 - x_2 + 2x_3 = 20.$$

OR

Use the Khun-Tucker conditions to solve the non-linear programming problem :

$$\text{Maximize } z = 8x_1 + 10x_2 - x_1^2 - x_2^2$$

subject to the constraints :

$$3x_1 + 2x_2 \leq 6$$

$$x_1 \geq 0, x_2 \geq 0.$$

5. Use Wolfe's method to solve the quadratic programming problem :

$$\text{Maximize } z = 4x_1 + 6x_2 - 2x_1^2 - 2x_1x_2 - 2x_2^2$$

subject to the constraints :  $x_1 + 2x_2 \leq 2, x_1, x_2 \geq 0.$

OR

Use Beale's method to solve the NLPP :

$$\text{Minimize } z = 6 - 6x_1 + 2x_1^2 - 2x_1x_2 + 2x_2^2$$

subject to the constraints :  $x_1 + x_2 \leq 2$  and  $x_1, x_2 \geq 0.$

**2015**

Full Marks - 40

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*The symbols used have their usual meaning*

1. We have five jobs, each of which must go through the two machines A and B in the order AB. Processing times in hour are given in the table below :

Job (i)	1	2	3	4	5
Machine A ( $A_i$ )	6	1	9	3	10
Machine B ( $B_i$ )	2	6	7	8	4

Determine a sequence for the five jobs that will minimize the elapsed time.

OR

Solve the following game graphically.

		Player B			
		$B_1$	$B_2$	$B_3$	$B_4$
Player A	$A_1$	2	1	0	-2
	$A_2$	1	0	3	2

[ 2 ]

2. Use dynamic programming to solve

$$\text{Minimize } z = y_1^2 + y_2^2 + y_3^2$$

subject to the constraints :

$$y_1 + y_2 + y_3 = 10 \text{ and } y_1, y_2, y_3 \geq 0.$$

OR

Use dynamic programming to solve the following L.P.P. :

$$\text{Maximize } z = 3x_1 + 5x_2$$

subject to the constraints :

$$x_1 \leq 4, x_2 \leq 6, 3x_1 + 2x_2 \leq 18 \text{ and } x_1, x_2 \geq 0.$$

3. The following table gives the activities in a construction project and time duration.

Activity	Preceding Activity	Normal time (days)
1-2	--	20
1-3	--	25
2-3	1-2	10
2-4	1-2	12
3-4	1-3, 2-3	5
4-5	2-4, 3-4	10

[ 3 ]

- Draw the activity network of the project.
- Find the total float and free-float for each activity.
- Determine the critical path and the project duration.

OR

A small project is having seven activities. the relevant data about these activities is given below :

Activity	Dependence	Normal Duration (days)	Crash Duration (days)	Normal Cost (₹)	Crash Cost (₹)
A	--	7	5	500	900
B	A	4	2	400	600
C	A	5	5	500	500
D	A	6	4	800	1,000
E	B,C	7	4	700	1,000
F	C,D	5	2	800	1,400
G	E,F	6	4	800	1,600

- Find out the normal duration and the minimum duration.
- What is the percentage increase in cost to complete the project in 21 days ?

**SECTION - B**  
(ASM)

1. What factors you will take into account for setting up a sales organisation ? Explain the principles of determining sales organisation. 14

OR

Write notes on the following : 7+7

- a) Sales forecasting  
b) Sales budget.

2. What is Sales Compensation ? Explain different methods of Sales Compensation. 13

OR

Write notes on the following : 6½+6½

- a) Motivation of Sales Personnel  
b) Sales Meeting and Sales Contest.

3. What do you mean by Control Process ? Explain "Analysis of sales volume, cost and profitability as a tool of control". 13

OR

Write notes on the following : 6½+6½

- a) Evaluation of sales force performance  
b) Managing expenses of sales personnel.

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions from any *one* Section

**SECTION - A**  
(FM)

1. Compute the market value of the firm and the average cost of capital from the following information :

Net operating income ₹2,00,000

Total investment ₹10,00,000

Equity capitalisation rate :

- a) If the firm uses no debt 10%  
b) If the firm uses ₹4,00,000 debentures 11%  
c) If the firm uses ₹6,00,000 debentures 13%

Assume that ₹4,00,000 debentures can be raised at 5% rate of interest whereas ₹6,00,000 debentures can be raised at 6% rate of interest.

Apply the Traditional Approach and comment on your findings. 14

OR

[ 2 ]

- a) What do you understand by a stable dividend policy ? Why should it be followed ? 7
- b) Discuss the various forms of dividends. 7
2. A proforma cost sheet of a company provides the following particulars :

Elements of Cost

Material	40%
Direct Labour	29%
Overheads	20%

The following further particulars are available :

- a) It is proposed to maintain a level of activity of 2,00,000 units.
- b) Selling price is ₹12 per unit.
- c) Raw materials are expected to remain in stores for an average period of one month.
- d) Material will be in process, on average half a month and is assumed to be consisting of 100% raw material, wages and overheads.
- e) Finished goods are required to be in stock for an average period of one month.
- f) Credit allowed to debtors is two months.
- g) Credit allowed by suppliers is one month.

[ 3 ]

You may assume that sales and production follow a consistent pattern.

You are required to prepare a statement of working capital requirements, a forecast Profit and Loss Account and Balance Sheet of the company assuming that :

Share Capital	₹15,00,000
8% Debenture	₹ 2,00,000
Fixed Assets	₹13,00,000

OR

What are the advantages of adequate working capital ? What shall be the repercussions if a firm has (a) Redundant Working Capital (b) Inadequate working capital ? 7+3+3

3. Explain various methods of investing surplus cash. What criteria should a firm use in investing in marketable securities ? 10+3

OR

Explain various tools and techniques used for inventory management. 13

3. Write short notes on any *two* of the following:  $8 \times 2$
- Globalisation has brought about rapid social change in India – Discuss.
  - 'Indian Political Culture is in transition' – Comment.
  - 'Youth and student movement in India are controlled and directed by Political parties'. – Examine.
  - Discuss the steps taken by Govt. for upliftment of Peasants in India.

V-102-0.5

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

- Examine the role of Trade Unions in Formulating Public Policies. 12

OR

Write an essay on women's movement in Post Independence period. Critically assess their contribution towards upliftment of women in India.

- 'The rapid pace of development has brought about a transformation in the socio-economic structure in rural India' – Examine. 12

OR

What do you mean by Sustainable Development ? Discuss the conditions for achieving the goals of sustainable development.

[ 2 ]

VI-UG-Eng(H)-VIII

4. 'The Hairy Ape deals magnificiently with the disintegration of man in search of belongingness'. Elaborate.

OR

Comment on the character of Mildred Douglas in the play.

5. Discuss Beckett's 'Waiting For Godot' as an absurd play.

OR

"Vladimir and Estragon are complementary characters". Do you agree ? Give reasons.

V-79-0.5



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Comment on Jayanta Mohapatra's poetic style with reference to his poem 'Indian Summer'.

OR

Critically analyse the poem 'Home Coming'.

2. "Sin recoils on the sinner". Discuss how this is related to the theme of the novel 'Six Acres and a Third'.

OR

"Saria and Bhagia suffer for no fault of theirs". Comment.

3. "In singing himself Whitman sings of others". Discuss with reference to the poem 'Songs of Myself'.

OR

Write an appreciation of the poem 'The Gift Outright'.

V-79

[Turn Over

- c) Use Fermat factorization to factor 809009. 4
- d) Show that  $p^2$  (with  $p$  prime) is a pseudoprime to the base  $b$  if and only if  $b^{p-1} \equiv 1 \pmod{p^2}$ . 4

V-103-0.5

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Prove that the sum  $\sum \frac{1}{p}$ , and the product  $\prod \left(1 - \frac{1}{p}\right)^{-1}$ , are both divergent, as  $p$  runs through all the prime numbers. 8

OR

There exist constants  $a$  and  $A$ ,  $0 < a < A$ , such that if  $x$  is sufficiently large, then show that

$$a \frac{x}{\log x} < \pi(x) < A \frac{x}{\log x}. \quad 8$$

2. If  $S$  is a measurable, convex, symmetric set of measure  $V > 2^n$  (possibly  $V = \infty$ ), then show that it contains a lattice point other than the origin. 8

OR

[ 2 ]

Show that there exist integers  $x_1, x_2, \dots, x_n$ , not all zero, such that

i)  $|\xi_1| + |\xi_2| + \dots + |\xi_n| \leq (n! |\Delta|)^{1/n}$

ii)  $|\xi_1 \xi_2 \dots \xi_n| \leq \frac{n! |\Delta|}{n^n}$  8

3. a) Solve the following system of simultaneous congruences

$$2x + 3y \equiv 1 \pmod{26}$$

$$7x + 8y \equiv 2 \pmod{26}. \quad 4$$

b) Using the Silver-Pohling-Hellman algorithm, find the discrete log of 153 to the base 2 in  $F_{181}^*$ . (2 is a generator of  $F_{181}^*$ ). 4

OR

c) Show that any sequence of positive integers  $\{v_i\}$  with  $v_{i+1} \geq 2 v_i$  for all  $i$  is superincreasing. 4

d) How many possible affine enciphering transformations are there for digraphs in an N-letter alphabet? How many are there when  $N = 26, 29, 30$ ? 4

[ 3 ]

4. a) Describe a polynomial time deterministic algorithm for imbedding plaintexts  $m$  as points on an elliptic curve in the following case :

E has equation  $y^2 = x^3 - x$  and  $q \equiv 3 \pmod{4}$

b) Compute the zeta function of the curve  $y^2 + y = x^3 - x + 1$  over  $F_p$  for  $p = 2$  and  $3$ . 4

OR

c) Find the type of  $y^2 = x^3 - x$  over  $F_{71}$ . 4

d) Use Pollard's method with  $K = 840$  and  $a = 2$  to try to factor  $n = 53467$ . Then try with  $a = 3$ . 4

5. a) Let  $n$  be an odd composite number. If  $n$  is square free, then show that  $n$  is a Carmichael number if and only if  $p - 1 \mid n - 1$  for every prime  $p$  dividing  $n$ . 4

b) Factor 141467. 4

OR

**IV-PG-Com-XVIII (SAPM/IM)**

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions from any *one* Section

**SECTION - A**

( *SAPM* )

1. Discuss technical approach towards security analysis.  
How does it differ from fundamental analysis ? 14

OR

What is the trend analysis ? How it is useful for  
selection of a share ?

2. What do you mean by Portfolio Theory ? Explain  
the Markowitz model. 13

OR

The following information belonging to 3 securities.  
Calculate the return on securities.

<i>Security</i>	<i>Expected Return</i>	$\beta$
A	14%	1.20
B	15%	0.75
C	20%	1.50

[ 2 ]

The risk free rate of return is 9% and market return is 15%.

3. What are the limitations of using duration as a measure of bond's price sensitivity to interest rate changes ? 13

OR

Calculate portfolio performance of the following X and Y securities by using Treynor's method.

<i>Portfolio</i>	<i>Return</i>	$\beta_m$	<i>rf</i>
X	22	0.6	11
Y	26	1.2	11

**SECTION - B**

(IM)

1. Discuss promotional strategies of International Marketing. 14

OR

Describe international distribution channels and international logistics.

[ 3 ]

2. What do you mean by international market planning ? State its entry strategies. 13

OR

Discuss branding decisions and branding problems in international marketing.

3. In international marketing, a very complex and controversial issue is that of ethics. Explain. 13

OR

Discuss the role of WTO in international marketing.

V-104-1



**2015**

Full Marks - 50

Time - 2 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Write an essay on any *one* of the following in about 250 words : 15
  - a) Terrorism : a threat to the modern world
  - b) Computer Revolution.
  
2. Write a feature on any *one* of the topics mentioned below : 15
  - a) A national-level Seminar on English literature
  - b) Barack Obama's recent visit to India.
  
3. Go through the following passage and summarize it. 10

There are several kinds of crossword puzzles. One kind is the prize competition in which the person who finds the correct answers gets a big prize. But

the answers are very hard to find, since several words appear equally appropriate : 'bad, mad or sad', for example, in the clue sentence, ..... 'people are seldom popular'. Such competitions attract people who are fond of gambling because by paying a small entry fee, they can win big prizes. The second type of crossword puzzle is one in which there is only one possible answer to every clue. But this answer is elusive and calls for some detective work on our part. The clue gives only hints about the word. A clue like 'Mate changes to flesh for food' will elude you till you realise that by changing the spelling of 'mate' you get 'meat'. Your comprehension and your general knowledge are put to the test. The effort to solve such crosswords is an intellectual exercise. The third type of crossword is a straightforward exercise in which words matching the definitions given in the clues have to be found and written in the appropriate place in the crossword square. There are no catches or tricks. This type is useful in the study of vocabulary. As simple exercises in problem-solving, they provide some entertainment too.

4. Correct the errors in the following paragraph. Underline the portion of the sentence you have corrected : 10

A man was in his death bed. In his dream a angel too him in a tour of hell and heaven. First, he visit hell. There each ones hands tied with a spoon, in one hand and fork in the other. Most delicious food were in front of them. They struggle to eat because the spoon and the fork tied with each ones hand with a one-foot long stick. They starved. Then he took to heaven. The scene was the same like hell, but people here were enjoying and feeding the other.

[ 2 ]

What is meant by credit rating ? What are the objectives of credit rating ? 4+10

4. Discuss the reasons for slow growth of mutual funds in India. 14

OR

What is Venture Capital ? State the features of Venture Capital. 4+10

5. Discuss the advantages and disadvantages of leasing. 14

OR

- a) Distinguish between hire purchase and lease. 7  
b) Write a note on project monitoring and control. 7

V-77-0.5



VI-UG-BBA(H)-IX (FMS)

2015

Full Marks - 70

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. What are the different markets to be found in the financial system and state their functions. 14

OR

Discuss the features of a developed money market and bring out its importance. 7+7

2. Define a stock exchange and state its functions. 4+10

OR

State the functions of the SEBI. What are the SEBI guidelines for Stock Exchanges ? 9+5

3. Explain the services of merchant bankers. 14

OR

V-77

[Turn Over

[ 2 ]

Discuss how regression analysis helps in drawing conclusion in market research ?

4. Discuss the role of cluster analysis in data processing for marketing research.

OR

Write notes on the following :

- a) Factor analysis
- b) Multidimensional scaling.

5. What is research report ? Explain its types.

OR

Discuss the role of computer in using graphs, charts, excels etc for analysis and interpretation of data for marketing research.

V-78-0.5



**VI-UG-BBA(H)-IX (MR)**

**2015**

Full Marks - 70

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Explain briefly the basic steps in conducting Marketing Research.

OR

What are the steps in construction of a good questionnaire ? Explain.

2. Describe the different stages involved in Data Processing for conducting market research.

OR

Explain briefly various methods of collecting primary data.

3. What is Discriminant Analysis ? Discuss its importance and applicability in marketing research.

OR

V-78

[Turn Over

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions from any *one* Group

**GROUP - A**

*(Economic System)*

1. Discuss in details the social classes and social relations under feudalism. Present your views on decline of feudalism.

OR

Describe the meaning, classification and importance of an economic system. Bring out the importance of comparative economic analysis.

2. Discuss Marx's views on crisis of capitalism.

OR

What are the basic features of American economy ?  
Bring out the weaknesses of capitalism in USA.

[ 2 ]

3. What are economic significances of incentives ?  
Does socialistic economy provide enough incentives to workers and producers ?

OR

Discuss in details the socialism in Russia. Give an account of factors responsible for the collapse of Communism in USSR.

4. 'Mixed economy is an admixture of good and bad'.  
Discuss.

OR

Discuss the achievements and failures of public enterprises in India. Suggest remedies for their shortcomings.

5. Make an appraisal of the Post-Mao development in China.

OR

State and explain Jayprakash Narayan's concept of 'total revolution'. What are the ingredients required for its realisation ?

[ 3 ]

**GROUP - B**

*(Mathematical Economy)*

1. a) i) Examine the function :  $Y = 2x^2 - x^3$  for its maximum or minimum.

- ii) Find the partial derivatives of :

$$z = x^2 + 4xy + y^2.$$

- b) Solve the set of equations and find the value of 'x', 'y' and 'z' using matrix technique :

$$x - 2y + 3z = 1$$

$$3x - y + 4z = 3$$

$$2x + y - 2z = -1.$$

OR

- a) i) Evaluate :  $\int (x^2 + 1)^2 \cdot x \, dx$

- ii) Evaluate :  $\int \frac{x^2 dx}{(x^3 + 5)^2}$

- b) Solve the differential equation :

$$(2x + 3y)dx + (3x - 2y)dy = 0.$$

[ 4 ]

2. a) The demand law is given by :  $x = 10 - p$  at the point  $x = 4$ . If the price increases by 5% then determine the percent (%) decrease in demand. Find also the value of elasticity of demand.
- b) If  $U = x^2y$  is the utility function, find the optimum amount of commodities that the consumer will buy to maximise his satisfaction with the budget constraint :  $x + 2y = 4$ .

OR

- a) Derive the necessary and sufficient conditions for consumer equilibrium. State Slutsky condition of a single price change on demand.
- b) If the demand function is :  $P = 85 - 4x - x^2$  and the demand 'x' is 5 ( $x = 5$ ) then find consumer's surplus.
3. a) Examine the common properties of CES (Constant Elasticity of Substitution) function. Obtain ' $\sigma$ ' (elasticity of factor substitution) for the equation :

$$Q = A \left[ \alpha K^{-\beta} + (1 - \alpha) L^{-\beta} \right]^{-\frac{1}{\beta}}$$

[ 5 ]

- b) Discuss the features and properties of C-D (Cobb-Douglas) function.

OR

- a) Write notes on any *two* of the following :
- i) Homogeneous and non-homogeneous production function.
  - ii) Average Revenue and Marginal Revenue
  - iii) Conditions for cost minimisation
  - iv) Elasticity of factor substitution ( $\sigma$ )
- b) Total revenue (R) and the total cost (C) functions of a firm are given by :

$$R = 30Q - Q^2$$

$$C = 20 + 4Q$$

where 'Q' is the output. Find the equilibrium level of output of the firm and the total profit of the firm.

4. a) Discuss in details the 'Cobweb' model with figures.

[ 6 ]

- b) Explain with diagrams the equilibrium of a firm under perfect competition. Examine the conditions of equilibrium.

OR

- a) The demand functions of two commodities 'x' and 'y' are :  $P_1 = 8 - 2x$  and  $P_2 = 14 - y^2$ . The total cost function is :  $C = 10 + 4x + 2y$ . Determine the quantities of 'x' and 'y' that maximise the profit of the monopolist and also find the maximum profit.
- b) What is discriminating monopoly ? Examine the conditions necessary for maximisation of profit of a discriminating monopolist.

5. a) Solve the game and find the value of the game :

$$A = \begin{bmatrix} 4 & 3 & 2 \\ 3 & 4 & 10 \\ 7 & 6 & 8 \end{bmatrix}$$

- b) Maximise :  $z = 3x + 4y$   
subject to :  $x + y \leq 6$   
 $2x + 4y \leq 20$   
 $x \geq 0$   
 $y \geq 0$ .

OR

[ 7 ]

- a) Outline Leontief's 'open model' relating to 'input-output' analysis.
- b) Write notes on any *two* of the following :
- i) Basic and feasible solutions
  - ii) Simplex method
  - iii) Rectangular game
  - iv) Prisoner's dilemma
  - v) Closed model of 'Input-output' analysis.

V-80-1



Expand the meaning of the Ísopandisadic expression "sóham asmi". (Mantra - 16).

3. Explain reality as Advaita in the context of upaniṣads.

OR

Give an account of the upanisadic concept of Ātman.

4. Discuss the nature of avidyā and distinguish between parāvidyā and aparāvidyā.

OR

What are the moral considerations of upaniṣads ? Explain briefly.

5. "Prakṛtim yānti bhutāni nigrāh kim kariṣyati". – Explain after the Gitā. (Ch.III, V-33).

OR

Explain the meaning of the following expression :

"Svadharme nidhanam śreyah  
Paradharmo bhayāvah". (Ch.III, V-35).

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Bring out the significance of the following verse of Íṣopaniṣad :

"..... tena tyaktena bhūnjithā  
mā ḡṛdhaḥ kasyasviddhanam". (Mantra-1)

OR

How is the supreme reality explained in the following verse :

Tadejati tannaijati  
taddure tadvantike  
tadantarasya sarvasya  
tadu sarvasyāsyā bāhyataḥ. (Mantra-5)

2. The face of truth is covered with a golden lid. Elucidate the idea in the light of Íṣopaniṣad. (Mantra-15)

OR

[ 2 ]

VI-UG-Hist(H)-VIII

What were the major achievements of Washington Conference ? Did it successfully retain Japanese expansionism ?

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

4. Write the contribution of Dr. Sun-Yat-Set to the Chinese National Movement.

OR

Analyse the factors leading to the rise of militarism in Japan.

5. Briefly discuss life history, character and achievements of Mao-Tse-Tung.

OR

Give a brief account of the role of Japan in the Second World War.

1. Analyse the consequences of the Sino-Japanese War of 1894-95. Why was China defeated ?

OR

Discuss the character and significance of Boxer Movement in China.

2. Describe the causes and the results of the Russo-Japanese War of 1904-05.

OR

Critically examine the character and achievements of the Revolution of 1911.

3. Discuss the position and the role of Japan in the First World War.

OR

V-81-0.5



V-81

[Turn Over

୪. 'ଲକ୍ଷ୍ମୀପୁରାଣ' ନାରୀ ସଚେତନତାର ଏକ ଜୀବନ୍ତ ପ୍ରତୀକ - ଆଲୋଚନା  
କର ।

ଅଥବା

ଚଣ୍ଡୀପୁରାଣରେ ବର୍ଣ୍ଣିତ ସମରତିତ୍ର ପ୍ରଦାନ କର ।

୫. ଓଡ଼ିଆ କୋଇଲି ସାହିତ୍ୟ ସଂପର୍କରେ ଏକ ଆଲୋଚନାତ୍ମକ ପ୍ରବନ୍ଧ  
ଲେଖ ।

ଅଥବା

'ତଉତିଶା ସାହିତ୍ୟ' ଗୀତିକବିତାର ଏକ ବିଶିଷ୍ଟ ଅଙ୍ଗ - ପ୍ରମାଣ କର ।

V-84-0.7



2015

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer **all** questions

୧. ଓଷାବ୍ରତରୁ ଉତ୍କଳୀୟ ସାଂସ୍କୃତିକ ଜୀବନର ପରିଚୟ ଦିଅ ।

ଅଥବା

ଓଷାବ୍ରତ ଉତ୍କଳୀୟ ଆଧ୍ୟାତ୍ମିକ ଜୀବନର ପରିପ୍ରକାଶ - ଆଲୋଚନା  
କର ।

୨. ଓଡ଼ିଆ ଲୋକ କାହାଣୀର ସାମାଜିକ ଉପଯୋଗିତା ସଂପର୍କରେ ବିଚାର  
କର ।

ଅଥବା

ଲୋକ କାହାଣୀରେ ଜନଜୀବନର ଚିତ୍ର କିପରି ପ୍ରତିଫଳିତ ହୋଇଛି,  
ପ୍ରକାଶ କର ।

୩. ଲୋକ ନାଟକର ପ୍ରକାରଭେଦ ବର୍ଣ୍ଣାୟ ।

ଅଥବା

ଲୋକ ନାଟକର ମଞ୍ଚକଳା ଓ ପରିବେଷଣ ଶୈଳୀ ଉପରେ ଆଲୋଚନା  
କର ।

V-84

[Turn Over

4. Discuss the role of Bentham as a reformer.

OR

J.S. Mill is a reluctant Democrat. Analyse.

5. Explain Hegel's concept of State and Government.

OR

Discuss the relevance of Karl Marx today.

V-82-1



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Critically examine the Plato's concept of Justice.

OR

"The state comes into existence for the sake of life and continues to exist for the sake of good life." (Aristotle) Examine the statement.

2. "Machiavelli is the first modern Political Thinker". Explain.

OR

"Hobbes is an individualist". Examine.

3. "Locke is the father of Liberalism". Examine.

OR

Discuss the concept of Social Contract of Rousseau.

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. कठोपनिषद्दिशा श्रेयप्रेयसोः भेदं दर्शयत । 20

अथवा

कठोपनिषदि वर्णितं रथरूपकं विवृणुत ।

2. सप्रसङ्गं व्याख्यां कुरुत : 12

शतायुषः पुत्रपौत्रान् वृणीष्व  
वहून् पशून् हस्तिहिरण्यमश्वान् ।  
भूर्मेर्महदायतनं वृणीष्व  
स्वयं च जीव शरदो यादिच्छसि ॥

अथवा

तं दुर्दर्शं गूढमनुप्रविष्टं  
गुहाहितं गह्वरेष्ठं पुराणम् ।  
अद्यात्मयोगाधिगमेन देवं  
मत्वा घोरो हर्षशोकौ जहाति ॥

[ 2 ]

3. कश्याचिदेकस्य आङ्लभाषया उत्कलभाषया वा अनुवादं कुरुत । 8

क) उत्तिष्ठत जाग्रत  
प्राप्य वरान्निबोधत ।  
क्षुरस्य धारा निशितादुरत्यया  
दुर्गं पथस्तत्कवर्योवदन्ति ॥

ख) अणोरणीयान् महतो महीया-  
नात्मास्य जन्तोर्निहितो गुहायाम् ।  
तमक्रतुः पश्यति वीतशोको  
धातुः प्रसादान्महिमानमात्मनः ॥

4. मनुस्मृतौ वर्णितानां देशानां वर्णनं कुरुत । 10

अथवा

पठितांशमवलम्ब्य मनुष्यस्य संस्कारान् आलोचयत ।

5. अधोलिखितेषु द्वयोः टिप्पणीं लिखत : 5 × 2

- क) धर्म लक्षणम् ।  
ख) श्रुति द्वैधम् ।  
ग) ब्रह्मचारिणः प्रथमभिक्षा ।  
घ) ब्रह्मचारिणः दण्डधारणम् ।

[ 3 ]

6. गूढपुरुषाणां विवरणं पठितांशमवलम्ब्य दीयत । 10

अथवा

अमात्यनियुक्तिप्रकारं अर्थशास्त्रमनुसृत्य उपबृंहयत ।

7. अधोलिखितेषु द्वयोः टिप्पणी प्रदेया : 5 × 2

- क) राजर्षिः ।  
ख) कामोपधा ।  
ग) नवास्तु यमस्थाने दण्डघरं मन्यमाना नापराध्यन्तीतिविशदयत ।  
घ) सर्वत्राशुचीन् रवनिद्रव्यहस्तिवनकर्मान्तेषु पयोजयेत्विशदयत ।

V-85-0.5

□□

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. क) भारतीय और पाश्चात्य आलोचकों द्वारा दिये गये काव्य लक्षणों पर विस्तार से आलोचना कीजिए । 12

अथवा

रीति की परिभाषा देते हुए उसके स्वरूप के बारे में आलोचना कीजिए । रीति सम्प्रदायों की संक्षिप्त जानकारी प्रदान कीजिए ।

- ख) किन्हीं **दो** अलंकारों का लक्षण और उदाहरण दीजिए :  $5 \times 2$   
यमक, रूपक, उत्प्रेक्षा, अनुप्रास ।

- ग) किन्हीं **दो** छन्दों के लक्षण और उदाहरण प्रस्तुत कीजिए ।  $5 \times 2$   
चौपाई, सवैया, मन्दाक्रांता, इन्द्रावज्रा ।

2. क) प्लेटो के काव्य सिद्धांतों से अरस्टो के काव्य सिद्धांत किन दृष्टिकोण से अलग है; आलोचना कीजिए । 13

अथवा

प्लेटो के काव्य सिद्धांतों पर विस्तार से आलोचना कीजिए ।

[ 2 ]

- ख) स्वच्छन्दतावाद के स्वरूप के बारे में आलोचना करते हुए उसके तत्वों पर समीक्षा कीजिए । 13

अथवा

विम्बवाद क्या है ? 'विम्ब' के बारे में विस्तार से आलोचना कीजिए ।

3. क) एक आलोचक के रूप में डॉ नगेन्द्र का व्यक्तित्व निराला है; प्रमाणित कीजिए । 12

अथवा

आचार्य हजारी प्रसाद द्विवेदी और आचार्य रामचंद्र शुक्ल के समीक्षा सिद्धान्तों का तुलनात्मक लेख प्रस्तुत कीजिए ।

- ख) निम्न प्रश्नों के उत्तर अति संक्षेप में दीजिए : 1 × 10

- i) नंद दुलारे वाजपेयी जी को किन आलोचक के सच्चे उत्तराधिकारी माना जाता है ।
- ii) वाजपेयी जी के पिता कौन थे ?
- iii) वाजपेयी जी किनके प्रिय शिष्य थे ?
- iv) वाजपेयी जी किस पत्रिका का सम्पादन करने के लिए गोरखपुर गये ?
- v) वाजपेयी जी किस विश्वविद्यालय के कुलपति बने ?

[ 3 ]

- vi) पिताजी के द्वारा महावीर प्रसाद द्विवेदी को दिये गये नाम क्या था ?

- vii) रोजी रोटी के लिए महावीर प्रसाद द्विवेदी जी को किस क्षेत्र में नौकरी करनी पडी ?

- viii) महावीर प्रसाद द्विवेदी जी के संपादित पत्रिका का नाम उल्लेख कीजिए ।

- ix) महावीर जी से अनुदित किस एक काव्य का नाम उल्लेख कीजिए ।

- x) महावीर जी का निधन कहाँ पर हुआ था ?

V-86-0.3

□□

2. Calculate the local electric field at an atom inside a dielectric solid by calculating depolarising field, Lorentz field and field of dipoles of cubic symmetry. 4+4+4

OR

What are ferro-electric materials and how do you classify those materials. Discuss the condition for polarisation catastrophe.

Distinguish between first order and second order transitions with one example each.  $1\frac{1}{2}+1\frac{1}{2}+5+4$

3. Starting from BCS Hamiltonian, discuss the superconducting ground state and obtain the gap equation at  $T = 0^{\circ}\text{K}$ . 8+4

OR

Write notes on :  $6 \times 2$

- i) High-Temperature Superconductors
- ii) SQUIDS.

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Describe in detail the quantum theory of diamagnetism of core electrons. Show that it agrees with the classical Langevin's result. 8+2
- b) List out the principal phenomena in magnetic resonance. 3
- c) What are excitons ? Distinguish between Frenkel and Mott-Wannier excitons. 1+2

OR

- a) Obtain an expression for the susceptibility of a free electron like metal on the basis of Pauli paramagnetism. What are the other contributions to the observed susceptibility of a paramagnetic metal ? 8+2
- b) How are colour centres produced in a solid ? Discuss the various properties of F-centres. 3+3

2015

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Define Political Socialisation and discuss phases of Political Socialisation.

OR

Define Political Recruitment and discuss factors influencing political recruitment.

2. Define Caste and discuss its characteristics.

OR

What is social mobility and discuss types of social mobility.

3. Write notes on any *five* of the following : 8 × 2

- Classification of Political Culture
- Significance of Political Culture
- Factors of Power
- Perspective of Power.

2015

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

୧. ଉଚ୍ଚାରଣ ଜ୍ଞାନ ଦୃଷ୍ଟିରୁ ଓଡ଼ିଆ ବ୍ୟଞ୍ଜନ ଧ୍ୱନି ଉତ୍ପାଦନରେ ବାରମ୍ବର ଭୂମିକା ଚିତ୍ର ସହକାରେ ବୁଝାଇ ଦିଅ । ୧୬

ଅଥବା

ଧ୍ୱନିର ସ୍ୱରୂପ ଉପରେ ଆଲୋଚନା କର ।

୨. ଓଡ଼ିଆ ସ୍ୱରଧ୍ୱନିର ସୃଷ୍ଟି ସଂପର୍କରେ ଆଲୋଚନା କର । ୧୬

ଅଥବା

ଓଡ଼ିଆ ଓ ଇଂରାଜୀ ବ୍ୟଞ୍ଜନ ଧ୍ୱନିର ତୁଳନାତ୍ମକ ବିଚାର କର ।

୩. ଯେ କୌଣସି *ଦୁଇଟି* ସଂକ୍ଷିପ୍ତ ଚିନ୍ତଣୀ ଲେଖ : ୪ × ୨

କ) ଅଲିକ୍ତିତ୍ୱ

ଖ) ସ୍ୱରାଘାତ ବା ବଳାଘାତ

ଗ) ସ୍ୱରତ୍ରିକୋଣ

ଘ) ଅର୍ଦ୍ଧସ୍ୱର

ଙ) ସଂଯୋଗ ଧ୍ୱନି ।

2015

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

୧. ବଳାଘାତକୁ ଧ୍ୱନିର ଗୁଣ ବୋଲି କାହିଁକି କୁହାଯାଏ, ବୁଝାଇ ଦିଅ । ୧୬

ଅଥବା

ଧ୍ୱନିଗ୍ରାମ କାହାକୁ କହନ୍ତି ? ଭାଷା ବିଜ୍ଞାନରେ ଏହାର କି ପ୍ରକାର ଆବଶ୍ୟକତା ରହିଛି, ଉଲ୍ଲେଖ କର ।

୨. ଧ୍ୱନିଗ୍ରାମ ପ୍ରତିଲିଖନ କାହାକୁ କହନ୍ତି, ଉଦାହରଣ ଦେଇ ବୁଝାଇ ଦିଅ । ୧୬

ଅଥବା

ସଂଧ୍ୱନି (allophone) କାହାକୁ କହନ୍ତି ? ଧ୍ୱନିଗ୍ରାମ ସହିତ ଥିବା ଏହାର ସଂପର୍କ ବୁଝାଇ ଦିଅ ।

୩. ଯେ କୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଚିହ୍ନଟି ଲେଖ : ୪ × ୨

କ) ବଳାଘାତ

ଖ) ଆଇ.ପି.ଏ.

ଗ) ଶବ୍ଦସ୍ୱର ଲହରୀ

ଘ) ମାନସ୍ୱର ।

2015

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

୧. ବଳାଘାତକୁ ଧ୍ୱନିର ଗୁଣ ବୋଲି କାହିଁକି କୁହାଯାଏ, ବୁଝାଇ ଦିଅ । ୧୬

ଅଥବା

ଧ୍ୱନିଗ୍ରାମ କାହାକୁ କହନ୍ତି ? ଭାଷା ବିଜ୍ଞାନରେ ଏହାର କି ପ୍ରକାର ଆବଶ୍ୟକତା ରହିଛି, ଉଲ୍ଲେଖ କର ।

୨. ଧ୍ୱନିଗ୍ରାମ ପ୍ରତିଲିଖନ କାହାକୁ କହନ୍ତି, ଉଦାହରଣ ଦେଇ ବୁଝାଇ ଦିଅ । ୧୬

ଅଥବା

ସଂଧ୍ୱନି (allophone) କାହାକୁ କହନ୍ତି ? ଧ୍ୱନିଗ୍ରାମ ସହିତ ଥିବା ଏହାର ସଂପର୍କ ବୁଝାଇ ଦିଅ ।

୩. ଯେ କୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଚିହ୍ନଟି ଲେଖ : ୪ × ୨

କ) ବଳାଘାତ

ଖ) ଆଇ.ପି.ଏ.

ଗ) ଶବ୍ଦସ୍ୱର ଲହରୀ

ଘ) ମାନସ୍ୱର ।

Describe relevant strategies of Educational Planning  
in Indian Context. 10

4. What is Communication ? Discuss nature,  
process and components of communication in  
class-room. 3+4+3+5

OR

Discuss need and importance of mass media in  
educational environment. 7+8

5. What is Micro-teaching ? Discuss the uses  
and limitations of Micro-teaching in class room  
situation. 3+6+6

OR

Write short notes on the following :  $2 \times 7\frac{1}{2}$

- a) Simulated Teaching  
b) Computer Assisted Learning.

**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. What do you mean by Educational Management ?  
State its nature. 5+5

OR

What is Democratic Management ? Discuss its  
salient features. 5+5

2. What is Managerial Behaviour ? Explain the factors  
affecting managerial behaviour. 3+7

OR

Discuss important elements and functions of school  
plant. 5+5

3. What is Educational Planning ? Discuss types of  
Educational Planning. 3+7

OR

Explain the strategies used by the teacher to encourage motivation and thoughtful learning in Educational settings.

4. Who are Gifted children ? How can teachers and parents help them in their education and guidance.

OR

Define mental retardation. Suggest measures for educating the students with mental retardation.

5. What is meant by assessment ? Explain the different current approaches to assessment.

OR

What do you mean by standardized test ? Discuss the advantages and limitations of standardized test used in classroom assessment.

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Discuss briefly the concepts and principles of Educational Psychology.

OR

Explain the styles of thinking and learning in Educational Psychology.

2. Define cognitive ability. Describe the instructional implications of different theories of cognitive development.

OR

Explain the role of motivation in behaviour and learning in the classroom settings.

3. State the different means of creating a positive learning environment in the classroom.

OR

**2015**

Full Marks - 50

Time - 3 Hours

The questions are of equal value

Answer **all** questions

1. Determine the extremal of the functional

$$I[y(x)] = \int_{-l}^l \left( \frac{1}{2} \mu y''^2 + p y \right) dx$$

subject to  $y(-l) = 0 = y'(-l)$ ,  $y(l) = y'(l) = 0$ .

OR

Find the curve joining given points A and B traversed by a particle moving under gravity from A to B in the shortest time.

2. Derive transversality condition of the functional

$$I[y(x)] = \int_{x_1}^{x_2} f(x, y, y') dx$$

when one of the boundary  $(x_1, y_1)$  is fixed and the other boundary  $(x_2, y_2)$  is moving.

OR

[ 2 ]

Find the extremum of the functional

$$I = \int_{x_1}^{x_2} (y'^2 + z'^2 + 2yz) dx \text{ with } y(0)=0$$

$z(0) = 0$  and the point  $(x_2, y_2, z_2)$  moves over the fixed plane  $x = x_2$ .

3. Investigate for an extremum the functional

$$I[y(x)] = \int_0^1 \left( x + 2y + \frac{y'^2}{2} \right) dx, \quad y(0) = 0, \quad y(1) = 0.$$

OR

Derive Weierstrass function of the functional

$$I[y(x)] = \int_{x_1}^{x_2} f(x, y, y') dx$$

$$y(x_1) = y_1, \quad y(x_2) = y_2.$$

4. a) Solve the integral equation with separable kernel

$$\phi(x) = 1 + \lambda \int_0^1 xs\phi(s) ds \quad 5$$

[ 3 ]

b) Transform the volterra integral equation of the 1st kind

$$x = \int_0^x (e^x + e^s) \phi(s) ds$$

into a volterra equation of 2nd kind.

OR

Solve the Fredholm equation of the second kind

$$\phi(x) = f(x) + \int_{-\infty}^{\infty} K(x-s) \phi(s) ds$$

5. Find the solutions to the Volterra equation of the second kind

$$\phi(x) = f(x) + \lambda \int_0^x \sin(x-s) \phi(s) ds$$

where  $f(x) = e^{-x}$  and  $\lambda = 2$ .

OR

Use the method of successive approximations to solve

$$\phi(x) = 1 + \lambda \int_0^1 e^{x+s} \phi(s) ds.$$

[ 4 ]

IV-UG-MIL(O)-II

ସଂଗ୍ରାମରେ ଲିପ୍ତ ହେଲେ ।

୮. ରାଧାନାଥ ଓଡ଼ିଆ ସାହିତ୍ୟରେ ଆଧୁନିକ ଯୁଗର ବାର୍ତ୍ତାବହ - ଆଲୋଚନା  
କର । ୧୫

ଅଥବା

ଫକୀର ମୋହନଙ୍କ ଉପନ୍ୟାସରୁ ସମକାଳୀନ ସମାଜର ଚିତ୍ର  
ପ୍ରଦାନ କର ।

V-105-3.5



2015

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

୧. 'ବିଦ୍ୟା ଓ ବିଦ୍ୟାର୍ଥୀ' ପ୍ରବନ୍ଧର ଭାବଧାରା ବିଶ୍ଳେଷଣ କର । ୨୦

ଅଥବା

ଧର୍ମ ସହିତ ସାହିତ୍ୟ ଓ ସମାଜ କିପରି ଜଡ଼ିତ ପଠିତ ପ୍ରବନ୍ଧ ଅନୁସରଣରେ  
ଆଲୋଚନା କର ।

୨. ସପ୍ତସଙ୍ଗ ସରଳାର୍ଥ ଲେଖ : ୧୦

ମାତ୍ର ଧନ ବିନିମୟରେ ବିକା ହେଉଥିବା ଜ୍ଞାନ କେବଳ ଧନିକ ଓ ଧନ  
କ୍ଷମତା ହାତରେ ଏକ ମତିହୀନ ଯନ୍ତ୍ର ମାତ୍ର ହୋଇ ରହିଯାଏ ।

ଅଥବା

ଯେ କୌଣସି ଦାୟିତ୍ୱ ପାଇଁ ବାର୍ଦ୍ଧକ୍ୟର ପ୍ରଜ୍ଞା ଓ ଯୌବନର ଶକ୍ତି ଦରକାର ।

୩. 'ଦୁର୍ଯ୍ୟୋଧନଙ୍କ ରଞ୍ଜନଦୀ ସଙ୍ଗରଣ' କବିତା ଅବଲମ୍ବନରେ ଦୁର୍ଯ୍ୟୋଧନଙ୍କ  
ପିତୃ ହୃଦୟର ପରିଚୟ ଦିଅ । ୨୦

ଅଥବା

V-105

[Turn Over

‘ସର୍ପ ଜଣାଣ’ କବିତାରେ ବ୍ୟାଜସ୍ତୁତି ଛଳରେ କବି କିପରି ଭକ୍ତି ନିବେଦନ କରିଛନ୍ତି, ଉଲ୍ଲେଖ କର ।

୪. ସପ୍ତସଙ୍ଗ ସରଳାର୍ଥ ଲେଖ : ୧୦

କେହ୍ନୁ ଏହି ମେରୁଗିରି ଚାଳିଲୀରେ ବାପ  
ହୃଦେ ଆଭରଣ କଲା କେହ୍ନୁ କାଳସର୍ପ ।

ଅଥବା

କେବେହେଁ ନିମ୍ନ ନୋହେ ମଧୁର  
ସଂଯୋଗ କଲେ ନେଇ ଶାକର  
କଳାକୁ ନ ଛାଡ଼ଇ ଅଙ୍ଗାର ଦୁଧେ  
ଧୋଇଲେ ଯେ ।

୫. ଯେ କୌଣସି **ଗୋଟିକର** ଭାବ ସଂପ୍ରସାରଣ କର : ୧୦

- କ) ତୁଳସୀ ଦୁଇ ପତ୍ରରୁ ବାସେ ।
- ଖ) ଧାର ପାଣି ପଥର କାଟେ ।
- ଗ) ବୋଝ ଉପରେ ନଳିତା ବିଡ଼ା ।

୬. ଯେ କୌଣସି **ପାଞ୍ଚୋଟି** ବାକ୍ୟ ଶୁଦ୍ଧ କରି ଲେଖ : ୫

- କ) ସାଂପ୍ରତିକ ସମାଜରେ ଅନେକ ସମସ୍ୟା ଦେଖାଯାଉଛି ।
- ଖ) ସେ ନେଳୀ କାଳିରେ ଲେଖୁଛି ।

- ଗ) ବର୍ଷାରେ ଅନେକ ଲୋକମାନେ ଓଦା ହେଉଛନ୍ତି ।
- ଘ) ରାକ୍ଷାସରାଜ ରାବଣ ସୀତାଙ୍କୁ ଅପହରଣ କରିଥିଲା ।
- ଙ) ଦୃତ ଗତି ବଡ଼ ବିପତ୍ତି ।
- ଚ) ଉନବିଂସ ଶତାବ୍ଦୀରେ ପାଇକ ବିଦ୍ରୋହ ହୋଇଥିଲା ।
- ଛ) ଧୂମ୍ରପାନ ଏକ ବଦଭ୍ୟାସ ।

୭. ଭାବ ସଂକ୍ଷେପଣ କର : ୧୦

ଗଲା ମହାଯୁଦ୍ଧ ପର ଠାରୁ ସାରା ଇଉରୋପରେ ବିଛୁଡ଼ି ହୋଇ ଦଳେ ଯୁବକ ଅଛନ୍ତି । ଦିନେ ସେମାନେ ସ୍ୱପ୍ନ ଦେଖୁଥିଲେ ଯେ ଏହି ଯୁଦ୍ଧଟା ହିଁ ମଣିଷ ଇତିହାସରେ ଶେଷ ଯୁଦ୍ଧ ହେବ । ଏହାପରେ ଆସିବ ସାରା ପୃଥିବୀରେ ଏକ ନୂତନ ଯୁଗ । ସବୁ ଆଦର୍ଶ ନେଇ ରାଷ୍ଟ୍ରଗୁଡ଼ିକ ଗଢ଼ି ଉଠିବ । ସେଠି ଧର୍ମର ଅନ୍ଧତା ନଥିବ, ପ୍ରତ୍ୟେକେ ହେବେ ସ୍ୱାଧୀନ, ଚାରିଆଡ଼େ ପ୍ରତିଷ୍ଠିତ ହେବ ଭ୍ରାତୃ ମୈତ୍ରୀ ଭାବ - ସେଥିପାଇଁ ସେମାନେ ଜୀବନମୂର୍ଚ୍ଛା ଲାଗି ପଡ଼ିଥିଲେ, କିନ୍ତୁ ଦେଖିଲେ ଯୁଦ୍ଧ ସରିଗଲା । କିଛିଦିନ ପରେ ଇଂଲଣ୍ଡରେ ଆସିଲା ଜାଠ ସରକାର । ଅତ୍ୟାଚାରର ଡେଉ ଖେଳିଲା ଆଫ୍ରିକା ମହାଦେଶରେ । ଫ୍ରାନ୍ସ, ଜର୍ମାନୀ, ଇଟାଲି, ଗ୍ରୀସ୍ ପଡ଼ିଲା ରକ୍ଷଣଶୀଳ ଧର୍ମାନ୍ତରୋଷୀଙ୍କ ପ୍ରଭାବରେ । ଇଉରୋପରୁ ଅର୍ଦ୍ଧେକ ରହିଲେ କମ୍ୟୁନିଷ୍ଟ ରୁଷର ଦାସତ୍ୱ ବନ୍ଧନରେ । ସ୍ୱାଧୀନତାର ଶେଷ ଦୀପଶିଖା ଅନିଶ୍ଚିତ ସମୟ ପାଇଁ ଲିଭିଗଲା । ସାମ୍ରାଜ୍ୟବାଦ ଜାହିର ରହିଲା । ରକ୍ଷଣଶୀଳ ଧର୍ମ ହେଲା କ୍ଷମତାଶୀଳ । ଅତ୍ୟାଚାର, ଅସମତା ପୃଥିବୀରେ ବଢ଼ିଗଲା । ଏହି ଆଦର୍ଶବାଦୀ କତିପୟ ଯୁବକଙ୍କ ଦଳ ସିନିକ୍ ପାଲଟି ଗଲେ । ଭବିଷ୍ୟତ ପ୍ରତି ସେମାନଙ୍କର ବିଶ୍ୱାସ ଚୁଟିଲା, ନିଜର ଜୀବନ

Prepare a report on the activities of a cultural body of which you are Secretary.

5. Hemingway's novel "The Oldman and the Sea" is based on a simple belief that "Man can be destroyed, but not defeated". Elucidate. 20

OR

Sketch the character of Santiago.

6. Give a thematic analysis of Arthur Miller's play "All My Sons". 20

OR

Draw a character sketch of Kate Keller.

V-107-0.3



**2015**

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Fill in the blanks by choosing appropriate words from the brackets : 4
- i) Two-third of the boys \_\_\_\_\_ (is/are) absent.
  - ii) Either he or we \_\_\_\_\_ (was/were) in the list.
  - iii) New York with all its lights \_\_\_\_\_ (look/looks) beautiful from a distance.
  - iv) He died \_\_\_\_\_ (of/from) over-eating.
- b) Change the voice of the following sentences : 4
- i) One should keep one's promise.
  - ii) They told us to walk on the left.
  - iii) Shall we ever forget those memorable days ?
  - iv) The town was destroyed by an earthquake.

[ 2 ]

- c) Change the following sentences into indirect speech : 4
- i) The priest said, "God rules and governs all things".
  - ii) They said to the stranger, "Why have you come here ?"
  - iii) The servant said to the master, "Forgive me sir".
  - iv) Jane said to them all, "Good-bye my friends".
- d) Replace the underlined portions by suitable phrasal verbs : 4
- i) The battery of the mobile has become weak.
  - ii) Lisa and Ramesh have quarrelled.
  - iii) You must help him during his distress.
  - iv) The sickman died in his sleep.
- e) Punctuate the following sentences : 4
- Everyday Robert eats bread butter and curry this is his regular diet do you think it to be a good food-habit

[ 3 ]

2. Write an application to the Secretary of a college in response to an advertisement in The Samaj, to appoint you as a junior clerk-cum-typist. 10

OR

What do you understand by the word 'resume' ?  
Frame your own resume.

3. Edit the following passage : 15

The Twentieth century is the edge of machines From the time of the Industrial revolution began in europe. man's life have bin changing in many ways. At fast The change were slow. but in the second half of the nineteenth century their was An increase in the rate of mechanisaTion And as a resulted life began two change moor quickley during the last Fifty ears, machines of all kindes has become part Of hour daily Life and have transformed it in the most incredible manner.

4. Write a report on the activities of the N.S.S. volunteers of your college in a flood-affected area to be published in a local newspaper. 15

OR

[ 4 ]

department is 60, 40 and 80 hours for weaving, processing and packing department respectively.

Formulate the linear programming problem to find the product mix to maximize the profit.

OR

Solve graphically the following L.P.P.

$$\text{Max } z = 3x_1 + 5x_2$$

$$\text{subject to } x_1 + 2x_2 \leq 2000$$

$$x_1 + x_2 \leq 1500$$

$$x_2 \leq 600$$

$$\text{and } x_1 \geq 0, x_2 \geq 0.$$

7. Show that the set

$$S = \{(x_1, x_2) \in \mathbb{R}^2 : 4x_1 + 3x_2 \leq 6, x_1 + x_2 \geq 1\}$$

is a convex set.

OR

Let S be a closed convex set which is bounded from below. Prove that S has extreme points in every supporting hyperplane.

**IV-UG-Math(P/EL)-IV**  
(Arts/Sc)

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Perform five iterations of the Regula-Falsi method to obtain a real root of the equation

$$x^3 - 5x + 1 = 0$$

OR

Prove that Newton-Raphson method converges quadratically.

2. Construct the divided difference table for the data

x	0.5	1.5	3.0	5	6.5	8
f(x)	1.625	5.875	31	131	282.125	521

Hence, find the interpolating Polynomial.

OR

[ 2 ]

For the following data, calculate the differences and obtain the Newton-Gregory forward difference polynomial and find  $f(0.25)$  :

x	0.1	0.2	0.3	0.4	0.5
f(x)	1.40	1.56	1.76	2.00	2.28

3. Evaluate  $\int_0^1 \frac{dx}{1+x^2}$  using the Simpson's  $\frac{1}{3}$  Rule with 6 subintervals. Compare with the exact solution.

OR

Evaluate  $I = \int_0^2 \frac{dx}{3+4x}$ , by Gauss-Legendre two point and three point formulas.

4. Solve  $\frac{dy}{dx} = -2xy^2$ ,  $y(0) = 1$  by Euler's method with  $h = 0.2$  on the interval  $[0, 1]$ .

OR

Using Picard's method, find the 4th approximation of i.v.p,  $\frac{dy}{dx} = x + y^2$ ,  $y(0) = 1$ .

[ 3 ]

5. For  $f(x) = e^x$ , find the approximations to  $f''(1)$  with  $h = 0.1, 0.01, 0.001$ .

OR

Solve the system of Linear equations

$$5x_1 - x_2 + 0x_3 = 9$$

$$-x_1 + 5x_2 - x_3 = 4$$

$$-x_2 + 5x_3 = -6$$

by Jacobi method.

6. A company has three operational departments (weaving, processing and packing) with capacity to produce three different types of clothes namely Suitings, Shirtings and Woollens yielding a profit of Rs.2, Rs.4 and Rs.3 per meter respectively. One meter suiting requires 3 minutes in weaving, 2 minutes in processing and 1 minute in packing. Similarly one meter of shirting requires 4 minutes in weaving, 1 minute in processing, 3 minutes packing and one meter woollens requires 3 minutes in each department. In a weak, total run time of each

[ 5 ]

8. Use simplex method to solve the following L.P.P. :

$$\begin{aligned} \text{Maximize } z &= x_1 + x_2 + 3 \\ \text{subject to } x_1 + 3x_2 &\leq 9 \\ 2x_1 + x_2 &\leq 8 \\ 3x_1 + 4x_2 &\geq 12 \\ \text{and } x_1 &\geq 0, x_2 \geq 0 \end{aligned}$$

OR

$$\begin{aligned} \text{Use Big-M method to maximize, } z &= 6x_1 + 4x_2 \\ \text{subject to } 2x_1 + 3x_2 &\leq 30 \\ 3x_1 + 2x_2 &\leq 24 \\ x_1 + x_2 &\geq 3 \\ x_1 &\geq 0 \text{ and } x_2 \geq 0. \end{aligned}$$

9. Obtain the dual problem of the following L.P.P.

$$\begin{aligned} \text{Minimize } z &= x_1 - 3x_2 - 2x_3 \\ \text{subject to the constraints :} \\ 3x_1 - x_2 + 2x_3 &\leq 7 \\ 2x_1 - 4x_2 &\geq 12 \\ -4x_1 + 3x_2 + 8x_3 &= 0 \\ x_1, x_2 &\geq 0 \\ \text{and } x_3 &\text{ is unrestricted.} \end{aligned}$$

OR

[ 6 ]

Prove that the dual of the dual is the primal.

10. Prove that the number of basic (decision) variables of the general transportation problem at any stage of the feasible solution must be  $m + n - 1$ .

OR

Solve the following assignment problem :

	A	B	C	D
I	1	4	6	3
II	9	7	10	9
III	4	5	11	7
IV	8	7	8	5

V-109-1.3



2015

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. किन्हीं **दो** अवतरणों की सप्रसंग व्याख्या कीजिए : 12 × 2
- क) जो अपनी उन्नति के प्रयत्न में बराबर लगा रहता है उसे न तो नैराश्य होता है और न हर घड़ी दूसरे की स्थिति के मिलान करते रहने की फुरसत । इर्ष्या की सबसे अच्छी दवा है उद्योग और आशा । जिस वस्तु के लिए उद्योग और आशा निष्फल हो उस पर से अपना ध्यान हटाकर सृष्टि की अनन्तता से लाभ उठाना चाहिए ।
- ख) जंग बहादुर के स्वार्थ त्याग पर कोई काव्य चाहे न लिखा जाय, पर मेरे हृदय में उसकी स्मृति एक कोमल मधुर कविता है ।
- ग) हल्दी-दूब इस देश की संस्कृति को रूप और सौन्दर्य-स्पर्श देते रहे हैं, कमल गंध देता रहा है; पर दधि-अच्छत रस तथा शब्द देते रहे हैं ।

[ 2 ]

घ) आज संस्कृति का अभिधान है, जो न होता तो अच्छा होता, पर उसका अभिव्यंजन नहीं है। उस अभिव्यंजन को न पाकर ही साहित्य रिक्त है, सांस्कृतिक जीवन भी मृदंग की भाँति मुखर होते हुए भी खोखला है।

2. किन्हीं दो प्रश्नों का उत्तर दीजिए :  $15 \times 2$

क) 'इर्ष्या' निबन्ध में आचार्य रामचन्द्र शुक्ल इर्ष्या नामक मनोविकार का किस रूप में विश्लेषण किया है।

ख) दो पर्वत पुत्रों का चरित्र-चित्रण महादेवी वर्मा के संस्मरण के आधार पर कीजिए।

ग) भारतीय संस्कृति में हल्दी, दूब, दधि, अच्छत के महत्व पर विचार कीजिए।

3. किन्हीं दो प्रश्नों का उत्तर दीजिए :  $15 \times 2$

क) भाषा की एक वैज्ञानिक परिभाषा प्रस्तुत करते हुए उसके स्वरूप पर प्रकाश डालिए।

ख) कार्यालयी भाषा के रूप में हिन्दी का व्यवहार एवं उसकी सफलताओं का मूल्यांकन कीजिए।

[ 3 ]

ग) किसी एक मिडिया रूप का उदाहरण देते हुए विश्लेषण कीजिए कि उस माध्यम से मिडिया की भाषा के रूप में हिन्दी का कैसा विकास हुआ है।

4. हिन्दी में अनुवाद कीजिए : 16

Science and technology should aim to serve the people who are at the grass-root of our social structure. Welfare of mankind is the purpose of all human knowledge. Some evil-minded and over-ambitious people have used the power of science in destructive modes. If our mother-earth and mankind have to survive for a long time it is possible with constructive use of science. Victory science is the victory human civilisation.

2015

Full Marks - 75

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) State Bohr's postulates and obtain expression for energy of the electron in the  $n$ th energy level in an atom. 3+9
- b) Calculate the energy of electron in the second energy level of hydrogen atom. 3

OR

- c) Describe Frank-Hertz experiment and state the importance of its result. 10+2
  - d) State Duan-Hunt law. 3
2. a) What is Compton effect ? Derive an expression for Compton shift. 2+10
  - b) Obtain a relation between phase velocity and group velocity. 3

OR

[ 2 ]

- c) State and explain Heisenberg's uncertainty principle. 2+3
- d) Applying this principle show that the electron can not exist inside the nucleus and find expression for ground state energy of hydrogen atom. 5+5
3. a) State the properties of linear operators. 5
- b) Establish the orthonormality relation between eigen functions. 10
- OR
- c) Set up the time independent Schrodinger equation in one dimension. 3
- d) Solve the Schrodinger equation for a one-dimensional potential step of height  $V_0$  for the case particle energy  $E < V_0$ . 12
4. a) State the properties of nuclear force. 5
- b) Find the relation between half-life of a radio active substance and its decay constant. 10

OR

[ 3 ]

- c) Describe with necessary theory the working and construction of a cyclotron. 8+4
- d) State its limitations. 3
5. a) State the postulates of special theory of relativity. 3
- b) Set up Lorentz transformation equations. 12

OR

- c) Derive the formula showing variation of mass of a body with its speed or velocity. 12
- d) Calculate the speed of a body for which its mass is increased to double of its rest mass. 3

V-110-1



6. a) Explain the aromatic characters of furan, pyrrole and thiophene. 3
- b) Discuss the amphoteric nature of pyrrole. 4
- c) Explain Diels-Alder reaction in furan. 3½
- d) How can you prepare thiophene from acetylene? 2

OR

- a) Give preparation and uses of two organosulphur compounds. 4½
- b) Write notes on the following : 4 × 2
- i) antipyretics
- ii) antimalarial drugs.

V-111-0.5

**2015**

Full Marks - 75

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) State and explain Kohlrausch law. Discuss some of its applications. 4+3
- b) Define transport number. How can it be determined by moving boundary method? 1+4½

OR

- a) Discuss conductometric titration of a weak acid and a strong base. 4
- b) Explain salt hydrolysis. Derive expression for hydrolysis constant. How can it be determined from conductometric titration? 2+2½+4

2. a) Define reversible electrode. Write the electrode reactions of a Galvanic cell. 2+3

V-111

[Turn Over

[ 2 ]

- b) How can solubility product of a sparingly soluble salt can be determined by EMF measurement ? 7½

OR

- a) Discuss different methods of preventing corrosion. 4
- b) Draw the phase diagram for sulphur system and explain different parts of it. 8½
3. Discuss two methods of preparation and two properties of diborane. Explain its structure. 3+3+6½

OR

- a) Discuss the structure of  $\text{ClF}_7$  and  $\text{ClF}_3$ . 6
- b) What are Carbides ? Discuss preparation and properties of  $\text{SiC}$ . 2+2+2½
4. a) What are important ores of nickel ? Discuss the Mond's process of extraction of nickel. 2+6
- b) Discuss its oxidising properties of  $\text{K}_2\text{Cr}_2\text{O}_7$ . 4½

OR

[ 3 ]

- a) Discuss different alloys of Chromium. 4
- b) How  $\text{K}_3[\text{Co}(\text{NO}_2)_6]$  is prepared ? 4
- c) Discuss the function of myoglobin in biological system. 4½
5. a) How Ketones can be synthesised from Grignard's reagent ? 2
- b) Name the products of the reaction : 2 × 2
- i)  $\text{CH}_3\text{MgBr} + \text{C}_2\text{H}_5\text{OH} \rightarrow$
- ii)  $\text{C}_2\text{H}_5\text{MgBr} + \text{Br}_2 \rightarrow$
- c) Explain the mechanism of Knoevenagel reaction. 6½

OR

- a) Name the product of the reaction : 2½
- $$\text{CH}_3\text{COCH}_2\text{COOC}_2\text{H}_5 \xrightarrow[\text{reduction}]{\text{Electrolytic}}$$
- b) Write notes on the following : 5 × 2
- i) Gabriel synthesis
- ii) Isoelectric point.

[ 2 ]

IV-UG-Bot(P/EL)-VII

3. What are Auxins ? What role do they play in plant growth and development ?

OR

Write notes on the following :

- a) Sigmoid curve
  - b) Factors affecting plant growth.
4. Discuss the cause, effect and control measure of Air Pollution.

OR

Write notes on the following :

- a) Food Web
  - b) Ecological Pyramid.
5. Describe the formation, function and types of endosperm in Angiosperms.

OR

Write notes on the following :

- a) Tapstum
- b) Nucellus.

**2015**

Full Marks - 75

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*Give labelled diagrams wherever necessary*

1. Explain some physical force theories responsible for conduction of water in plants.

OR

Write notes on the following :

- a) Importance of imbibition in plants
  - b) Diffusion and its significance.
2. Describe the mechanism of formation of Carbohydrates in green plants through Calvin cycle.

OR

Write notes on the following :

- a) Symbiotic Nitrogen fixation
- b) Photophosphorylation

3. Write an essay on the causes of Water pollution and its remedial measures.

OR

Write notes on any *two* of the following :

- Types of biodiversity
  - Food chain and food web
  - Community.
4. Discuss Vermitechnology in detail.

OR

Write notes on any *two* of the following :

- Innate immunity
  - AIDS
  - Wildlife conservation.
5. What do you mean by induced breeding ? Describe induced breeding in fish.

OR

Write notes on any *two* of the following :

- Population and sample
- Mean
- Sericulture.

**2015**

Full Marks - 75

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Draw labelled diagrams wherever necessary*

1. Give an account of structure of thyroid gland and discuss the functions of thyroid hormones.

OR

Write notes on any *two* of the following :

- Chemical nature of hormones
- Hormones of neurohypophysis
- Mechanism of action of steroid hormone.

2. Briefly describe the mechanism of fertilization.

OR

Write notes on any *two* of the following :

- In vitro* fertilization
- Ultrastructure of mammalian sperm
- Types of cleavage.

- 5 a) State and illustrate the multiplication theory of probability. 8
- b) In a single throw of two uniform dice, find the probability of throwing (i) five (ii) eight. 4+4

OR

- a) State the important properties of the normal curve and the normal distribution. 8
- b) The probability that a student entering the college will graduate is 0.4. Determine the probability that out of 5 students (i) None (ii) at least one will graduate. 4+4

V-114-3

**2015**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Define Statistics. Explain its functions and limitations. 4+6+6

OR

Calculate Karl Pearson's co-efficient of Skewness from the following data : 16

<i>Variable</i>	<i>Frequency</i>
70-80	11
60-70	22
50-60	30
40-50	35
30-40	21
20-30	11
10-20	6
0-10	5

[ 2 ]

2. What is correlation ? How it is different from regression ? Explain different types of correlation you know. 4+4+8

OR

Calculate two regression lines and the correlation coefficient from the following data : 12+4

X	57	58	59	59	60	61	62	64
Y	67	68	65	68	72	72	69	71

3. What is an Index number ? What are its uses ? Explain the problems in constructing Index number. 4+4+8

OR

Calculate Fisher's Ideal Index number for the following data and prove that it satisfies factor reversal test. 12+4

Commodity	Base Year		Current Year	
	Qty.	Expenditure (₹)	Qty.	Expenditure (₹)
A	20	240	25	375
B	8	80	10	160
C	2	30	1	12
D	1	60	1	65
E	2	6	1	10

[ 3 ]

4. What do you mean by Trend ? Explain in brief, the various methods that can be used for determining trend. 4+12

OR

Assume a four-yearly cycle and calculate the trend by the method of moving averages from the following data relating to the production of sugar in India. 16

<i>Year</i>	<i>Production</i> (00,000'tons)
2005	464
2006	515
2007	518
2008	467
2009	502
2010	540
2011	557
2012	571
2013	586
2014	612

The following are the ratios relating to the activities of National Traders Ltd. :

Stock velocity	6 months
Creditors velocity	2 months
Debtors velocity	3 months
Gross Profit ratio	25%

Gross Profit of the year ended 31st December 2014 amounts to ₹4,00,000. Closing stock of the year ₹10,000 more of the opening stock. Bills receivable amounts to ₹25,000 and bills payable to ₹10,000.

Find out :

- i) Sales
- ii) Purchases
- iii) Sundry Creditors
- iv) Sundry Debtors
- v) Closing Stock.

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer **all** questions

1. What is Cost Accounting ? Explain briefly the scope and objectives of Cost Accounting.

OR

Following informations are available from the records of Alpha Company :

Direct material ₹4,400, Works overhead ₹8,400, Direct labor ₹2,100, Administrative overhead ₹2,980. The company absorbs works overhead as a percentage of direct wages and administrative overhead as percentage of works cost. Prepare a cost sheet and calculate the price which the company should quote for the product from the following data :

Direct material ₹200, Direct labour ₹80, Selling expenses 14.3% on cost of sales, Profit desired is 12.5% on sales.

[ 2 ]

2. What are (a) Bin Card and (b) Stores ledger ? State what purpose do they serve and bring out the distinction between the two.

OR

Calculate Labour hour rate of a worker from the following data :

Basic pay = ₹200 per month, DA ₹150 per month, Fringe benefit ₹100 per month. No. of working days in a year 300 @ 8 hours per day.

*Leave rules :*

- a) 30 days full pay and 20 days half pay leave in a year is availed and allowed.
- b) What would be the effect an hourly rate if only 30 days full pay leave is allowed.
3. What do you mean by overhead absorption ? Explain briefly the methods of absorbing factory overhead.

OR

The following overhead data were available from a primary distribution summary :

Production Department overhead cost for A - ₹5000, B - ₹6,000, C ₹3,000 and service department

[ 3 ]

overhead cost for  $S_1$  - ₹2,250 and for  $S_2$  - ₹1,000. The company decided to apportion the service department cost on the following percentage.

	A	B	C	$S_1$	$S_2$
$S_1$	40%	30%	20%		10%
$S_2$	30%	30%	30%	20%	

Find the total overhead of Production Department after distribution of Service Department cost.

4. How does Management Accounting differ from Financial Accounting ? What are the limitations of management accounting ?

OR

What do you mean by reconciliation of cost and financial accounting ? Why is it necessary ? Under what circumstances can a reconciliation statement be avoided ?

5. Explain the concept of working capital. What shall be the repercussions if a firm has (i) Redundant working capital (b) inadequate working capital ?

OR

derived and received by the illusion of supposing if some nonsense syllable, Sir or count or lord is pronounced in conjunction of our names we belong to superior order of peoples.

- 4 Prepare a report on the zonal camp of Youth Red Cross organised by your college recently. 15

OR

Write a report on the celebration of marriage ceremony of your elder sister.

5. What message do you draw from the novel 'Old Man and the Sea' ? 20

OR

Discuss the importance of the boy, Manolin in 'Old Man and the Sea'.

6. Comment on Miller's tragic vision of life on the basis of his play 'All My Sons'. 20

OR

Analyse the character of Joe Keller.

**2015**

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Do as directed :

- a) Supply the correct punctuation mark in the following wherever necessary : 1 × 4

i) I have news for you your brother has arrived

ii) Hello Is anybody there

- b) Change the following into reported speech :

1 × 4

i) He said to me, "Is your brother at home ?"

ii) Mita said, "Who gave Greenland its name ?"

iii) Arun says, "Barun was ill yesterday".

iv) "Hello ! How are you ?", my friend said.

- c) Change into passive voice : 1 × 4

i) He answered the question.

ii) He has completed the work.

[ 2 ]

- iii) Who broke the cup ?
- iv) Open the window.
- d) Replace the underlined with phrasal verbs : 1 × 4
- i) I don't understand what you say.
- ii) He rejected the proposal.
- iii) I shall visit you next Sunday.
- iv) the daughter resembles her father.
- e) Fill in the blanks with suitable alternatives given in brackets : 1 × 4
- i) Five thousand rupees \_\_\_\_\_ (is/are) too much for a cycle.
- ii) Mr. Sharma with his children and wife \_\_\_\_\_ (has/have) gone to Agra.
- iii) Bread and butter \_\_\_\_\_ (is/are) our problem.
- iv) His friend, philosopher and guide \_\_\_\_\_ (is/are) no more.
2. Write a resume to be sent to the Manager of a reputed mercantile firm seeking a job as a sales executive. 10

OR

[ 3 ]

Write a letter to the General Manager of a multi operational company applying for the post of a Tele Caller.

3. Attempt a copy editing of the following passage : 15
- The illusions by which men have lived seem to be of two Kinds. First there is what one may perhaps call the great illusion I mean the religious illusion that the universe is Moral and Good that it follows a wise and noble plan that it is gradually generating some supreme value that goodness is bound to triumph in it. Second there is a whole host of minor illusions on which human happiness nourishes itself. How much of Human Happiness notorious comes from the illusion of the Lover about his Beloved ! Then again we work and strive because the illusions connected with fame, glory, power, or money. Banners of all kind, flags, emblems, insignia, ceremonies and ritual are invariably symbols of some illusions, or other. The British empires the connection between mother country and dominion is part kept going by illusion surrounding notion of king. Or, think the vast amounts of human happiness which is

2015

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) State and prove Gauss's law in electrostatics. 3+7
- b) Using Gauss's law obtain the expression for the fields due to a spherically symmetric charge distribution at points lying (i) outside and (ii) inside it. 5+5

OR

- c) State and explain Biot-Savart's law. give its vector form. Write the S.I. unit of magnetic induction. 3+1+1
- d) Using Biot-Savart's law deduce the expression for the magnetic induction on the axis of a circular coil carrying current and hence find its value at its centre. 12+3

[ 2 ]

2. Derive the expressions for the instantaneous currents during the growth and decay in L-R circuit connected to a d.c. source. Show the growth and decay curves graphically. 8+8+2+2

OR

A circuit containing resistance, capacitance and inductance in series is connected to an a.c. source. Deduce the expression for the current and draw the phasor diagram. 16+4

3. What do you mean by a rectifier ? With a neat circuit diagram describe the construction and working of a full wave rectifier. Obtain the expression for its ripple factor and efficiency. 1+3+4+6+6

OR

With the neat circuit diagrams describe the theory of Hartley oscillator and obtain the necessary condition for resonance. 5+10+5

4. Define ionisation potential and resonance potential. With a neat diagram describe Frank-Hertz experiment to demonstrate their study. 2+2+2+14

OR

[ 3 ]

What is a Cyclotron and how is it different from a linear accelerator ? Describe the principle, construction, theory and working of a cyclotron. Discuss its limitations. 2+1+2+2+10+3

5. Define Compton effect and Compton shift. Deduce the expression for the Compton shift. Under what condition the Compton shift is maximum ? Obtain its value. 2+1+12+1+4

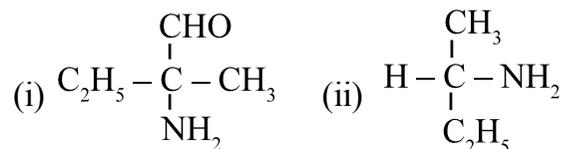
OR

Obtain the time dependent Schrodinger's wave equation of motion of a particle in one dimension under the action of a conservative force and hence find the one-dimensional wave equation for a free particle. 15+5

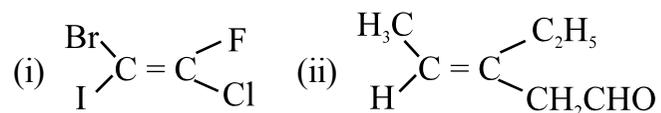
V-117-0.2



5. a) Discuss optical isomerism of tartaric, acid. 4  
 b) Assign 'R' or 'S' configuration to the following compounds : 3



- c) Explain geometrical isomerism in maleic and fumaric acids. 4  
 d) Assign 'E' or 'Z' configuration to each of the following compounds. 3



- e) Discuss two methods used for resolution of racemic mixture. 6

OR

- f) Distinguish between configuration and conformation. 5  
 g) Discuss various conformations of n-butane with special reference to their stability. 6

**2015**

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) State and explain Raoult's law. 6  
 b) Derive a relation between elevation of boiling point of a solution and molecular mass of the solute dissolved in it. 9

OR

- c) Define osmosis and osmotic pressure. Discuss laws of osmotic pressure. 2+4  
 d) Explain extensive and intensive properties with suitable examples. 4  
 e) Establish a relation between  $C_p$  and  $C_v$ , where the terms have their usual meanings. 5
2. a) Give an account of Hess's law of constant heat summation. 5  
 b) State and explain second law of thermodynamics. 5

[ 2 ]

- c) Discuss one application of conductance measurement. 5

OR

- d) State Kohlrausch's law.

If the molar conductivities at infinite dilution of NaCl, HCl and CH<sub>3</sub>COONa are 126.4, 426.1 and 91.0 Ohm<sup>-1</sup>cm<sup>2</sup>mol<sup>-1</sup> respectively, what will be the molar conductance of acetic acid at infinite dilution ? 2+3

- e) Aqueous solution of NaCl is neutral but that of CH<sub>3</sub>COONa is alkaline. Explain. 3
- f) What is buffer solution ? Derive Henderson's equation for calculating pH. 2+5
3. a) Write a note on Werner's co-ordination theory. 6
- b) Write the IUPAC names of the following complex compounds : 3
- i) K<sub>4</sub>[Fe(CN)<sub>6</sub>]
- ii) [Co(NH<sub>3</sub>)<sub>6</sub>] Cl<sub>3</sub>.
- c) State and explain Effective Atomic Number (EAN) rule with an example. 1+2

[ 3 ]

- d) Why are 'd'-block elements called as transition elements ? Give the electronic configuration of the element with atomic number 24. 2+1

OR

- e) What is lanthanide contraction ? Write the cause and consequences of lanthanide contraction. 1½+1½+3
- f) Write the general characteristics of first row transition elements with particular reference to their oxidation state, colour and magnetic behaviour. 3 × 3

4. a) Discuss Lux-Flood concept of acids and bases. 4
- b) Name the noble gases. Give their electronic configuration. 5
- c) Discuss the structure of XeF<sub>2</sub> and XeO<sub>3</sub>. 3+3

OR

- d) Write two methods of preparation of diborane. Discuss its hydrogen bridge structure. 2+5
- e) Write two ores of Chromium. How is Chromium metal extracted from its chief ore ? 1+7

[ 5 ]

- h) Write one method of preparation of methyl magnesium bromide. 3
- i) What happens when methyl magnesium bromide is treated with the following reagents and the products are hydrolysed ?
- i) Ethylene oxide
  - ii) Carbon dioxide. 3+3
6. a) What do you mean by active methylene groups ? 2
- b) How will you carry out the following transformations ? 3 × 4
- i) Acetoacetic ester → Crotonic acid
  - ii) Malonic ester → Succinic acid
  - iii) Aceto acetic ester → n-Valeric acid
  - iv) Aceto-acetic ester → 4-methyl uracil.
- c) Discuss one method of preparation of amino acid. What happens when an amino acid reacts with nitrous acid ? 4+2

OR

[ 6 ]

- d) How is glycine prepared from Chloroacetic acid ? 2½
- e) How will you separate a mixture of primary, secondary and tertiary amines by Hinsberg's method ? 7½
- f) What is meant by 'isoelectric point' of amino acids ? 3
- g) How is benzene diazonium chloride prepared ? 3
- h) Phenol is acidic. Explain. 4

V-118-1.5



[ 2 ]

3. Give an account of the complementary and supplementary factors showing one example of each.

OR

Write notes on the following :

- a) Genetic Engineering
- b) Gene Library.

4. Describe briefly the botany, cultivation and economic importance of Rice.

OR

Write notes on the following :

- a) Modern Synthetic theory
- b) Hybrid vigour.

5. Describe briefly Hutchinson's system of classification.

OR

Write notes on the following :

- a) Floral structure of Family *Apocyanaceae*.
- b) Floral formula and Floral diagram of Family *Euphorbiaceae*.

IV-UG-Bot(Maj.EL)-II

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*Give labelled diagrams wherever necessary*

1. What is Heterospory ? Give an account of life history of *selaginella* showing heterospory.

OR

Write notes on the following :

- a) Ultra structure of plant cell
- b) Mitosis.

2. Give an account of the different types of adoptive anomalous secondary growth in Angiosperms.

OR

Write notes on the following :

- a) Apical meristem
- b) Growth rings.

[ 2 ]

Write notes on any **two** of the following :

- a) Parturition
- b) Artificial insemination
- c) Corpus luteum
- d) Functions of Testis.

4. Give an account of applications of biotechnology in human welfare.

OR

Write notes on any **two** of the following :

- a) RNA
- b) Genetic engineering
- c) Translation
- d) Chemical nature of gene.

5. Describe the structure and life cycle of any phage you have studied.

OR

Write notes on any **two** of the following :

- a) Cancer
- b) Antibody
- c) Economic importance of bacteria
- d) AIDS.

IV-UG-Zool(Maj.EL)-II

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*Support your answer with suitable diagrams*

1. Explain the mechanism of conduction of nerve impulse.

OR

Write notes on any **two** of the following :

- a) Enzyme Classification
- b) Cardiac Cycle
- c) Blood group
- d) DNA.

2. Describe the structure and functions of thyroid gland.

OR

Write notes on any **two** of the following :

- a) Properties of hormone
- b) Islet of Langerhans
- c) Neurohypophysis
- d) Medullary hormones.

3. Explain menstrual cycle. Add a note on its control mechanism.

OR

$$\text{Mini } z = 4x_1 + 8x_2 + 3x_3$$

$$\text{subject to } x_1 + x_2 \geq 2$$

$$2x_1 + x_3 \geq 5$$

$$x_1, x_2, x_3 \geq 0.$$

7. Test the convergence of any **three** of the following series  $\sum a_n$ , where  $a_n$  is given by

i)  $a_n = \frac{n!}{n^3}$

ii)  $a_n = \frac{1}{n(\log n)^2}, n \geq 2$

iii)  $a_n = \sqrt{n+1} - \sqrt{n}$

iv)  $a_n = \frac{n!}{n^n} 2^n$

v)  $a_n = \sin \frac{1}{n}$

8. State Lagrange's mean value theorem, and using it prove that

$$\frac{x}{1+x^2} < \tan^{-1} x < x, \quad x > 0$$

OR

Expand  $x^2y + 3y - 2$  in powers of  $x - 1$  and  $y + 2$ .

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*Symbols used have their usual meaning*

1. Determine the initial approximations to find the smallest positive root of the equation  $x^4 - x - 10 = 0$  and use these to find the root correct to three decimal places by the Secant method.

OR

Perform five iterations of the Newton-Raphson method to find the smallest positive root of the equation  $x^3 - 5x + 1 = 0$ . Compare with the exact value.

2. Construct the interpolating polynomial that fits the data :

x	0	0.1	0.2	0.3	0.4	0.5
f(x)	-1.5	-1.27	-0.98	-0.63	-0.22	0.25

Using (i) Gregory-Newton forward difference and (ii) Gregory-Newton backward difference interpolation. Hence estimate the values of  $f(x)$  at  $x = 0.15, 0.45$ .

OR

[ 2 ]

Find the unique polynomial  $P(x)$  of degree 2 or less such that  $P(1) = 1$ ,  $P(3) = 27$ ,  $P(4) = 64$  using

- i) Lagrange interpolating formula
- ii) Newton divided difference formula.

Estimate  $P(1.5)$ ,  $P(2)$ .

3. Numerically integrate

$$I = \int_0^1 x \sin x \, dx$$

by Simpson's  $\frac{1}{3}$  rule with 6-subintervals.

OR

Evaluate approximately the integral

$$I = \int_0^1 x e^{-x} \, dx,$$

by 2-point and 3-point Gauss-Legendre rules.

4. Solve  $\frac{dy}{dx} = x + y$ ,  $y(0) = 1$ , by Picard's method.

OR

Solve by Euler's method

$$\frac{dy}{dx} = xy^2; y(1) = 2$$

Determine  $y(2.1)$  by choosing  $h = 0.1$  and  $h = 0.05$ .

[ 3 ]

5. Solve the following L.P.P. by graphical method ;

$$\begin{aligned} \text{Max } z &= 5x_1 + 7x_2 \\ \text{s.t. } x_1 + x_2 &\leq 4 \\ 3x_1 + 8x_2 &\leq 24 \\ 10x_1 + 7x_2 &\leq 35 \\ \text{and } x_1, x_2 &\geq 0. \end{aligned}$$

OR

$$\begin{aligned} \text{Mini } z &= 2x_1 + 3x_2 \\ \text{s.t. } x_1 + x_2 &\leq 4 \\ 6x_1 + 2x_2 &\geq 8 \\ x_1 + 5x_2 &\geq 4 \\ x_1 &\leq 3 \\ x_2 &\leq 3 \\ \text{and } x_1, x_2 &\geq 0. \end{aligned}$$

6. Solve the following L.P.P. by Simplex method :

$$\begin{aligned} \text{Max } z &= 2x_1 + 4x_2 + x_3 \\ \text{s.t. } x_1 + 2x_2 &\leq 4 \\ 2x_2 + x_3 &\leq 3 \\ x_2 + 4x_3 &\leq 3 \\ \text{and } x_1, x_2, x_3 &\geq 0. \end{aligned}$$

OR

[ 2 ]

Discuss the Political goal and techniques of Bal Gangadhar Tilak.

4. Explain Gandhi's concept of Satyagraha.

OR

Discuss Nehru's views on Nationalism.

5. Describe Fakirmohan Senapati's views on Odia Nationalism.

OR

Discuss briefly Madhusudan Das's views on harmony between Odia Nationalism and Indian Nationalism.

V-144-0.2



IV-UG-Pol.Sc(EL)-IV (Back)

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Discuss the nature and sources of ancient Indian Political thought.

OR

Examine Kautilya's views on classification of State and Government.

2. 'Raja Rammohan Roy was a social reformer'. Examine.

OR

Discuss the concept of Vedic Swarajya of Dayananda Saraswati.

3. "Mahadev Govinda Ranade was a Social Reformer". Explain.

OR

V-144

[Turn Over

[ 2 ]

4. Define urbanization and discuss the trends of urbanization in India.

OR

Explain the factors responsible affecting urbanization.

5. Critically evaluate the Community Development Programme in India.

OR

Discuss the different rural development programmes.

V-146-0.2



IV-UG-Soc(EL)-IV (Back)

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Discuss the importance of Rural Sociology in Indian Society.

OR

Define Urban Sociology and discuss its scope and subject matter.

2. Define Urban Society and discuss its distinctive characteristics.

OR

Briefly discuss the rural-urban contrast and continuum.

3. Discuss the causes and consequences of casteism in India.

OR

Write a short note on Slum.

V-146

[Turn Over

3. What are the duties of an auditor of a limited company ? 20

OR

What are divisible profits ? Briefly discuss important legal decisions with regards to the distribution of profits. 6+14

4. State the special features of audit of an educational institution. 20

OR

What special points will receive your attention while auditing the accounts of a banking company ? 20

5. What is meant by investigation of accounts ? What points will you bear in mind while carrying out an investigation on behalf of a person who wants to purchase business as a going concern ? 6+14

OR

Write a note on 'Cost Audit'. 20

**2015**

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. What do you understand by 'auditing' ? Explain its objectives. 4+16

OR

What is audit programme ? What are its advantages and dis-advantages ? 4+8+8

2. State the features of internal check. How does it differ from internal control ? Explain the advantages of internal check system. 6+6+8

OR

How will you vouch the following : (any *four*) 5 × 4

- i) Cash sales
- ii) Wages
- iii) Rent received
- iv) Salaries
- v) Credit sales

3. Describe briefly the role of Information Technology in Environment and Human health.

OR

Write notes on any *two* of the following :

- Natality
- Airborne human diseases
- Population growth.

4. What is Bio-diversity ? Discuss the methods of conservation of Bio-diversity.

OR

Write notes on any *two* of the following :

- Bio-geographical classification of India.
- Forest resources
- Equitable use of resources for sustainable development.

5. Describe briefly the Water Act and Air Act.

OR

Write notes on any *two* of the following :

- C.P.C.B. (Central Pollution Control Board)
- Need for Public environmental awareness
- Wild life Protection Act.

**2015**

Full Marks - 70

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Give an account of structure and function of Ecosystem.

OR

Write notes on any *two* of the following :

- Energy flow in ecosystem
- Food web
- Desert ecosystem.

2. Describe the causes and effects of water pollution.

OR

Write notes on any *two* of the following :

- Ozone layer depletion
- Cyclone
- Photochemical smog.

**2015**

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

- v) "The topic will be announced soon", said the teacher.
- g) Rewrite the sentences as instructed :  $1 \times 5$
- i) The doctor is examining his patient.  
(Change into passive voice)
- ii) The patient very weak. He is unable to speak.  
(Combine into a complex sentence)
- iii) He has been advised by the doctor to avoid sweets.  
(Change into active voice)
- iv) He is the best doctor in the town.  
(Change into the comparative)
- v) What a nice doctor !  
(Transform into a simple sentence)

5. Discuss *Animal Farm* as a political satire. 20

OR

How did the animals take possession of the Manor Farm ?

6. Give an account of the writer's experiences with the photographer. 20

OR

Discuss Haldane's views on science.

1. Two friends are planning to raise a flower garden in a vacant field in their locality. Compose a dialogue between them. 15

OR

A mother advises her son on the necessity of punctuality. Compose a dialogue between them.

2. Prepare a note on the passage given below : 10
- Advertising is part of the world we live in and on the whole, strictly organised and ethical. It can do a great deal of good in informing us of the goods and services available, in helping improving standards and quality, launching new products, lowering prices through large-scale production, thus helping maintain and improve the standard of living of the country, in ensuring the freedom of the press and acting as a public servant.

Advertising helps but it is not the entire answer, and it never was. Advertising can play an integral part in repairing the consuming power of the world. Advertising nourishes the consuming power of men.

[ 2 ]

It creates want for a better standard of living. It sets up before a man the goal of a better home, better clothing, better food for himself and his family. It spurs individual exertion and greater production. It brings together in fertile union those things which otherwise would never have met. Advertising, as every advertising man will admit, is not all. There must be a spirit of enterprise on the part of the individual. There must be stability, there must be goodwill. But all these conditions might exist unconnected, unless advertising was brought into unite them and to fuse them into one effective whole, to make them vital and to make them active.

Advertising can help; it cannot do these things on its own and for advertising to play its part there is a great deal more to it than producing a picture and a slogan.

3. You have witnessed a song competition organized in your town. As a news reporter, prepare a report for publication in your daily. 10

OR

A two-day beach festival was held at Chandipur-on-sea recently. Prepare a report on the event.

4. Do as directed :
- a) Write the noun forms of the following : 1 × 3  
honest, think, repeat.

[ 3 ]

- b) Give antonyms of the following : 1 × 3  
beauty, bravery, sincerity.
- c) Substitute the following expressions with a single word : 1 × 3
- i) one who studies plants.  
ii) one who is an expert in economics  
iii) a shopkeeper who sells flowers.
- d) Choose the correct alternatives given in brackets : 1 × 3
- i) The (brightly / bright) rays of the Sun is blinding.  
ii) The wind is blowing (hard / hardly).  
iii) Birds are (return / returning) to their nets.
- e) Write the verb forms of the following : 1 × 3  
preparation, agreement, division.
- f) Change the following into reported speech : 1 × 5
- i) The teacher said, "Are you taking part in the Debate Competition, Amit?"  
ii) Amit said, "Yes, Sir."  
iii) the teacher said, "What is the topic?"  
iv) "The topic has not yet been announced", said Amit.

[ 2 ]

3. Describe the structure and properties of Carbohydrates.

OR

Write notes on the following :

- a) Auxin
- b) Growth Curve.

4. Describe the ecological adaptations of Xerophytes with examples.

OR

Write notes on the following :

- a) Plant Succession
- b) Environmental Pollution.

5. Describe briefly the process of megasporogenesis in angiosperms.

OR

Write notes on the following :

- a) Endosperm
- b) Bisporic embryosac.

IV-UG-Bot(EL)-VII (Back)

2015

Full Marks - 75

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*Give labelled diagrams wherever necessary*

1. Give an account of the mechanism of absorption of water in plants.

OR

Write notes on the following :

- a) Biological Nitrogen fixation
- b) Mechanism of enzyme action.

2. Give an account of the TCA cycle during Respiration.

OR

Write notes on the following :

- a) C<sub>3</sub> plants
- b) Photorespiration.

[ 2 ]

Explain and examine Rigorism as a moral standard. 20

4. Explain and examine collectivism as a relation between individual and society. 20

OR

Discuss the Deterrent theory of Punishment. 20

5. Does end justify means ? Explain it in the light of Gandhin Ethics. 20

OR

How is Niskāma Karma explained in the Bhagavad Gitā ? Discuss. 20

V-145-0.2



IV-UG-Phil(EL)-IV  
(Back)

**2015**

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Is Ethics a normative science ? Discuss. 20

OR

How is Ethics related to Sociology ? Discuss. 20

2. Distinguish between moral and non-moral actions. Explain with examples different types of non-moral actions. 8+12

OR

Write notes on the following : 6+8+6

- a) Conduct and character  
b) Motive and intention  
c) Desire and will.

3. Discuss Refined Egoism as a moral standard. 20

OR

V-145

[Turn Over

2015

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. क) सामान्य हिन्दी, साहित्यिक हिन्दी और प्रयोजनमूलक हिन्दी की अवधारणा को स्पष्ट कीजिए । 15

अथवा

भारत सरकार द्वारा स्वीकृत मानक देवनागरी लिपि के स्वरूप पर चर्चा कीजिए ।

- ख) किसी एक पर संक्षेप में लिखिए : 5

i) लिखित माषा

ii) लिपि से अभिप्राय ।

2. क) राजभाषा के संबन्ध में संविधान की स्थिति स्पष्ट कीजिए । 15

अथवा

प्रारूप लेखन की आवश्यकता पर विचार करते हुए प्रारूप लेखन संबन्धी महत्वपूर्ण बातों पर प्रकाश डालिए ।

[ 2 ]

- ख) किसी एक पर संक्षेप में लिखिए । 5  
i) राजभाषा हिन्दी  
ii) टिप्पण की भाषा हिन्दी ।
- ग) निम्न शब्दों के हिन्दी रूप लिखिए : 1 × 10  
Advocate, Committee, Enquiry, Secretariat,  
Income Tax, Defence, Development,  
Superintendent, Justice, Head Clerk.
- घ) निम्न शब्दों के अंग्रेजी रूप लिखिए : 1 × 10  
स्थानान्तर, दिनांक, निविदा, न्यायाधीश, कानून, उपभोक्ता,  
इस्तीफा, संविधान, मंत्रालय, कार्यालय ।
3. क) अनुवाद का स्वरूप स्पष्ट करते हुए इसके विभिन्न प्रकारों का उल्लेख कीजिए । 15

अथवा

भूमंडलीकरण के दौर में अनुवाद का महत्व स्पष्ट कीजिए ।

- ख) किसी एक पर संक्षेप में लिखिए : 5  
i) कार्यालयी अनुवाद  
ii) रोजगार के क्षेत्र में अनुवाद ।

[ 3 ]

4. क) जनसंचार माध्यमों के प्रकारों और उनके महत्व का आकलन कीजिए । 15

अथवा

समाचार लेखन क्या है ? हिन्दी में समाचार लिखते समय किन-किन बातों पर ध्यान रखना जरूरी है— इनका उल्लेख कीजिए ।

- ख) किसी एक पर संक्षेप में लिखिए : 5  
i) श्रव्य और दृश्य संचार में अंतर  
ii) सरकारी संवाद एजेंसी ।

V-148-0.2



ପଢ଼ି କହିଲେ, ମନ୍ତ୍ରୀ ଇଏ କ'ଣ କଲ? ମନ୍ତ୍ରୀ କହିଲେ ଆପଣଙ୍କର ଆଦେଶ ଥିଲା ପଦ୍ମାବତୀଙ୍କୁ ଚଣ୍ଡାଳକୁ ଦେବାପାଇଁ । ରାଜନ୍ ଏବେ ଚଣ୍ଡାଳର କର୍ମ କରୁଛନ୍ତି । ଆପଣଙ୍କ ଆଦେଶ ମାନି ପଦ୍ମାବତୀଙ୍କୁ ଚଣ୍ଡାଳକୁ ଦେଲି । ସମସ୍ତେ ମନ୍ତ୍ରୀଙ୍କ ବୁଦ୍ଧିକୁ ଧନ୍ୟ ଧନ୍ୟ କଲେ ।

The king Purusottam Deva was serving at the Chariot of Sri Jagannath during Chariot ceremony. The wise minister hinted at the princess Padmavati. Padmavati offered a bridal garland on the neck of the king. Shaken by this the king said, O' Minister what you have done ? The minister said it was your order to offer Padmavati to a candala. Presently the king is doing the deeds of a candala. Following your command I offer padmavati to a candala. Every one praised the wisdom of the minister.

5. संस्कृतेन एकस्य भावसंप्रसारणं कुरुत : 15
- क) मातृदेवो भव ।
- ख) यत्रनार्यास्तु पूज्यन्ते रमन्ते तत्र देवता ।
- ग) सत्यंब्रूयात् प्रियं ब्रूयात् मा ब्रूयात् सत्यअप्रियम् ।
- घ) विद्याधनं सर्वधनप्रधानम् ।

2015

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. निम्नलिखितमनुच्छन्दं पठित्वा चतुर्णां प्रश्नानामुत्तरं लिखत : 5 × 4

ततः निशायां स राजा त्रिविक्रमसेनः शवं स्कन्धेवहन् श्मशानतरुमध्यगं क्षान्तिशीलं भिक्षु ददर्श । तदा स कृतेष्टदैवतपूजने मण्डले समुपविष्ट आसीत् । तत्मण्डलं अस्थिचूर्णेन निर्मितं जातम् । तत्र महतैलपूर्णं दीपं प्रज्वलितमभवत् । होमकुण्डम् अग्निना प्रदीप्तम् अजनि । भिक्षुश्च तम् आनीतशवं नृपं समुत्थाय प्रोवाच, 'राजन् ! त्वाया अन्य दुष्करो महान् अनुग्रहो मे विहितः । सत्यमेव त्वां कुलभूभुजां मुख्यमाहुः, एव मात्मानपेक्षेण येन परार्थः साध्यते ।' इत्युक्त्वा स भिक्षुः राज्ञः स्कन्धात् तं शवम् अवतारयामास । तत स्तं स्नापयित्वा बद्धमाल्यं विधाय तस्य मण्डलस्य अन्तः स्थापयामास । ततः स क्षपणकः भस्मालेपित गात्रः केशयक्षोपवीती प्रावृतप्रेतवसनः भूत्वा क्षणं ध्याननिभृतं स्थितः । अथ स भिक्षु ध्यानवलात् तस्मिन् शवदेहे प्रविष्टं बेतालं क्रमेण पूजयामास । स तं वेतलां नरकपालेन अर्ध्र्यं, नवदन्तैः पुष्पं, रक्ताविलेपनं, मानुषनेत्रं धूपं, मांसानि नैवेद्यानि दत्तवान् । अनन्तरं स पार्श्वगं राजानं प्रावाच, 'राजन् ! इहास्य मन्त्राधिराजस्य अष्टाभिरङ्गेः निपत्य भूतले प्रणामं कुरु, येन अभीष्टसिद्धिं तेऽयं वरप्रदो दास्यति ।' तदा स राजा भिक्षुम् अब्रवीत्, 'भगवन् ! अहं राजा । नाहं तादृशं प्रणामं वेदिम, तत् पूर्वं भवान् प्रदर्शयतु, ततस्तथाऽहं करिष्ये' इति । ततः स भिक्षुः यावत् तथा प्रणामं

दर्शयितुं भुवि पतितः, तावत् स राजा खड्गप्रहारेणास्य शिरः अच्छिनत्, आकर्षचास्य हतूपद्यं पाटितम् । ततः तत्शिरः तच्च हतूपदमं वेतालाय प्रददौ ।

- क) यदा राजा आगच्छति तदा भिक्षुः किं कृतवान् ?  
ख) भिक्षुः कथं राजनि कृतज्ञातां प्रकाशयति ?  
ग) क्षपणकस्य वेतालोपासना किदृशी ?  
घ) पूजावसाने क्षपणकः राजानं किमुक्तवान् ?  
ङ) क्षपणकतः राजा आत्मानं कथं रक्षयामास ?

2. अधोलिखितेषु विषयमेकम्वलम्ब्य संस्कृतेन निबन्धं रचयत : 25

- क) गीतगोविन्दम्  
ख) नीतिकथा  
ग) आदिशङ्करः  
घ) नारीसुरक्षा  
ङ) उत्कल संस्कृतम् ।

3. उत्कलभाषया आङ्गलभाषया वा अनुवादं कुरु : 20

सत्यभाषणेन दशरथः अमरत्वं प्राप्तवान् । सत्यस्य पालनाय प्राणेभ्योपि प्रियं पुत्रं वनं प्रेषयामास । युधिष्ठिरः सत्यभाषणबलेनैव विजयं लेभे । महात्मागान्धिः ईसामसीहप्रभृतयः सत्यस्य पालनार्थमेव स्वप्राणानत्यजन् । शास्त्रेषु कथ्यते, 'नहि सत्यात् परो धर्मो नानृतात् पातकं महत् ।'

अथवा

कश्चित् ब्रह्मराक्षसः कस्याचित् ब्राह्मणस्य स्कन्धे समारुह्य अटव्यां भ्रमन् अवदत्, 'भोः ! यावदहं स्नानं कृत्वा देवतार्चनविधिं विधाय आगच्छामि, तावत् त्वया अतः स्थानात् अन्यत्र न गन्तव्यम् । तथाऽनुष्ठिते द्विजः चिन्तयामासनूनं देवतार्चनविधेरुर्ध्वं मामेष भक्षयिष्यति । तत् द्रुततरं गच्छामि । येन एष आर्दपादो न मम पृष्ठम् एष्यति ।'

4. संस्कृतेन अनुवादं कुरुत : 20

ବୃହଦାରଣ୍ୟକ ଉପନିଷଦ କାଳର କଥା । ରାଜର୍ଷି ଜନକଙ୍କର ଯଜ୍ଞସଭା ଚାଲିଥାଏ । ବଚକୁଦୁହିତା ଗାର୍ଗୀ ଯାଜ୍ଞବଲ୍କ୍ୟଙ୍କୁ ନାନା ପ୍ରଶ୍ନବାଣରେ ଥାପାତ କରୁଥାଆନ୍ତି । ଯାଜ୍ଞବଲ୍କ୍ୟ କହିଲେ ବ୍ରହ୍ମ ଚର୍ଚ୍ଚର ନୁହେଁ ଅନୁଭବର ବିଷୟ । ତୁମେ ଅଧିକ ଚର୍ଚ୍ଚ କରନା । ଅନ୍ୟଥା ତୁମର ମୁର୍ଦ୍ଧା ପାଟିଯିବ ।

It was a story of the days of Bruhadaranyaka Upanisad. A sacrifice ceremony of Rajashree Janaka was going on. Gargi, the daughter of Vacaknu was attacking Yagyavalkya by arrows of different questions. Yagyavalkya said, Brahman is not a subject matter of debate. It is a matter of realisation. Do not argue more. Otherwise your head will be split into pieces.

ଅଥବା

ରଥଯାତ୍ରାରେ ଶ୍ରୀଜଗନ୍ନାଥଙ୍କ ରଥରେ ରାଜା ପୁରୁଷୋତ୍ତମ ଦେବ ସେବା କରୁଥାଆନ୍ତି । ବିଜ୍ଞ ମନ୍ତ୍ରୀ କାଞ୍ଚିଜେମା ପଦ୍ମାବତୀଙ୍କୁ ସଂକେତ ଦେଲେ । ପଦ୍ମାବତୀ ରାଜାଙ୍କ ବେକରେ ବରଣମାଳା ପକାଇଦେଲେ । ରାଜା ଚମକି

5. Critically analyse G.K. Chesterton's essay "A Piece of Chalk". 14

OR

Bring out the central ideas behind De Quency's essay "On the knocking at the Gate in Macbeth".

6. The poem "Child Harold's Pilgrimage" by Byron, projects Harold as a typical Byronic hero. Explicate this with reference to the text you have read. 14

OR

Throw light on the religious and moral implications of Mathew Arnold in his poem 'Dover Beach'.

**2015**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Answer the following multiple choice questions :

1 × 8

- i) In which year was the 'Lyrical Ballads' published ?

(a) 1820 (b) 1799 (c) 1797 (d) 1798

- ii) Lady Dedlock is an important character who appears in the novel :

(a) Hard Times (b) Great Expectation

(c) Bleak House (d) A Tale of Two Cities.

- iii) Who is the author of the book 'Vanity Fair' ?

(a) George Eliot (b) George Meredith

(c) W.M. Thackeray (d) Charles Dickens.

[ 2 ]

- iv) What kind of poem is Wordsworth's 'Tintern Abbey' ?  
(a) biographical (b) autobiographical  
(c) descriptive (d) ethical.
- v) Who penned the lines "I fall upon the thorne of life ! I bleed !" ?  
(a) S.T. Coleridge (b) John Keats  
(c) P.B. Shelley (d) William Wordsworth.
- vi) Jane Austen is a prolific writer of :  
(a) emotion (b) realism  
(c) marriage and matrimony (d) imagination.
- vii) Who among the following was a revolutionary poet ?  
(a) William Blake (b) Mathew Arnold  
(c) Robert Browning (d) P.B. Shelley
- viii) The poem 'Enoch Arden' is related to :  
(a) Robert Browning (b) H.W. Longfellow  
(c) A.L. Tennyson (d) D.G. Rossetti.

[ 3 ]

2. Write short notes on any **four** of the following :  
4 × 4
- i) Poetry as the criticism of life  
ii) Romantic poetry  
iii) Dominance of prose in the 18th Century  
iv) Victorian Novel  
v) Influence of American war of Independence on English literature.  
vi) Religion, in the development of English literature.  
vii) Eco-criticism in Wordsworth's poetry.  
viii) Role of chance and co-incidence in the novels of Thomas Hardy.
3. Justify the title of the novel "Great Expectations" by Charles Dickens. 14
- OR
- Sketch the character of Pip.
4. "That Hardy is a pessimist, needs no proof". Prove this line with reference to Thomas Hardy's novel "The Mayor of Casterbridge". 14
- OR
- Draw a character sketch of Donald Farfrae.

- a) Find median and mode of the following distribution :

Class Interval	15-25	25-35	35-45	45-55	55-65	65-75
Frequency	5	11	19	15	13	7

- b) From the following data calculate combined standard deviation of the two series

	<i>Series I</i>	<i>Series II</i>
Mean	63	54
S.D.	9	6
No. of Items	50	40

4. a) Prove that Pearsonian coefficient of Correlation is independent of change of origin and of scale.
- b) From two regression equations given below find the mean values of X and Y and the correlation coefficient between them

$$2y - x = 50$$

$$3y - 2x = 10$$

OR

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. a) Find  $\frac{dy}{dx}$  if  $y = (x+1)^2 + \log(x + \sqrt{x})$
- b) Find  $\frac{dy}{dx}$  if  $y = (2x^2 + 3)e^{-3x^2}$
- c) Given the function  $z = \frac{x^3 - 2x^2y}{x + y}$   
determine the degree of homogeneity.
- d) Given the matrix find out its inverse

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 2 \\ 3 & 2 & 1 \end{bmatrix}$$

OR

[ 2 ]

- a) If  $U = x_1^2 x_2$  is a utility function and the budget constraint is  $x_1 + 2x_2 = 4$ , find the equilibrium bundle of two goods which would maximise utility.
- b) Evaluate elasticity of demand if the demand law is given by  $P = q^a e^{-b(q+c)}$  where a, b and c are constants.
2. a) Evaluate  $\int \frac{4x+5}{2x^2+5x+2} dx$
- b) If the demand function is  $P = 35 - 2x - x^2$  and  $x_0 = 3$ , find the Consumer's surplus.
- c) If the supply curve is  $P = \sqrt{9-x}$  and  $x_0 = 7$ , find Producer's surplus.
- d) If the MC function is  $(1 + x + 6x^2)$  and fixed cost is ₹100, find TC function.

OR

[ 3 ]

- a) Solve by Cramer's rule
- $$\begin{aligned} -x + y + z &= a \\ x + y + z &= b \\ x + y + z &= c \end{aligned}$$
- b) Find the rank of the following matrix :

$$A = \begin{bmatrix} -1 & 2 & 1 \\ 0 & 1 & 1 \\ 2 & 1 & 3 \end{bmatrix}$$

3. a) Discuss various methods of collecting primary data.
- b) The scores of Papu and Tapan for 8 innings are given below :

Papu	12	115	76	42	7	19	49	80
Tapan	47	12	76	73	24	51	61	65

Who of the two is a more consistent batsman ?

OR

[ 5 ]

- a) Calculate Pearson's coefficient of correlation from the following data :

X	5	6	7	8	9
Y	6	11	20	16	7

- b) What is regression analysis ? Find out two regressions equations from the following observations :

X	46	42	44	40	43	41	45
Y	40	38	36	35	39	37	41

5. a) The production figures for a sugar factory over a period from 2007 to 2013 are given below. Estimate the production of sugar for 2015 with least square method :

<i>Year</i>	<i>Quantity (Tonnes)</i>
2007	60
2008	72
2009	75
2010	65
2011	80
2012	85
2013	95

[ 6 ]

- b) Construct an appropriate Index Number from the following data :

	<i>Rice</i>		<i>Wheat</i>		<i>Bazra</i>	
<i>Year</i>	p	q	p	q	p	q
2004	4	50	3	10	2	5
2014	10	40	8	8	4	4

OR

- a) Explain factor reversal and time reversal test and point out why Fisher's Index Number is called an ideal Index Number.
- b) What is probability ? Probability that a man will be alive 25 years, hence is 0.3 and the probability that his wife will be alive 25 years hence is 0.4. Find the probability that 26 years hence
- both will be alive
  - only the man will be alive
  - only the women will be alive
  - at least one of them will be alive.

**2015**

Full Marks - 75

Time - 3 Hours

The figures in the right-hand margin indicate marks  
Answer *all* questions

1. a) Explain the origin of various spectral lines of hydrogen atom on the basis of Bohr's atomic model. 10
- b) Explain the effect of nuclear mass on Rydberg constant. 5

OR

- a) Describe Frank-Hertz experiment and discuss its result. 10
  - b) Explain Bohr's correspondence principle. 5
2. a) What is Compton effect. Derive an expression for Compton shift. 10
  - b) An X-ray Photon is found to have double its wavelength on being scattered by  $90^\circ$ . Find the energy and wavelength of the incident Photon. 5

OR

[ 2 ]

- a) State Heisenberg's uncertainty relation. By using the diffraction of a beam of electrons through a narrow slit, prove  $\Delta p \cdot \Delta x \approx h$  (where symbols have their usual meaning). 2+8
- b) Prove that the electrons can not be present inside the nucleus by using uncertainty principle. 5
3. a) Define eigen functions and eigen values. Show that eigen values corresponding to Hermitian operator is always real. 1+1+4
- b) Find the value of  $[\hat{x} \cdot \hat{p}_x]$ . 5
- c) Explain what is meant by orthonormality of eigen functions. 4

OR

A beam of particles of energy  $E$  moving in one dimension with potential  $v(x) = 0$  encounters suddenly another region of constant potential  $V_{(x)} = V_0$  with ( $V_0 < E$ ). Set up Schrodinger's equation and obtain the expression for the reflection coefficient ( $R$ ) and transmission coefficient ( $T$ ). Prove that  $R + T = 1$ . 2+5+5+3

[ 3 ]

4. a) State and explain statistical law of radioactive decay and hence define decay constant. 5+2
- b) Define average life and half life of a radioactive element and establish a relation between them. 2+2+4

OR

Describe construction and working of Cyclotron. 6+9

5. Write postulates of special theory of relativity. Obtain Lorentz transformation equations. 3+12

OR

- a) Deduce the relativistic variation of mass with velocity. 10
- b) Derive length contraction formula. 5

V-156-0.2



4. Critically evaluate India's Foreign Policy towards China.

OR

Analyse India's Foreign Policy with the Super Power the U.S. in the Post-Cold war era.

5. What are the possible connection both negative and positive, between globalisation and Environmental Change ?

OR

"Politics of Gender inequality has given birth to Feminist Movement". Examine.

V-127-1



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Discuss the various elements of National Power.

OR

Discuss the meaning and functions of Diplomacy.

2. Explain the impacts of Decolonizations in International Politics.

OR

Non-Alligned Movement is irrelevant today. Examine.

3. Describe the composition and functions of the General Assembly.

OR

Discuss the role of the Economic and Social Council in the present scenario.

[ 2 ]

IV-UG-Hist(H)-IV

4. Analyse the domestic policy of Bismarck as Imperial Chancellor of Germany.

OR

What was Tripple Alliance ? Throw light on its consequences.

5. Discuss the responsibility of Germany for the outbreak of World War I.

OR

Describe the results of Russian Revolution of 1917.

V-126-0.5



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Write a note on Metternich System.

OR

Discuss the causes of the Revolution of 1848 in France.

2. Critically examine the role of Mazzini in the Unification of Italy.

OR

Narrate briefly the part played by Bismarck in the Unification of Germany.

3. Discuss the significance of Crimean war in European History.

OR

Give a brief account of the foreign policy of Napoleon III.

V-126

[Turn Over

[ 2 ]

IV-UG-Phil(H)-IV

4. What is Purusa according Sāmkhya ? What are the proofs for the existence of Purusa ?

OR

Discuss the theory of evolution of Sāmkhya.

5. Discuss Prabhākar's theory of error.

OR

Give an account of Sankar's concept of Brahman.

V-128-0.5



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Discuss the Jaina view of Anekāntavāda.

OR

Explain Jaina ethics of Anybratas and Mahabratas.

2. Bring out the significance of Buddhist doctrine of Pratitya-Samutpāda.

OR

What is Buddhist concept of soul ? Elucidate.

3. Discuss Nyāya theory of causation.

OR

State and explain the Vasesika concept of Padārthas.

V-128

[Turn Over

[ 2 ]

IV-UG-Soc(H)-IV

4. Bring out the meaning and features of urbanisation in India.

OR

Explain the factors affecting urbanisation in India.

5. Describe the success and failure of community development programme in India.

OR

Assess critically various programmes of Rural development in India.

V-129-0.3



**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Discuss the nature of Rural Sociology.

OR

Explain the scope to subject matter of Urban Sociology.

2. Describe the feature of Rural Society.

OR

Analyse the rural-urban contrast.

3. Examine the problem of poverty in rural society and its consequences.

OR

Write a note on Casteism.

V-129

[Turn Over

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

୧. କ) 'ଅଭିଯାନ' ନାଟକ ଅବଲମ୍ବନରେ ପୁରୁଷୋତ୍ତମ ଦେବଙ୍କ ଚରିତ୍ର ଚିତ୍ରଣ କର । ୧୫

ଅଥବା

'ଭରସା' ନାଟକର ସାମାଜିକ ଆବେଦନ ପ୍ରକାଶ କର ।

- ଖ) ସପ୍ତସଙ୍କ ସରଳାର୍ଥ ଲେଖ : ୫

ଏ ନିନ୍ଦା କେବଳ ମୋର ପ୍ରଭୁଙ୍କର ନୁହେଁ, ପତିତପାବନ ଜଗନ୍ନାଥଙ୍କର ।

ଅଥବା

ଯେଉଁ ନିରାଚ ସତକଥା ତୁମେ ମୋ ଆଖି ଆଗରେ ଥୋଇ ଦେଇଛ, ତାକୁ ତ ମୁଁ ଏଡ଼ିଦେଇ ପାରିବି ନାହିଁ ।

୨. କ) 'ଆଗାମୀ' ନାଟକରୁ ଶରତର ଚରିତ୍ର ଚିତ୍ରଣ କର । ୧୫

ଅଥବା

'ଯୁଗ ଚରିତ ବୃତ୍ତାନ୍ତ' କେବଳ ସତ୍ୟ ଓ ଚିରନ୍ତନ ମୂଲ୍ୟବୋଧର ପୁନଃ ପ୍ରତିଷ୍ଠା ନିମନ୍ତେ ଅଙ୍ଗୀକାରବଦ୍ଧ - ଆଲୋଚନା କର ।

[ 2 ]

ଖ) ସପ୍ତସଙ୍ଗ ସରଳାର୍ଥ ଲେଖ : ୫

ସମସ୍ତଙ୍କ ବୀଣାର ତାର ଛିଣ୍ଡି ଯାଇଛି, ତଥାପି ଆଗାମୀ କାଳି  
ପାଇଁ ବଞ୍ଚିବାକୁ ପଡ଼ିବ ।

ଅଥବା

ଏ କାଳରେ ମର୍ତ୍ତ୍ୟରେ ବାସ କଲେ-  
କେବଳ ଅଧର୍ମ ଅନୀତି ଓ ଅନାଚାର ପଙ୍କରେ-  
ଉତୁଟୁଛୁ ହେବାକୁ ପଡ଼ିବ ।

୩. କ) ‘ପାହାଡ଼ର ଆତ୍ମକଥା’ ଏକାଙ୍କିକାର ମନସ୍ତାତ୍ତ୍ୱିକ ଦିଗ  
ନିର୍ଦ୍ଦେଶ କର । ୧୫

ଅଥବା

“ଛୋଟ ପିଲା ଓ ବୁଢ଼ାଲୋକ ଉଭୟ ସମାନ” - ‘ଶିଶୁ’ ଏକାଙ୍କିକା  
ଆଧାରରେ ଏହା ପ୍ରମାଣ କର ।

ଖ) ସପ୍ତସଙ୍ଗ ସରଳାର୍ଥ ଲେଖ : ୫

କିଛି ଭାଙ୍ଗେନି, ସବୁ ଯିଏ ଯେମିତି ସେଇଠି ଠିଆହୋଇ ରହିଥାଏ ।  
ତା’ପରେ କାଳକ୍ରମେ ମ୍ୟୁଜିୟମ, ମନୁମେଣ୍ଟ ହୋଇଯାଏ ।

ଅଥବା

ଯେଉଁମାନେ ଶରୀରକୁ ବଧ କରନ୍ତି, କିନ୍ତୁ ଆତ୍ମାକୁ ବଧକରି ପାରନ୍ତି  
ନାହିଁ, ସେମାନଙ୍କୁ ଭୟ କର ନାହିଁ ।

[ 3 ]

୪. କ) ନାଟକ ଓ ଲୋକନାଟକ ମଧ୍ୟରେ ଥିବା ପାର୍ଥକ୍ୟ ଦର୍ଶାଅ । ୧୦

ଅଥବା

ଲୋକନାଟକର ସାମାଜିକ ଆବେଦନ ଉଲ୍ଲେଖ କର ।

ଖ) ଏକାଙ୍କିକା ନାଟକ ନୁହେଁ, ମାତ୍ର ଏକ ସ୍ୱୟଂସଂପୂର୍ଣ୍ଣ ଅଭିନୟ କଳା  
- ଆଲୋଚନା କର । ୧୦

ଅଥବା

ଏକାଙ୍କିକାର ସଂଜ୍ଞା, ସ୍ୱରୂପ ଓ ପ୍ରକାରଭେଦ ଦର୍ଶାଅ ।

V-130-0.5



ପାଇଁ ନିଜ ଝିଅ ଶକୁନ୍ତଳାକୁ ସେ ଦାୟିତ୍ୱ ଦେଇଥିଲେ । ରାଜା ଆଶ୍ରମରେ ପ୍ରବେଶ କରିବା ମାତ୍ରେ ହସିବାର ଶବ୍ଦ ଶୁଣାଗଲା । ସନ୍ନ୍ୟାସ ଜୀବନର ସମ୍ପୂର୍ଣ୍ଣ ବିନାତ ବେଶରେ ଗ୍ରାମ୍ୟ ଚରୁଣୀ ମାଠିଆ ଧରି ଗଛରେ ପାଣି ଦେଉଥିଲେ । ସେମାନେ କୌଣସି ଅଳଙ୍କାର ଧାରଣ କରି ନଥିଲେ ତଥାପି ସୁନ୍ଦର ଦିଶୁଥିଲେ । ସେମାନଙ୍କ ସୌନ୍ଦର୍ଯ୍ୟ ଦର୍ଶନମାତ୍ରେ ରାଜା ବିମୋହିତ ଥିଲେ ।

When king Dushyanta came to the hermitage Kanva was not there. He had gone to Somatirtha for worship. He had assigned his daughter Shakuntala the task of looking after guests. When the king came to the hermitage, sounds of laughter were heard. The rustic maidens, in humble attire befitting monastic life, were carrying pots and watering the trees. They did not wear jewels but looked beautiful. The king became enchanted by their looks.

5. संस्कृतेन एकस्य भावसम्प्रसारणं कार्यम् : 10
- क) सम्पत्तौ विपत्तौ च महतामेकस्वपता ।  
 ख) शरीरमाद्य खलु धर्मसाधनम् ।  
 ग) अहिंसा परमो धर्मः ।  
 घ) वसुधैव कुटुम्बकम् ।

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. अधस्तनं गद्यखण्डमधीत्य प्रश्नानामुत्तरं देयम् । 4 × 5
- अस्ति भारतवर्ष योगविज्ञानं नाम प्रयोगविद्या । तामेव समाश्रित्य जीवति भारतीयः सनातनो धर्मः । त गुरुं विना सा विद्या सम्पादयितुं शक्यते । शिष्या एव गुरुकृपया योगविज्ञानस्य प्रयोगपक्षं ज्ञातुं शक्नुवन्ति । आसनस्य प्राणायामस्य च प्रयोगेण मधुमेहादीनामसाध्यरोगाणामुपशमं विलोक्य चिकित्सका अपि विस्मयं भजन्ते । अतो धर्मनिर्विशेषं सर्वे जनाः साम्प्रतं योगविज्ञानमभिवर्तन्ते । योगविज्ञानं हि मनुष्याणामुपकाराय महर्षिभिः प्रवर्तितम् ।
- क) किमाश्रित्य सनातनो धर्मो जीवति ?  
 ख) कस्य कृपया शिष्या योगविज्ञानस्य प्रयोगपक्षं जानन्ति ?  
 ग) कस्य प्रयोगेण असाध्यरोगाणामुपशमो भवति ?  
 घ) कथं सर्वेजना योगविज्ञानमभिवर्तन्ते ?  
 ङ) किमर्थं महर्षिभिः योगविज्ञानं प्रवर्तितम् ?

2. संस्कृतेन निबन्धमेकं रचयत : 20

क) रम्या रामायणी कथा

ख) सम्वादपत्रम्

ग) कालिदासः

घ) भारतीयसंस्कृतिः ।

3. उत्कलभाषया आङ्गलभाषया वा अनुवादः कार्यः । 15

बालकस्य जीवने आचारस्य प्रभावो बाल्यादेव ज्ञायते यतो बाल्यकाल एव जीवनस्य प्रभातवेला । बालकानां कृते सदाचारशिक्षायाः सर्वाधिकं महत्त्वं सर्वाधिकावश्यकता च वर्तते यतः तेष्वचरणस्य प्रभावः सारल्येन भवति । अतो यादृशी शिक्षा ते गृहेषु विद्यालयेषु वा लभन्ते तेषामाचरणमपि तावदेव भवति, एवं बालकानां जीवननिर्माणार्थं विद्यालयेषु महाविद्यालयेषु च सदाचारस्य शिक्षा अनिवार्या भवितव्या ।

अथवा

चेतना एव जीवनस्य मूलाधारः । प्रत्येकं जीवे चेतना विराजते । चेतनामन्तरेण भगवानपि सत्ताहीनो भवेत् । अतः चेतना एव सत्यम् । वैज्ञानिका अणुवीक्षणयन्त्रेण अपि चेतनां द्रष्टुं नैव शक्नुयुः । चेतना हि जीवानामात्मा । चेतना एव साक्षाद् भगवान् । प्रत्येकं जीवे चेतनायाः पूजा कर्तव्या । चेतनादर्शनमेवं भगवद्दर्शनम् ।

4. संस्कृतेन अनुवादः कार्यः । 15

ରାକ୍ଷସ ଓ ଚାଣକ୍ୟ ପରସ୍ପର ମୁହାଁମୁହିଁ ହେଲେ । ଦୀର୍ଘବର୍ଷ ଧରି ସେମାନେ ପରସ୍ପର ମଧ୍ୟରେ ଲଢୁଥିଲେ । କିନ୍ତୁ ପ୍ରତ୍ୟେକ ଗୋଟିଏ ପକ୍ଷ ପ୍ରତି ବିଶ୍ୱସ୍ତ ଥିଲେ । ଯେତେବେଳେ ରାକ୍ଷସଙ୍କୁ ଚାଣକ୍ୟଙ୍କ ଆଶ୍ରମକୁ ଅଣାଗଲା ତାଙ୍କର ଜୀବନ ଚାଣକ୍ୟଙ୍କ ହାତରେ ରହିଲା । ଚାଣକ୍ୟ ନିଜ ଆସନରୁ ଓହ୍ଲାଇ ରାକ୍ଷସଙ୍କ ଆଡ଼କୁ ଗଲେ । ସେ ଅତି ସମ୍ମାନର ସହ ତାଙ୍କୁ ସମ୍ମାଣଣ କଲେ । ରାକ୍ଷସ ସ୍ତମ୍ଭୀଭୂତ ହୋଇଗଲେ । ସେ ମନେ ମନେ ଭାବିଲେ - ଏହି ମହାପୁରୁଷଙ୍କର ମୁଖମଣ୍ଡଳରେ କି ଦୀପ୍ତି ! ଚାଣକ୍ୟ ତାଙ୍କୁ ଆସନ ଦେଇ ବିନୟର ସହ ସଜ୍ଜାର କଲେ ।

Rakshasa and Chanakya remained face to face with each other. They fought each other for long years, but each of them was loyal to one side. The life of Rakshasa was in the hands of Chanakya when the former was brought to the hermitage of Chanakya. Chanakya got down from his seat and walked towards Rakshasa. He spoke to him with great respect. Rakshasa was amazed. He thought within himself, 'What a brilliance there is on the face of this great man'. Chanakya offered him a seat and adored with humility.

अथवा

ଦୁଷ୍ଟ୍ୟକ୍ତ ଆଶ୍ରମରେ ପହଞ୍ଚିଲାବେଳେ କଣ୍ଠ ସେଠାରେ ନଥିଲେ । ସେ ପୂଜା କରିବାକୁ ସୋମତୀର୍ଥ ଯାଇଥିଲେ । ଅତିଥିମାନଙ୍କର ଯତ୍ନ ନେବା

- ड) अज्ञेय की किसी एक बहुचर्चित कहानी का नाम उल्लेख कीजिए ।
- च) परिवेश के बीच व्यक्ति के आत्मसंघर्ष को चित्रित करने वाले प्रसिद्ध कहानीकार का नाम लिखिए ।
- छ) जैनेन्द्र कुमार की कहानियों पर किस किस विचारधारा का प्रभाव ज्यादा रहा ?
- ज) यशपाल की किन्हीं दो कहानी संग्रहोंका नाम उल्लेख कीजिए ।
- झ) जैनेन्द्र कुमार अपने युग के किस प्रसिद्ध कहानीकार से विशेष प्रभावित रहे ?
- ञ) छायावाद के पश्चात् की कहानियों को किस नाम से जाना जाता है ?

V-132-0.3



2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. निम्नलिखित अवतरणों की सप्रसङ्ग व्याख्या कीजिए : 8 × 2

- क) श्रद्धा न्याय बुद्धि के पलड़े पर तुलीहुई एक वस्तु है जो दूसरे पलड़े पर रखे हुए श्रद्धेय के गुण-कर्म आदि के हिसाब से होती है । श्रद्धा सत्कर्म या सदगुण ही का मूल्य है जिससे और किसी प्रकार का सौदा नहीं हो सकता ।

अथवा

यह सुलह का झंडा सिरपर लहराने लगा है, यह घोषणा कर रहा है, “अब तक के शत्रुओं मैंने हथियार डाल दिए हैं, आओ संधि कर लें ।” तो क्या संधि होगी उनसे । जिनसे संघर्ष होता रहा ? समझौता होगा उनसे जिसे गलत मानता रहा ?

- ख) कायरों को इसके सिवा और सूझ ही क्या सकता है ? धन कमाना आसान नहीं है । व्यवसायियों को जितनी कठिनाइयों का सामना करना पड़ता है, वह अगर सन्यासियों को झेलनी पड़े तो सारा सन्यास भूल जाय । किसी भले आदमी के द्वार पर जाकर पड़े रहने के लिए बल, बुद्धि, विद्या, साहस किसी की भी जरूरत नहीं ।

अथवा

V-132

[Turn Over

[ 2 ]

हमारी डिग्री है— हमारा सेवा भाव, हमारी नम्रता, हमारे जीवन की सरलता । अगर यह आत्मा जागृत नहीं हुई तो कागज की डिग्री व्यर्थ है ।

2. 'हमारे वैज्ञानिक युग की समस्या' में लेखिका ने किन महत्वपूर्ण समस्याओं की तरफ हमारा ध्यान आकर्षित किया है ? स्पष्ट कीजिए । 12

अथवा

श्रद्धा एवं भक्ति में लेखक ने किसे श्रेष्ठमाना है और क्यों ? तर्क सहित उत्तर दीजिए ।

3. 'कर्मभूमि' में प्रेमचन्द ने तत्कालीन सामाजिक, राजनैतिक, धार्मिक, सांस्कृतिक जीवन के यथार्थ को बड़ी जीवन्नता के साथ चित्रित किया है', क्या आप इससे सहमत हैं ? 12

अथवा

सुखदा और अमरकांत में आपको किसका चरित्र ज्यादा प्रभावशाली लगता है ? किसी एक के चरित्र के उन प्रभावशाली पक्षों पर प्रकाश डालिए ।

4. 'उसने कहा था' में लहना सिंह के प्रेम, त्याग और बलिदान को अपने शब्दों में चित्रित कीजिए । 12

अथवा

'वापसी' कहानी का मुख्य उद्देश्य क्या है ? स्पष्ट कीजिए ।

[ 3 ]

5. किन्हीं चार प्रश्नों के संक्षिप्त उत्तर दीजिए : 5 × 4

क) श्रद्धा और प्रेम में अंतर को एक उदाहरण सहित स्पष्ट कीजिए ।

ख) 'अशोक के फूल' में मानव की जीजिविषा को शुद्ध क्यों कहा गया है ?

ग) अमरकांत सफीना के प्रति क्यों प्रभावित था ?

घ) 'पहला सफेद वाल' में लेखक अपने आनेवाली पीढ़ी को क्या धरोहर देना चाहता है ?

ङ) घीसू और माधव ने कफन क्यों नहीं खरीदा ?

च) 'अशोक के फूल को देखकर लेखक का मन क्यों उदास हो जाता है ?

6. किन्हीं आठ प्रश्नों के उत्तर एक वाक्य में दीजिए : 1 × 8

क) यशपाल हिन्दी साहित्य के किस 'वाद' से जुड़े थे ?

ख) अज्ञेय का पूरा नाम क्या था ?

ग) कौन सी साहित्यिक कृति के लिए अज्ञेय को ज्ञानपीठ पुरस्कार मिला ?

घ) यशपाल की कहानियों पर किस पाश्चात्य दार्शनिक का प्रभाव है ?

Discuss the use of various type of norms in interpretation of test scores. 15

4. What is Median ? Calculate the median of the following series : 3+12

<i>C.I.</i>	<i>F</i>
45-49	6
40-44	2
35-39	5
30-34	10
25-29	3
20-24	6
15-19	4
	N = 36

OR

What are different measures of central tendency ? Discuss their uses and limitations. 7+4+4

**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. What is Measurement ? Discuss the nature of educational measurement. 5+10

OR

What is meant by evaluation ? Differentiate between formative evaluation and diagnostic evaluation. 5+10

2. What is meant by validity of a test ? Discuss construct validation of a test. 5+10

OR

What is meant by reliability of a test ? Discuss the split-half method of estimating the reliability of a test. 5+10

3. Discuss briefly the procedures followed in constructing a standardized achievement test. 15

OR

[ 2 ]

IV-UG-Psy(H)-VII

What is Type-A behaviour pattern ? Explain how Type-A behaviours lead to cardiovascular diseases.

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer *all* questions

4. Write notes on the following :

- i) Nature of stress
- ii) Types of stress.

OR

Describe the various causes of stress.

5. Suggest the primary and secondary strategies to remain physically healthy.

OR

Describe Cancer-related health behaviours.

1. What is Health Psychology ? Citing relevant examples, evaluate Health Psychology in Socio-Cultural context.

OR

What do you mean by Psychosomatic Disorders ? With suitable examples, suggest Behavioural medicines for the cure of such disorders.

2. Distinguish between Early Research Literature and Current Research Literature in understanding the complexity of health.

OR

Discuss how Health Belief Model (HBM) explains the health status of a person.

3. Distinguish between Health Promoting and Health Damaging life styles. Cite examples to support your answer.

OR

V-135-0.5



V-135

[Turn Over

**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. State and explain Fermat's principle. Deduce laws of reflection and refraction using Fermat's principle. 4+4+4

OR

What is spherical aberration ? Describe and explain with the help of suitable diagrams longitudinal spherical aberration and lateral spherical aberration. Discuss with necessary mathematical details how the defect can be reduced. 2+4+6

2. Explain with necessary theory the phenomenon of interference in thin films show that with monochromatic light the interference pattern of reflected and transmitted light are complementary. 6+6

OR

[ 2 ]

Describe the construction and working of Michelson Interferometer. Explain how this is used to determine the wavelength of monochromatic light. If the movable mirror in Michelson interferometer moves through 0.233 mm, 792 fringes are counted, what is the wavelength of light used ? 6+3+3

3. Give the construction and theory of zone plate. Show that a zone plate has multiple foci. What is meant by phase reversal of zone plate ? 2+6+2+2

OR

Describe Fraunhofer's diffraction due to a single slit and deduce positions of maxima and minima. 12

4. a) State and explain Brewster's law. 4  
b) What are quarter and half waveplates ? Find out the formula for the thickness of the plates. 6  
c) Find out the thickness of a quarter wave plate when the monochromatic light of wavelength 5890 Å is used. Given  $\mu_o = 1.55$  and  $\mu_e = 1.54$ . 2

OR

[ 3 ]

Define specific rotation. Describe the working of Laurent's half shade polarimeter. How it will be used to find the specific rotation of sugar solution. A 20 cm long tube containing 20% sugar solution rotates the plane of polarisation by  $26.4^\circ$ . Calculate the specific rotation. 2+4+3+3

5. Describe the construction and working of Ruby Laser with necessary diagram what are the characteristics of Laser beam ? 9+3

OR

Explain the origin of Raman Effect. What are Stokes and antistokes lines ? Give a quantum mechanical treatment for the explanation. Mention some characteristics of Raman lines. 3+6+3

V-136-0.5

□□

- d) Explain Hofmann Bromamide reaction with an example. 2
- e) What happens when \_\_\_\_\_ ?
- i)  $\text{PCl}_5$  reacts with acetic acid. 2
- ii) Acetic acid reacts with ethyl alcohol in presence of Conc.  $\text{H}_2\text{SO}_4$ . 2
6. a) Write one method of preparation of nitrobenzene. Explain reduction of nitrobenzene in acidic medium. 2+2
- b) How are TNT and picric acid prepared ? Write the uses of TNT. 4+2
- OR
- c) Discuss the mechanism of electrophilic aromatic substitution in aniline. 4
- d) p-nitro aniline is less basic than aniline. Explain. 2
- e) What are analgesics ? Write two examples of analgesics. 2+2

**2015**

Full Marks - 60

Time - 3 Hours

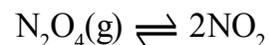
The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Derive an expression for the efficiency of a Carnot engine working between two temperatures  $T_1$  and  $T_2$  (where  $T_2 > T_1$ ). 6
- b) State and explain 2nd law of thermodynamics. 4
- OR
- c) How are work function (A) and free energy (G) related ? Discuss the criteria of Spontaneity of a chemical reaction. 3+3
- d) Calculate the entropy change when 9.1 moles of ice are converted to water  $0^\circ\text{C}$ , if the latent heat of fusion of ice is  $80 \text{ cal.gm}^{-1}$ . 4
2. a) Derive thermodynamically the law of mass action and the law of chemical equilibrium. 6

[ 2 ]

b) At 300°K,  $\Delta G^0$  for the reaction,



is 5743J. Calculate the value of  $K_p$ . 4

OR

Explain Nernst heat theorem. How does it help to derive the third law of thermodynamics? 8+2

3. a) How acid-base strength and hardness and softness are inter-related? 5  
b) How electronegativity is related to hardness and softness? 5

OR

- c) Why alkali metals impart blue colour to the solution when dissolved in liquid ammonia? 3  
d) What is a metathetical reaction? Explain with example. 3  
e) Complete the following reactions: 4



[ 3 ]

4. a) Write the postulates of crystal field theory. 5  
b) Draw and explain crystal field splitting in square planar field. 5

OR

- c) What is meant by crystal field splitting? 3  
d) Which out of  $\text{Cu}^{2+}$  and  $\text{Zn}^{2+}$  is paramagnetic and why? 3  
e) Octahedral complexes can be high spin or low spin but tetrahedral complexes are generally high spin complexes. Explain. 4  
5. a) How will you get acetic acid from Grignard's reagent? 2

- b) Give one method of preparation of each of the following:  
i) Malic acid 2  
ii) Succinic acid 3  
iii) Tartaric acid. 3

OR

- c) Write one method of preparation of  
i) aceto acetic ester  
ii) acetic anhydride. 2+2

3. Give an account of structure and morphological nature of sporocarp of Marsilea.

OR

Write notes on the following :

- Stem anatomy of Equisetum
  - Equisetum cone.
4. What is living fossil ? "Ginkgo is a living fossil". – Discuss and justify the statement.

OR

Write notes on the following :

- Ovule of Cycas
  - Collar of Ginkgo.
5. Give an illustrated account of the salient features in the life history of Gnetum. Point out its advanced characters which suggests its affinities with angiosperms.

OR

Write notes on the following :

- Wood of Pinus
- Pinus needle.

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*Give labelled diagrams wherever necessary*

1. Describe the reproductive structure of Cycadeoidea. Point out its similarity with angiospermic flower.

OR

Write notes on the followings :

- Geological time scale
  - Stem of Lepidodendron.
2. Describe the phenomenon of heterospory. Point out its significance in the life history of Selaginella and state how for it approaches the seed habit.

OR

Write notes on the following :

- Rhizophore of Selaginella
- Synangium of Psilotum.

3. Discuss the structure of Thyroid gland and mention the biological actions of hormones secreted from the gland.

OR

Write notes on any *two* of the following :

- Mechanism of steroid hormone Action
  - Pineal gland
  - Oxytocin.
4. What is steroid hormone ? Discuss the structure and biological actions of steroid hormone secreted from testis.

OR

Write notes on any *two* of the following :

- Pheromone
  - Insulin
  - Gastrointestinal hormones.
5. Discuss the structure of Immunoglobulin and mention different types of Immunoglobulins with functions.

OR

Write notes on any *two* of the following :

- Innate immunity
- MHC complex
- Antigen-antibody reaction.

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Draw suitable diagrams wherever necessary*

1. Discuss the development of chick upto formation of three germ layers.

OR

Write notes on any *two* of the following :

- Spermatogenesis
  - Influence of Yolk on cleavage
  - Vitellogenesis.
2. Describe the process of metamorphosis of anuran tadpole larva.

OR

Write notes on any *two* of the following :

- Embryo transfer technique
- Apoptosis
- Cell lineage.

**2015**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Discuss the differences between Sequential, Indexed and Hashed/Direct file systems in briefly. 8
- b) Discuss the different problems of sharing files. 4

OR

- c) Write the differences between file management and database management systems. 6
  - d) What is hashing ? What procedures are used for insertion, deletion, updation and retrieval of data in hashing. 6
2. a) Discuss the different users and end-users of the database system. 6
  - b) Explain various types of data models used in database. 6

OR

[ 2 ]

- c) What do you mean by database language ?  
Discuss the different DBMS Languages in  
brief. 8
- d) Differentiate between logical and physical data  
independence. 4
3. a) Discuss the two types of Relational Integrity rule  
in brief. 6
- b) Discuss the DBTG model along with links,  
owner, member, virtual fields and chain, in  
brief. 6
- OR
- c) Explain the basic concept of Hierarchical data  
model. 6
- d) Differentiate between the primary key and  
foreign key with appropriate examples each. 6
4. a) Define Functional dependency. Explain  
Armstrong's Axioms of functional  
dependency. 8
- b) Explain the time stamp protocol. 4

OR

[ 3 ]

- c) Discuss the different types of Back up and  
recoveries of the DBMS. 6
- d) What is Normalization ? Differentiate between  
3NF and BCNF with examples. 6
5. a) Prove that a given connected G is an Euler  
graph if and only if all vertices of G are even  
degree. 6
- b) Write short notes : 2 × 3
- i) Cutsets
- ii) Rooted tree
- iii) Eulerian path.
- OR
- c) Compare weighted and non-weighted graph. 4
- d) From the weighted graph, find cost of the graph  
and construct minimal spanning tree. 8

**IV-UG-Math(H)-IV (Arts/Sc)**

**2015**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer **all** questions

*Symbols used have their usual meanings*

1. Discuss Secant method and its rate of convergence.

OR

Find a root of the equation  $x \sin x + \cos x = 0$  by Newton-Raphson's method starting from the initial guess  $x_0 = \pi$  upto 5 significant figures.

2. Establish Lagrange's interpolating formula for  $(n+1)$  nodes. Using Lagrange's interpolating polynomial. Construct the polynomial for the set of data  $f(0) = 1$ ,  $f(-1) = 2$ ,  $f(1) = 3$ .

OR

From the following table of sines compute  $\sin 3^\circ$  and  $\sin 38^\circ$ .

$x^\circ$	0	10	20	30	40
$\sin x^\circ$	0	0.17365	0.34202	0.50000	0.64279

[ 2 ]

3. Derive compound trapezoidal rule with error term.

OR

Find the approximate value of

$$\int_0^1 e^{-x^2} dx$$

by Gauss Legendre's 3 point formula.

4. Solve numerically  $\frac{dy}{dx} = 2x$ ,  $y(0) = 0$  by Euler's method for  $0 \leq x \leq 0.1$  taking  $h = 0.01$  using 4-digit arithmetic.

OR

Solve the initial value problem  $\frac{dy}{dx} = \sqrt{y}$ ,  $y(0) = 1$  using Euler's method with  $h = 0.2$ . Determine  $y(0.4)$  approximately.

5. Solve the following system of equations

$$8x + 2y - 2z = 8$$

$$x - 8y + 3z = -4$$

$$2x + y + 9z = 12$$

by Jacobi method.

OR

[ 3 ]

Solve the following system of equations :

$$x_1 + 2x_2 + x_3 = 0$$

$$2x_1 + 2x_2 + 3x_3 = 0$$

$$-x_1 - 3x_2 = 2$$

by Gauss-Seidel iterating method.

6. Solve the following L.P.P. by graphical method :

$$\text{Maximize } z = x_1 + 3x_2$$

subject to the constraints

$$3x_1 + 6x_2 \leq 8$$

$$5x_1 + 2x_2 \leq 10$$

$$x_1, x_2 \geq 0.$$

OR

In a chemical industry, two products A and B are made involving two operations. The production of B also results in a byproduct C. The product A can be sold at a profit of Rs.3.00 per unit and B at a profit of Rs.8.00 per unit. The by-product C has a

[ 4 ]

profit of Rs.2.00 per unit. Forecasts show that upto 5 units of C can be sold. The company gets 3 units of C for each unit of B produced. The manufacturing times are 3 hrs per unit of B on operation one and two respectively. Because the product C results from producing B, no time is used in producing C. The available times are 18 hours and 21 hours of operation one and two respectively. The company desires to know that how much A and B should be produced keeping C in mind to make the highest profit. Formulate a L.P. model for this problem.

7. Prove that the intersection of any finite number of convex sets is also a convex set.

OR

If the convex set of feasible solutions of  $Ax = b, x \geq 0$  is a convex polyhedron, then prove that at least one of the extreme points gives an optimal solution.

8. Use two-phase Simplex method to solve the following L.P.P. :

$$\text{Maximize } z = 3x_1 - x_2$$

[ 5 ]

$$\begin{aligned} \text{subject to } & 2x_1 + x_2 \geq 2 \\ & x_1 + x_2 \leq 2 \\ & x_2 \leq 4 \\ \text{and } & x_1, x_2 \geq 0. \end{aligned}$$

OR

Use Big-M method to maximize  $z = 3x_1 + 2x_2$   
subject to constraints

$$\begin{aligned} & 2x_1 + x_2 \leq 1 \\ & 3x_1 + 4x_2 \geq 4 \\ & x_1, x_2 \geq 0. \end{aligned}$$

9. Use dual simplex method to maximize  $z = -3x_1 - 2x_2$

$$\begin{aligned} \text{subject to } & x_1 + x_2 \geq 1 \\ & x_1 + x_2 \leq 7 \\ & x_1 + 2x_2 \geq 10 \\ & x_1 \leq 3 \\ & x_1, x_2 \geq 0 \end{aligned}$$

OR

[ 6 ]

Explain duality theory of linear programming and write down the dual of the following L.P.P. :

Minimize  $z = 7x_1 + 3x_2 + 8x_3$

subject to  $8x_1 + 2x_2 + x_3 \geq 3$

$3x_1 + 6x_2 + 4x_3 \geq 4$

$4x_1 + x_2 + 5x_3 \geq 1$

$x_1 + 5x_2 + 2x_3 \geq 7$

$x_1, x_2, x_3 \geq 0.$

10. Find the feasible solution of the following transportation problem :

		W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	Supply
Factory	F <sub>1</sub>	14	25	45	5	6
	F <sub>2</sub>	65	25	35	55	8
	F <sub>3</sub>	35	3	65	15	16
Requirements		4	7	6	13	30 (Total)

OR

A company has four machines on which 3 jobs are to be done. Each job can be assigned to one and only

[ 7 ]

one machine. The cost of each job on each machine is given in the following table.

		Machine			
		W	X	Y	Z
	A	18	24	28	32
Job	B	8	13	17	19
	C	10	15	19	22

What are the job assignments which will minimize the cost ?

V-141-0.5



- ଖ) ସପ୍ତସଙ୍ଗ ସରଳାର୍ଥ ଲେଖ : ୫  
ତୁମେ ଜାଣିଥିବ ଅନେକ ସମୟରେ ଜୀବନରେ ଅଭିନୟ କରିବା  
ଦରକାର ପଡ଼େ ।

ଅଥବା

ତଥାପି.... ନାରୀମାନଙ୍କର ବୟସ କହିବା ଏକ ହନୁମାନ ପ୍ରଶ୍ନ  
ବ୍ୟାପାର ।

୩. କ) 'ଆବିଷ୍କାର' ଏକାଙ୍କିକାରୁ ବୁଝାଇ ଚରିତ୍ର ଚିତ୍ରଣ କର । ୧୫  
ଅଥବା

'ଗେଣ୍ଡା' ଏକାଙ୍କିକାରେ ଅତୀତ, ବର୍ତ୍ତମାନ ଓ ଭବିଷ୍ୟତ ପରଂପରାର  
ସଂଘର୍ଷ କିପରି ପ୍ରକାଶିତ ହୋଇଛି ଦର୍ଶାଅ ।

- ଖ) ସପ୍ତସଙ୍ଗ ସରଳାର୍ଥ ଲେଖ : ୫  
ଯାହା ନିଜର ନୁହେଁ, ତାକୁ ପାଇବା ପାଇଁ ଅଦମ୍ୟ ପିପାସାକୁ ମୁଁ  
ରୋକି ପାରି ନଥିଲି -

ଅଥବା

ଆଜିକାଲିର ପରିସ୍ଥିତି ଯାହା ହେଲାଣି, ମଣିଷ ପରି ଆମେ ବଞ୍ଚିବା  
କଷ୍ଟ ।

୪. କ) ଲୋକନାଟକର ପ୍ରକାରଭେଦ ଦର୍ଶାଅ । ୧୦  
ଅଥବା

ନାଟକରେ ଦୃଶ୍ୟର ଭୂମିକା ଉଲ୍ଲେଖ କର ।

- ଖ) ଏକାଙ୍କିକାର ସଂଜ୍ଞା ଓ ସ୍ୱରୂପ ପ୍ରକାଶ କର । ୧୦  
ଅଥବା

ଏକାଙ୍କିକାର ପ୍ରକାରଭେଦ ଲେଖ ।

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

୧. କ) 'ଅଭିଯାନ' ନାଟକ ଅବଲମ୍ବନରେ ପୁରୁଷୋତ୍ତମ ଦେବଙ୍କ ଚରିତ୍ର  
ଚିତ୍ରଣ କର । ୧୫

ଅଥବା

'ଭରସା' ଏକ ସାମାଜିକ ନାଟକ - ଆଲୋଚନା କର ।

- ଖ) ସପ୍ତସଙ୍ଗ ସରଳାର୍ଥ ଲେଖ : ୫  
ସ୍ୱପ୍ନକୁ ସତ୍ୟ ବୋଲି ଧାରଣା କରିବା ବୀରୋଚିତ ବିଚାର ହେବ  
ନାହିଁ - କୁହେଲିକା ବର୍ଷତ୍ତ-ମେଘ ନୁହେଁ ।

ଅଥବା

ଯେଉଁ ନିରାଚ ସତକଥା ତୁମେ ମୋ ଆଖି ଆଗରେ ଥୋଇଦେଇଛ,  
ତାକୁ ତ ମୁଁ ଏଡ଼ିଦେଇ ପାରିବି ନାହିଁ ।

୨. କ) 'ଆଗାମୀ' ନାଟକରୁ ସରସୀର ଚରିତ୍ର ଚିତ୍ରଣ କର । ୧୫  
ଅଥବା

'ଧୃତରାଷ୍ଟ୍ର ଆଖି'ରେ ଆଧୁନିକ ସଭ୍ୟତାର ଚିତ୍ର କିପରି ପ୍ରତିଫଳିତ  
ହୋଇଛି ଉଲ୍ଲେଖ କର ।

Explain and examine Rigorism as a moral standard. 16

4. Explain collectivism as a theory of relation between individual and society. 16

OR

Critically examine the Retributive theory of Punishment. 16

5. Does end justify means ? Discuss after Gandhian ethics. 16

OR

Explain the doctrine of niskāma karma in the Bhagavad Gītā. 16

**2015**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Define Ethics. Is Ethics a normative science ? Discuss. 6+10

OR

Explain the relation of Ethics to Politics. 16

2. What is a voluntary action ? Explain different stages of voluntary action. 4+12

OR

Write notes on the following : 8+8

- a) Moral and non-moral actions  
b) Motive and intention.

3. Critically examine Psychological hedonism as a moral standard. 16

OR

[ 2 ]

Write notes on the following :

- a) Sporocarp of *Marsilea*
- b) Apogamy.

4. Describe briefly the morphology and anatomy of stem and root of *Ginkgo*.

OR

Write notes on the following :

- a) Leaflet of *Cycas*
- b) Female cone of *Cycas*.

5. Give an account of development of male gametophyte of *Gnetum* with various views regarding the development of male gametophyte.

OR

Write notes on the following :

- a) *Pinus* needle
- b) Male gametophyte of *Pinus*.

IV-UG-Bot(H)-VII (Back)

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer **all** questions

1. Describe the life history of *Cycadeoidea* with affinities.

OR

Write notes on the following :

- a) Fossilization process
- b) Morphology of *Lepidodendron*.

2. Give an account of life history of *Lycopodium*.

OR

Write notes on the following :

- a) Sexual reproduction in *Psilotum*
- b) Strobilus of *Selaginella*.

3. Give an account of life history of *Equisetum*.

OR

[ 2 ]

3. What is linkage ? Describe different types of linkage with suitable examples.

OR

Write notes on any *two* of the following :

- Law of Segregation
  - Multiple alleles
  - Chromosomal mechanism of Sex-determination.
4. What is Mutation ? Give an account of gene mutation.

OR

Write notes on any *two* of the following :

- Euploidy
  - Parental diagnosis
  - Inherited Cancers.
5. Give an account of Darwin's theory of natural selection.

OR

Write notes on any *two* of the following :

- Theory of inheritance of acquired characters
- Role of isolation in organic evolution
- Biological species concept.

IV-UG-Zool(H)-VII (Back)

**2015**

Full Marks - 60

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Draw labelled diagram wherever necessary*

1. Describe the structure and functions of mitochondria.

OR

Write notes on any *two* of the following :

- Ribosome
- Lampbrush chromosome
- Functions of Plasma membrane.

2. Give a detail account of mitotic cell division and add a note on its significance.

OR

Write notes on any *two* of the following :

- Prophase-I of meiosis
- Ageing
- Effect of radiation on cell.

*Other information :*

- Period of credit allowed by suppliers is two months.
  - 25% of sales is for cash and the period of credit allowed to customers for credit sales is one month.
  - Delay in payment of wages and expenses one month.
  - Income tax ₹28,000 is to be paid in June 2014.
5. Define standard costing and explain its importance. 8+8

OR

The standard material cost to produce a tonne of chemical Y is :

200 kg of material A @ ₹10 per kg.

300 kg of material B @ ₹5 per kg.

400 kg of material C @ ₹7 per kg.

During the period, 100 tonnes of mixture Y were produced from the usage of :

30 tonnes of material A at a cost of ₹9000 per tonne.

40 tonnes of material B at a cost of ₹6000 per tonne.

50 tonnes of material C at a cost of ₹7000 per tonne.

*Calculate :*

- Material cost variance
- Material price variance
- Material usage variance. 16

**2015**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

- Define Management Accounting. Explain the difference between Management Accounting and Financial Accounting. 6+10

OR

The following data represents the ratios pertaining to X Co. Ltd. for the year ending 31st March, 2012 :

Annual Sales	₹ 40,00,000
Sales to Networth	4 times
Current Liabilities to Networth	50%
Total Debt to Networth	80%
Current Ratio	2.2 times
Sales to Inventory	8 times
Average Collection Period	40 days
Fixed Asset to Networth	70%

From the above-mentioned particulars prepare the Balance Sheet of X Co. Ltd. as on 31st March 2012. Assume that all sales are made on credit. 16

[ 2 ]

2. What is Funds Flow Statement. Explain the importance of Funds Flow Statement. 6+10

OR

The Balance of B. Ltd. as on 1.1.2011 and 31.12.2011 are given below :

Liabilities	1.1.11 ₹	31.12.11 ₹	Assets	1.1.11 ₹	31.12.11 ₹
Share Capital	1,25,000	1,53,000	Cash	10,000	47,000
Bank Loan	40,000	50,000	Debtors	30,000	50,000
Loan from Financial institution	25,000	--	Stock	35,000	25,000
Creditors	40,000	44,000	Machinery	80,000	55,000
Profit and Loss	1,00,000	1,20,000	Land	40,000	50,000
			Building	35,000	60,000
			Goodwill	1,00,000	80,000
<b>Total</b>	<b>3,30,000</b>	<b>3,67,000</b>	<b>Total</b>	<b>3,30,000</b>	<b>3,67,000</b>

*Other information :*

- Dividend paid ₹15,000 during the year.
  - ₹20,000 worth of machinery was sold at book value.
- With the help of the above information, prepare a 'Cash Flow Statement'. 16

3. Define Break-Even Analysis ? Discuss the assumptions and the limitations of this technique. 4+6+6

OR

A company produces and markets industrial containers and packing cases. Due to competition the company proposes to reduce the selling price. If the present level

[ 3 ]

of profit is to be maintained, indicate the number of units to be sold if the proposed reduction in selling price is (a) 5%, (b) 10% and (c) 15%.

The following additional information is available : 16

	₹	₹
Present sales (30,000 units)		3,00,000
Variable costs	1,80,000	
Fixed costs	<u>70,000</u>	<u>2,50,000</u>
Net profit		<u>50,000</u>

4. Explain Budgetary Control. Describe its merits and demerits. 6+5+5

OR

A company is expecting to have ₹32,000 cash in hand on 1.4.2014 and it requests you to prepare cash budget for the three months, April to June 2014. The following information is supplied to you : 16

Month	Sales(₹)	Purchase(₹)	Wages(₹)	Expenses(₹)
February	70,000	44,000	6,000	5,000
March	80,000	56,000	9,000	6,000
April	96,000	60,000	9,000	7,000
May	1,00,000	68,000	11,000	9,000
June	1,20,000	62,000	14,000	9,000

**IV-UG-Math(EL)-IV (Arts/Sc)**  
(Back)

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Solve  $\sin x = 10(x - 1)$  numerically by fixed point iteration method.

OR

Find the value of  $\sqrt{3}$  to 3-significant figures by bisection method.

2. Construct Newton's difference table for the data :

x	-1	0	2	5
f	-11	-5	-5	55

hence find the interpolating polynomial for the above data and also interpolate  $f(1)$ .

OR

[ 2 ]

Compute  $y = e^x$  for  $x = 0.02$  and  $x = 0.38$  given the values :

x	0	0.1	0.2	0.3	0.4
y	1	1.1052	1.2214	1.3499	1.4918

3. Evaluate the integral

$$I(f) = \int_0^1 \frac{dx}{1+x}$$

using compound Simpson's  $\frac{1}{3}$ rd rule with 4,8 equal subintervals.

OR

Derive Trapezoidal rule with error term.

4. Using Picard's method find the approximate solutions  $y_1, y_2, y_3$  of the differential equation

$$\frac{dy}{dx} = -xy ; y(1) = 2$$

at  $x = 1.1$  and compare the approximate solutions with the exact solution.

OR

[ 3 ]

Solve  $\frac{dy}{dx} = x + y, y(0) = 0$

by Euler's method taking  $h = 0.2$  and find out  $y(0.4)$ .

5. Solve by Jacobi method the following system of equations :

$$8x_1 + 2x_2 - 2x_3 = 8$$

$$x_1 - 8x_2 + 3x_3 = -4$$

$$2x_1 + x_2 + 9x_3 = 12$$

OR

Solve the system of equations

$$2x_1 - x_2 = 7$$

$$-x_1 + 2x_2 - x_3 = 1$$

$$-x_2 + 2x_3 = 1$$

by Gauss-Seidel iterative method.

6. Anita Electric company produces two products  $P_1$  and  $P_2$ . Products are produced and sold on a weekly basis. The weekly production cannot exceed 25 for product  $P_1$  and 35 for product  $P_2$  because of

[ 4 ]

limited available facilities. The company employs total of 60 workers. Product  $P_1$  requires 2 man-weeks of labour, while  $P_2$  requires one man-week labour. Profit margin on  $P_1$  is ₹60 and on  $P_2$  is ₹40.

Formulate it as a linear programming problem and solve for maximum profit.

OR

Use graphical method to solve the L.P.P. :

Maximise  $z = 5x_1 + 3x_2$

subject to the constraints :

$$x_1 + x_2 \leq 6$$

$$2x_1 + 3x_2 \geq 6$$

$$0 \leq x_1 \leq 4$$

$$0 \leq x_2 \leq 3.$$

7. Show that the set of all convex combinations of a finite number of points of  $S \subset \mathbb{R}^n$  is a convex set.

OR

Show that in  $\mathbb{R}^3$ , the closed ball  $x_1^2 + x_2^2 + x_3^2 \leq 1$  is a convex set.

[ 5 ]

8. Use Big M method to

$$\text{Maximise } z = 6x_1 + 4x_2$$

subject to the constraints :

$$2x_1 + 3x_2 \leq 30$$

$$3x_1 + 2x_2 \leq 24$$

$$x_1 + x_2 \geq 3$$

$$x_1 \geq 0 \text{ and } x_2 \geq 0.$$

OR

Use simplex method to solve the L.P.P. :

$$\text{Maximize } z = 2x_1 + 3x_2$$

subject to the constraints :

$$x_1 + x_2 \leq 4$$

$$-x_1 + x_2 \leq 1$$

$$x_1 + 2x_2 \leq 5$$

$$x_1 \geq 0, x_2 \geq 0.$$

9. Prove that the dual of the dual is the primal.

OR

[ 6 ]

Use duality to solve the following L.P.P. :

Maximize  $z = 2x_1 + x_2$

subject to the constraints

$$x_1 + 2x_2 \leq 10$$

$$x_1 + x_2 \leq 6$$

$$x_1 - x_2 \leq 2$$

$$x_1 - 2x_2 \leq 1$$

$$x_1, x_2 \geq 0.$$

10. Use Vogel's approximation method to obtain an initial basic feasible solution of the transportation problem.

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	

OR

[ 7 ]

The owner of a small machine shop has four machinists available to assign to jobs for the

	A	B	C	D	E
1	62	78	50	101	82
2	71	84	61	73	59
3	87	92	111	71	81
4	48	64	87	77	80

Find the assignment of machinists to jobs that will result in a maximum profit. Which job should be declined ?

V-157-0.2



[ 2 ]

4. Discuss the laws governing employee benefits and welfare.

OR

Discuss about the various ways of employee compensation.

5. Discuss the regulatory mechanism guiding industrial relations.

OR

Write notes on the following :

- a) Collective bargaining
- b) Worker's Participation in management.

V-143-1

□□

**IV-UG-BBA(EL)-IV (HRM)**

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Define Personnel Management and discuss its environment in India.

OR

Discuss about manpower planning.

2. What is recruitment ? Discuss the various methods of recruitment.

OR

Discuss about staff training and development.

3. Discuss the different ways of job analysis and its evaluation.

OR

Write notes on the following :

- a) Employee motivation
- b) Performance monitoring.

V-143

[Turn Over

[ 2 ]

3. What do you mean by perfect competition ? How are price and output determined under perfect competition ?

OR

What is price discrimination ? Under what conditions price discrimination under monopoly is possible and profitable ?

4. What do you mean by monopolistic competition ? State the characteristics of monopolistic competition.

OR

What do you mean by 'price leadership' in oligopoly market ? Discuss the different types of price-leadership in oligopoly market.

5. Discuss in detail the determination of wage rates under perfect competition.

OR

Critically examine the 'Liquidity Preference' theory of rate of interest determination.

II-UG-BBA(C)-II (EM)

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. State and explain the 'Law of Demand'. Why does a demand curve slope downward from left to right ?

OR

What is 'elasticity of demand' ? Explain the methods used for measuring price elasticity of demand.

2. State and explain the 'Law of Returns to Scale'.

OR

Write notes on any *two* of the following :

- Properties of Iso-quants
- Ridge Lines
- Average Cost (AC) and Marginal Cost (MC)
- 'Internal' and 'External' economies.

What do you mean by 'Price discrimination' ? Under what circumstances price discrimination is possible and profitable ?

4. Define 'Oligopoly'. Explain the main characteristics of an Oligopolistic market.

OR

Explain price and output determination in an oligopolistic market.

5. Critically discuss the 'Marginal Productivity' theory of distribution.

OR

Briefly discuss the various theories of profit.

V-180-4



**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. State and explain the 'Law of Demand'. Why does the demand curve slope downward to the right ?

OR

Define the concept of 'Elasticity of Demand'. Explain the meaning of 'Price-elasticity of demand', 'income elasticity of demand' and 'cross-elasticity of demand'.

2. State and explain the law of 'Returns to scale'.

OR

Discuss in details the internal and external economies and diseconomies and examine their effects on cost.

3. Discuss the importance of 'Time Element' in the determination of price in a perfectly competitive market.

OR

V-180

[Turn Over

What do you mean by 'Price discrimination' ? Under what circumstances price discrimination is possible and profitable ?

4. Define 'Oligopoly'. Explain the main characteristics of an Oligopolistic market.

OR

Explain price and output determination in an oligopolistic market.

5. Critically discuss the 'Marginal Productivity' theory of distribution.

OR

Briefly discuss the various theories of profit.

V-180-4



**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. State and explain the 'Law of Demand'. Why does the demand curve slope downward to the right ?

OR

Define the concept of 'Elasticity of Demand'. Explain the meaning of 'Price-elasticity of demand', 'income elasticity of demand' and 'cross-elasticity of demand'.

2. State and explain the law of 'Returns to scale'.

OR

Discuss in details the internal and external economies and diseconomies and examine their effects on cost.

3. Discuss the importance of 'Time Element' in the determination of price in a perfectly competitive market.

OR

V-180

[Turn Over

[ 2 ]

3. Suppose you have been assigned the task of interviewing a leftist economist who opposes foreign investment. Prepare a set of questions you want to ask the economist. 15

OR

You have been asked for an interview for the post of a clerk. Draft an interview between yourself and the Board members.

4. As the head of an organisation publish a tender notice for the office furniture. 10

OR

As the Secretary of a local body invite tenders for the construction of a room.

V-226-0.2



**II-UG-Comm.Eng-II (Com)**

(Back)

**2015**

Full Marks - 50

Time - 2 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Your college organised a blood donation camp last month. Prepare a report to be published in a local newspaper. 10

OR

Imagine that you witnessed a murder in dark night near your home. The local police wants a report of the incident from you. Draft the report for submitting it to the police station.

2. Compose a dialogue between yourself and your friend on the rising Cyber crime. 15

OR

Compose a dialogue between two friends on the last railway budget.

V-226

[Turn Over

[ 2 ]

3. Describe the development of frog upto three germ layers.

OR

Write notes on any *two* of the following :

- Spermatogenesis
  - Types of Cleavage
  - Structure of Sperm.
4. What is resource ? Describe some important renewable resources.

OR

Write notes on any *two* of the following :

- Management of Wildlife
  - Nonconventional energy resources
  - Conservation of forest resource.
5. Give an account of Vermiculture.

OR

Write notes on any *two* of the following :

- Rearing of Silkworm
- Management of Ponds for Fish Culture
- Sustainable agriculture.

IV-UG-Zool(EL)-VII (Back)

2015

Full Marks - 75

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Draw labelled diagrams wherever necessary*

1. Describe the Physiology of digestion and absorption of Carbohydrates in man.

OR

Write notes on any *two* of the following :

- Ultrafiltration
- Transport of O<sub>2</sub> in the blood
- Cardiac cycle.

2. Explain the mechanism of enzyme action.

OR

Write notes on any *two* of the following :

- Biological significance of Carbohydrate
- Types of RNA
- Structure of Protein.

- ଗ) ଇଶ୍ଵରଙ୍କ ନାଁରେ ସବୁଠି ଏକା ପ୍ରହସନ, ଏକା ଭଣ୍ଡାମି ।  
ଘ) ସେମାନେ ତ କୁହନ୍ତି ମୁଁ ଯାହା କହୁଛି କର, ଯାହା କରୁଛି କର ନାହିଁ ।

୪. ଯେ କୌଣସି **ଚାରିଟିର** ସଂକ୍ଷିପ୍ତ ଉତ୍ତର ଦିଅ :  $9 \times ୪$

- କ) ଜନସାଧାରଣଙ୍କ ପ୍ରତିନିଧି ଆମେ । ସେମାନଙ୍କ ଦୁଃଖ ଦୁର୍ଦ୍ଦଶା ନ ବୁଝିଲେ, ଆମ ଉପରୁ ସେମାନଙ୍କ ଆତ୍ମା ତୁଟି ଯିବ ନାହିଁ ? - ଏ କଥା କିଏ କାହାକୁ କହିଛନ୍ତି ?  
ଖ) ଏତେବଡ଼ ହସ କଥାରେ ଆମେ ଦୁହେଁ ମନଖୋଲା ହସ ହସିପାରୁନୁ - ଏ ସଂଳାପ କାହାର ?  
ଗ) ଧରିତ୍ରୀ କାହାର ଝିଅ ?  
ଘ) ଶ୍ରୀଯୁକ୍ତ ଚୌଧୁରୀଙ୍କ ବୟସ କେତେ ?  
ଙ) କାହାର ଜନ୍ମଦିନରେ କିଏ ବ୍ୟୟ ସାପେକ୍ଷ party ଆୟୋଜନ କରିଥିଲେ ?  
ଚ) ସତ୍ୟଛଡ଼ା ତ ଅନ୍ୟକିଛି ମୁଁ କହେ ନାହିଁ - ଏହା କିଏ କାହାକୁ କହିଛନ୍ତି ?  
ଛ) ‘ଆପଣମାନେ ହାତୀ ଦେଖନ୍ତୁ - ଆପଣ ନାହିଁ, କିନ୍ତୁ କ’ଣ ଦେଖିଲେ ଦୟାକରି ଶେଷରେ କହିଯିବେ’ - ଏକଥା କିଏ କେଉଁଠି କହିଛନ୍ତି ?  
ଜ) ଆଜିକାଲିର ପରିସ୍ଥିତି ଯାହା ହେଲାଣି, ମଣିଷ ପରି ଆମେ ବଞ୍ଚିବା କଷ୍ଟ - ଏକଥା କିଏ କାହାକୁ କହିଛନ୍ତି ?

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

୧. ପ୍ରତୀକାତ୍ମକ ଏକାଙ୍କିକା ଭବରେ ‘**ଫୁଲ ଓ ଫୁଲଦାନୀ**’ର ମୂଲ୍ୟାୟନ କର ।  $୧୨$

ଅଥବା

ହାସ୍ୟରସ ‘**ମକଦ୍ଦମା**’ ଏକାଙ୍କିକାର ମୁଖ୍ୟ ବିଭବ - ଆଲୋଚନା କର ।

୨. ‘**ଗେଣ୍ଡା**’ ଏକାଙ୍କିକାରେ ପୁରାତନ ଓ ନୂତନ ପରମ୍ପରାର ଦୃଶ୍ୟ କିପରି ପ୍ରକାଶିତ ହୋଇଛି ଉଲ୍ଲେଖ କର ।  $୧୨$

ଅଥବା

ପୌରାଣିକ ଚରିତ୍ର ଓ ଘଟଣା ଆଧାରିତ ଚିନ୍ତାଧାରା ‘**ଅନୁଶାସନ**’ ଏକାଙ୍କିକାରେ କିଭଳି ପ୍ରତିଫଳିତ ହୋଇଅଛି, ଦର୍ଶାଅ ।

୩. ଯେ କୌଣସି **ଦୁଇଟିର** ସପ୍ତସଙ୍ଗ ସରଳାର୍ଥ ଲେଖ :  $୪ \times ୨$

କ) ନିଜର ନେଇ ଯେ କଲା ଆମେ କହିବୁ ସ୍ଵାର୍ଥପର - ନିଜକୁ ବାଦ୍ ଦେଇ ଯେ କଲା ସେ ସେବକ ।

ଖ) ଆଇଡିଆଲିଜିମ୍ ଆଗରେ ବାପ-ପୁଅ, ଶଶୁର-ଜ୍ଞାଜ୍ଞ, ଏମିତିକି ସ୍ଵାମୀ-ସ୍ଵାମୀ ସଂପର୍କ ବି କିଛି ନୁହେଁ ।

3. Write notes on any *two* of the following : 8 × 2

- a) Hindrances to the process of modernizing public policy.
- b) Iron Law of Oligarchy - Michels
- c) Power Elite - C. Wright Mills
- d) Models of Public policy.

V-159-0.5



**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Critically examine Mosca's elite theory of democracy. 12

OR

Practical democracy is elitist in nature; it is the rule of multiple minorities; that is, the rule of the elite of the numerous groups within society - (Robert Dahl). In the light of the above statement discuss the relationship between contemporary Elite Theory of Politics and the concept of Liberal Democracy.

2. Examine the characteristics of public policy making. 12

OR

Discuss the role of Executive in policy making and the challenges for the executive in policy making.

[ 2 ]

II-PG-Com-VI (MCOB)

Write notes on the following :

- a) Concept of Two-way Communication 6  
b) Communication Process. 7

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Define 'Group Dynamics'. Discuss the factors responsible for group performance. 14

OR

Discuss the "Trait theory" of leadership. 14

2. Discuss about the various types of Organisation Conflicts. 13

OR

Discuss the ways of resolving organisational conflicts. 13

3. Discuss the various types of organisational communication. 13

OR

V-162-1



V-162

[Turn Over

[ 2 ]

II-UG-Phil(EL-A)-II

Discuss different theories of punishment. Which one of them is preferable ? Discuss.

5. Does end justify means ? Explain after Gandhi.

OR

The Bhagabat Gita has given greater recognition to the performance of disinterested action. Explain.

V-183-1



**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Explain why Ethics is called a Normative science ?

OR

Discuss the relation of Ethics to Religion.

2. Distinguish between moral and non-moral actions.

OR

Can there be conflict of desires ? Discuss.

3. Explain Bentham's altruism as a moral standard.

OR

Explain and examine Kant's categorical imperative.

4. How will you explain that the individual exists for the society and the society - exists for the individual ? Discuss.

OR

V-183

[Turn Over

4. Review the causes of the First World War.

OR

Explain the causes for the failure of the League of Nations.

5. Trace the factors responsible for the rise of Nazism in Germany.

OR

Describe the causes of the World War-II.

V-182-2.5



**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Write a note on the Reformation Movement in Germany.

OR

Write down the causes that led to Renaissance.

2. Discuss the effects of American War of Independence.

OR

Briefly discuss the causes of the French Revolution of 1789.

3. Narrate the role of Cavour in the Unification of Italy.

OR

Trace the steps by which the Unification of Germany was achieved.

4. Review the causes of the First World War.

OR

Explain the causes for the failure of the League of Nations.

5. Trace the factors responsible for the rise of Nazism in Germany.

OR

Describe the causes of the World War-II.

V-182-2.5



**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. Write a note on the Reformation Movement in Germany.

OR

Write down the causes that led to Renaissance.

2. Discuss the effects of American War of Independence.

OR

Briefly discuss the causes of the French Revolution of 1789.

3. Narrate the role of Cavour in the Unification of Italy.

OR

Trace the steps by which the Unification of Germany was achieved.

3. Discuss Born approximation in scattering theory and derive an expression for the scattering amplitude  $\sigma(\theta, \phi)$ . Discuss the condition for validity of Born approximation. 9+3

OR

Discuss resonance scattering from a square well potential specified by

$$V_{(r)} = \begin{cases} -V_0 & r < a \\ 0 & r > a \end{cases}$$

and deduce the Breit-Wigner formula for scattering cross-section. 12

V-160-30

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. What is anomalous Zeeman effect ? Explain it applying the Perturbation theory. 16

OR

Find the energy levels of a particle in a one dimensional oscillator potential using WKB method and normalize the wave functions obtained in this case. 12+4

2. Discuss the general features of time dependent Perturbation theory. Discuss zero order, first order and second order perturbation. 12

OR

Define and interpret Einstein's A, B coefficients. Deduce expressions for these coefficients. 12

V-160

[Turn Over

[ 2 ]

II-UG-Soc(EL-A)-II

4. Define joint family and explain its functions.

OR

Define marriage. Discuss the various forms of Hindu marriage.

5. Examine the impact of globalisation on Indian society.

OR

Briefly discuss the impact of Westernisation on the society of India.

V-184-0.5



**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. 'Indian society is a fine example of unity in diversity' – Discuss.

OR

Describe the linguistic composition of Indian society.

2. Write a note on the Ashram Vyavastha.

OR

Discuss the salient features of Hindu Social Organisation.

3. Examine the distinction between caste and class.

OR

Discuss the changing dimension of caste in Indian society.

V-184

[Turn Over

3. Write notes on any *two* of the following :
- a) Psychological symptoms of Frustration
  - b) Sources of Frustration
  - c) Consequences of Frustration.

OR

What is Dream ? Discuss the Mechanisms of dream.

4. Describe the symptoms, etiology and treatment of Anxiety Disorders.

OR

Outline the causes of Mental Retardation and suggest Prevention and Training programmes for the mentally retarded children.

5. What is Aggression ? Suggest the ways and means of Preventing and Controlling aggression.

OR

Write notes on the following :

- i) Behaviouristic Therapy
- ii) Humanistic Therapy.

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. What do you mean by Psychopathology ? Discuss the practical importance of studying Psychopathology.

OR

Classify the abnormal behaviours with reference to the Current Classification Strategy.

2. Write notes on any *two* of the following concepts of Freud :

- a) Basic Urges and Instincts
- b) Rationalization and Sublimation
- c) Conscious and Unconscious

OR

Briefly discuss the Psychosexual stages of personality development as stated by Freud.

3. Discuss the application of Biotechnology in the field of medicine.

OR

Write notes on any *two* of the following :

- Modern concept of gene
  - DNA : Double helical structure
  - Vectors.
4. Discuss biochemical theory of origin of life.

OR

Write notes on any *two* of the following :

- Role of isolation in evolution
  - Mutation
  - Morphological and anatomical evidences of organic evolution.
5. Describe the structure and function of skeletal tissue.

OR

Write notes on any *two* of the following :

- Smooth muscle
- Neuroglia
- Glandular epithelium.

**2015**

Full Marks - 75

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Draw labelled diagrams wherever necessary*

1. Describe the structure and functions of plasma membrane.

OR

Write notes on any *two* of the following :

- Endoplasmic reticulum
  - Prophase I of Meiosis
  - Lysosome.
2. What is crossing over ? Discuss its different steps. Add a note on its significance.

OR

Write notes on any *two* of the following :

- Co-dominance
- Law of segregation
- Sex chromosomes.

Using Choleski method, calculate the decomposition

$A = LL^T$  for

$$\begin{bmatrix} 2.25 & -3.0 & 4.5 \\ -3.0 & 5.0 & -10.0 \\ 4.5 & -10.0 & 34.0 \end{bmatrix}$$

5. Find a cubic spline interpolating function for the data  
Use the "not-a-knot" condition to obtain boundary conditions supplementing

$$\begin{aligned} \frac{h_{i-1}}{6} M_{i-1} + \frac{h_i + h_{i-1}}{3} M_i + \frac{h_i}{6} M_{i+1} \\ = \frac{y_{i+1} - y_i}{h_i} - \frac{y_i - y_{i-1}}{h_{i-1}}. \end{aligned}$$

Graph the resulting function  $s(x)$ .

OR

For all integers  $k$ , show that

$$\sum_{j=0}^{2n} e^{ikt_j} = \begin{cases} 2n+1, & e^{it_k} = 1 \\ 0, & e^{it_k} \neq 1 \end{cases}$$

The condition  $e^{it_k} = 1$  is equivalent to  $K$  being an integer multiple of  $2n + 1$ .

**2015**

Full Marks - 40

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. For  $n$  even, assume  $f(x)$  is  $(n + 2)$  times continuously differentiable on  $[a, b]$ . Then prove that

$$I(f) - I_n(f) = C_n h^{n+3} f^{(n+2)}(\eta), \text{ some } \eta \in [a, b]$$

$$\text{with } C_n = \frac{1}{(n+2)!} \int_0^n \mu^2 (\mu-1) \dots (\mu-n) d\mu.$$

For  $n$  odd, assume  $f(x)$  is  $n + 1$  times continuously differentiable on  $[a, b]$ . Then prove that

$$I(f) - I_n(f) = C_n h^{n+2} f^{(n+1)}(\eta), \text{ some } \eta \in [a, b]$$

$$\text{with } C_n = \frac{1}{(n+1)!} \int_0^n \mu (\mu-1) \dots (\mu-n) d\mu.$$

OR

Using Romberg integration, evaluate

$$I = \int_0^\pi e^x \cos x \, dx = -\frac{1}{2} (e^\pi + 1).$$

[ 2 ]

2. Assume the solution  $Y(x)$  of the IVP

$y' = f(x,y)$ ,  $y(x_0) = Y_0$  has a bounded 2nd derivative on  $[x_0, b]$ . The show that the solution  $\{y_h(x_n) \mid x_0 \leq x_n \leq b\}$  obtained by Euler's method satisfies

$$\text{Max}_{x_0 \leq x_n \leq b} |Y^{(x_n)} - y_h^{(x_n)}| \leq e^{(b-x_0) K_{|e_0|}} + \left[ \frac{e^{(b-x_0)K} - 1}{K} \right] \tau(h)$$

where  $\tau(h) = \frac{h}{2} \|Y''\|_\infty$  and  $e_0 = Y_0 - y_h(x_0)$

In addition,  $|Y_0 - y_h(x_e)| \leq c_1 h$ , as  $h \rightarrow 0$

for some  $e_1 \geq 0$ , then there is a constant  $B \geq 0$  for

which  $\text{Max}_{x_0 \leq x_n \leq b} |Y(x_n) - y_h(x_n)| \leq Bh$ .

OR

Convert the problem

$$y^{(3)} + 4y'' + 5y' + 2y = -4\sin x - 2\cos x,$$

$$y(0) = 1, y'(0) = 0, y''(0) = -1$$

to a system of first-order equations. Using Euler's method solve this system and empirically study the error.

[ 3 ]

3. Assume that  $\sum_{j=0}^p a_j = 1$ ,  $-\sum_{j=0}^p j a_j + \sum_{j=-1}^p b_j = 1$ .

Then prove that the multistep method

$$y_{n+1} = \sum_{j=0}^p a_j y_{n-j} + h \sum_{j=-1}^p b_j f^{(x_{n-j}, y_{n-j})}, \quad x_{p+1} \leq x_{n+1} \leq b$$

is stable iff the root condition

$$|r_j| \leq 1, j=0,1,2,\dots,p \text{ and } (r_j) = 1 \Rightarrow \rho'(r_j) \neq 0$$

are satisfied.

OR

Find the region of stability for the second order Adams-Bashforth method

$$y_{n+1} = y_n + \frac{h}{2} [3y'_n - y'_{n-1}], \quad n \geq 1.$$

4. Discuss Gaussian elimination method of solution of  $Ax = b$ . If  $L$  and  $U$  are the lower and upper triangular matrices defined in the method, then prove that

$$A = LU$$

OR

2015

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. शकुन्तलानाटकस्य प्रथमोऽङ्के गजप्रवेशस्य नाटकीयोपयोगितां वर्णयत । 10

अथवा

अधुना नारीसमाजं प्रति शकुन्तलाचरित्रस्य प्रभावं वर्णयत ।

2. शाकुन्तले पञ्चमोऽङ्कस्य वैशिष्ट्यं प्रतिपादयत । 10

अथवा

अनसूयाप्रियम्बदाचरित्रयोः प्रभावः शाकुन्तले कथम् अनुभूयते ?

3. प्रश्नचतुष्टयस्य संक्षिप्तोत्तरं प्रदत्त : 8 × 4

क) “भबितव्यानां द्वाराणि भवन्ति सर्वत्र” इत्युक्तेः किं वैशिष्ट्यम् ?

ख) सन्देहपदेषु वस्तुषु सताम् अन्तकरणप्रवृत्तयः कथं प्रमाणीभवन्ति ?

ग) शमप्रधानतपोधनानां तेजप्रभावमालोचयत ।

घ) शकुन्तला कथं धातुरपरा स्त्रीरत्नसृष्टिरिति प्रतिभाति ?

[ 2 ]

ड) महर्षिकण्वः कथम् आश्वस्तो वभूव ?

च) युवतेः गृहिणीपदलाभार्थं कण्वस्य का शिक्षा आसीत् ?

4. सप्रसङ्गं व्याख्या करणीया :

10

अर्थो हि कन्या परकीय एव

तामद्य संप्रेष्य परिग्रहीतुः ।

जातो ममायं विशदः प्रकारं

प्रत्यर्पितन्यास इवान्तरात्मा ॥

अथवा

दिष्ट्या शकुन्तला साध्वी सदपत्यमिदं भवान् ।

श्रद्धा वित्तं विधिश्चेति त्रितयं तत्समागतम् ॥

5. आङ्ग्लभाषया उत्कलभाषया वा अनुवादयताम् :

8

अनवरतधनुर्ज्यासगलनक्ररपूर्वं

रविकिरणसहिष्णु क्लेशलेशैरभिन्नम् ।

अपचितमपि गात्रं व्यायतत्वादलक्ष्यं

गिरिचर इव नागः प्राणसारं विभर्त्ति ॥

अथवा

अथं स ते तिष्ठति सङ्गमोत्सुको

विशङ्गसे शरु यत्तऽवधीरणाम् ।

लभेत वा प्रार्थयिता न वा श्रियं

श्रिया दुरापः कथमीप्सितो भवेत् ॥

[ 3 ]

6. क) **द्वयोः** सन्धिविच्छेदं कुरुत : 1 × 2

इवान्तरात्मा, सङ्गमोत्सुकः, कथमीप्सितः, सदपत्यमिदम् ।

ख) **द्वयोः** प्रकृतिं प्रत्ययञ्च निरूपयत :

श्रद्धा, विधिः, समागतम्, संप्रेष्य ।

ग) चतुर्थपञ्चमप्रश्नयोः रेखाङ्कितपदत्रयस्य सकारणविभक्तिं  
निरूपयत :

परिग्रहीतुः, भवान्, विधिः, गात्रं, भीरु, श्रियम् ।

घ) **द्वयोः** सविग्रहसमासनामानि लिखत :

सङ्गमोत्सुकः, श्रियादुरापः, गिरिचरः, रविकिरणः ।

7. **चतुर्णां** संक्षिप्त टिप्पणी प्रदेया : 5 × 4

क) स्वप्नवासवदत्तम्

ख) वेणीसंहारम्

ग) उत्तररामचरितम्

घ) मालविकाग्निमित्रम्

ड) मृच्छकटिकम्

च) मुद्राराक्षसम् ।

3. Give a brief account of structure and function of DNA.

OR

Write notes on any *two* of the following :

- Nitrogen bases
  - t-RNA
  - Recombinant DNA Technology.
4. Give an account of Darwin's theory of natural selection.

OR

Write notes on any *two* of the following :

- Inheritance of acquired characters
  - Embryological evidences of evolution
  - Urey and Miller's experiment.
5. Discuss the causes, effects and prevention of Air Pollution.

OR

Write notes on any *two* of the following :

- Food chain
- Components of Pond ecosystem
- Prevention of Water Pollution.

**2015**

Full Marks - 75

Time - 3 Hours

The questions are of equal value

Answer *all* questions

*Draw labelled diagrams wherever necessary*

1. Explain structure and functions of plasma membrane.

OR

Write notes on any *two* of the following :

- Golgi complex
  - Ribosomes
  - Functions of mitochondria.
2. What is independent assortment ? Explain with reference to Mendel's dihybrid experiment.

OR

Write notes on any *two* of the following :

- Co-dominance
- Complete linkage
- Lethal genes

**II-UG-BBA(EL)-II (ACB)**

**2015**

Full Marks - 50

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. a) Differentiate between the characteristics of a primary and secondary storage of a Computer system.
- b) List out and explain some of the important characteristics of a computer.

OR

- c) Convert the following numbers to its corresponding number system.
  - i)  $(1694)_{10} = (?)_2$
  - ii)  $(A2B.D4)_{16} = (?)_{10}$
- d) List out some of the key functions performed by the system software of computer system.

[ 2 ]

2. What are the four major components of a Database Management System (DBMS) ? Describe the roles of each of these components in the overall design and usage of database.

OR

- a) What is a computer Network ? How is it useful ?
- b) List out three main characteristic features of the Internet that may be used to define it.
3. a) List out any five features of a word-processing package. Explain how each of these five features found in a modern Word-processing package.
- b) What is meant by word-wrap features. How is it useful ?

OR

- c) What is a spread sheet package ? List out some of its typical uses. How a range of cells is identified ?
- d) Explain about the graphics feature of modern spread sheet package. How is it useful.

[ 3 ]

4. a) Write a program in foxpro for finding the greatest among three numbers using if...else.
- b) Write the steps to create the database using wizard in foxpro.

OR

- c) Write the steps to create a student from using MS Access.
- d) Discuss the advantages of using MS Access database.
5. Discuss the basic tasks of accounting in briefly.

OR

- a) Discuss the different types of Assets in briefly.
- b) Discuss the Profit and Loss Account.

- d) A bank pays interest @ 6% p.a. compounded continuously. If a person places Rs.1,000 in the bank each year, how much will be in his account after 3 years ? Given  $e^{0.18} = 1.1972$ .

5. Explain briefly the formulation procedure of a linear programming problem.

OR

Solve the following L.P.P. using the graphic method :

$$\text{Maximise } z = 22x_1 + 18x_2$$

Subject to

$$3x_1 + 2x_2 \leq 48$$

$$x_1 + x_2 \leq 20$$

$$x_1, x_2 \geq 0.$$

**2015**

Full Marks - 100

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. a) Find the second order partial derivatives of

$$z = 4x^2 + 9xy - 5y^2$$

- b) If  $z = \log(x^2 + y^2)$ , then show that

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$$

OR

- c) Find the total differential of the function

$$z = \log \left\{ \frac{(x^2 + y^2)}{xy} \right\}$$

- d) The price  $p$  per unit at which the company can sell all that it produces is given by the function,  $p = 300 - 4x$ , where  $x$  is the output. The cost function is  $C = 500 + 28x$ . Find  $x$  so that the profit is maximum. What is this profit ?

[ 2 ]

2. a) Evaluate  $\int x^2 e^{3x} dx$
- b) Evaluate  $\int \frac{3x+4}{x^2+x-6} dx$

OR

- c) Evaluate  $\int_0^3 e^{5x} dx$
- d) The demand function of a commodity is given by  $p = 100 - 8x$ . Determine the consumer's surplus corresponding to  $p = 4$ .

3. a) Prove that

$$\begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(ab+bc+ca)$$

- b) If  $A = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ , show that  $A^2 - 4A - I = 0$ ,  
where I is the identity matrix of order 2

OR

[ 3 ]

- c) If  $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 4 & -1 \\ -3 & 2 \end{bmatrix}$ ,  
find AB and BA. Is  $AB = BA$  ?

- d) Find the inverse of

$$\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$$

4. a) What effective rate is equivalent to nominal rate of 8 % p.a. compounded quarterly ?
- b) A wants to purchase a car for ₹5,00,000. The contract is that he will pay ₹3,00,000 cash and the balance is to be paid in 20 equal annual instalments with 5% compound interest p.a. Find the amount to be paid by A annually.

OR

- c) A deposited ₹25,000 in a bank. The deposit was left to accumulate at 8% compounded quarterly for first 5 years and at 10% compounded semi-annually for the next 3 years. Find the compound amount at the end of 8 years.

3. Write short notes on any **one** of the following : 8

- a) Max Weber's 'ideal type' of a fully developed bureaucracy 'is a mental model that can not be found in reality'. –Comment.
- b) Discuss the various types of Disasters.
- c) Write a note on Ecological approach to the study of Public Administration.

V-164-0.5



**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **all** questions

1. Discuss the characteristics of 'ideal type' model of a bureaucratic form of organisation as advocated by Max Weber. 16

OR

Discuss the Decision Making Approach of Herbert Simon.

2. The General Public has an important role to play in both pre and post disaster management.–Examine. 16

OR

Examine the aims and objectives of the National Disaster Management Authority of India. Discuss its role in tackling natural and manmade disasters.

**2015**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Sketch the circuit of a transistor phase-shift oscillator and explain its operation. Find an expression for the frequency of oscillations and the condition of sustained oscillations. 10
- b) With a clear diagram, describe the construction and operation of an n-channel FET. Give its circuit symbol. Why the name field effect is used for the device ? 6

OR

- c) What is a Multivibrator ? With a neat circuit diagram, explain the operation of an Astable Multivibrator. Discuss the wave forms generated by it and find out an expression for its frequency. 14

[ 2 ]

- d) Mention the advantages of VTVM over a multimeter. 2
2. a) With a neat circuit diagram, describe the operation of a differential amplifier and find an expression for the differential gain. 4 + 4
- b) Define Common Mode Rejection Ratio (CMRR). Derive an expression for amplifier output consisting of different output and common mode output. 1 + 3

OR

- c) i) Define the base or radix of a number system. What is the base of the octal number system ? 1
- ii) Convert the binary number 11111011110101 to its octal equivalent. 1
- iii) Convert octal number 25.634 to its binary equivalent. 1
- iv) Convert  $56_{10}$  to octal system. 1

[ 3 ]

- d) i) Express decimal numbers 0 to 10 in Gray Code. 1
- ii) Convert binary 1011 to Gray Code. 1
- e) Give the circuit representation, logic symbol and truth table of a two-input NAND Gate. Show that NAND Gate can be used to build an OR gate or an AND gate or a NOT circuit. 3+3
3. a) With necessary figure, explain Antenna action. 7
- b) Give a brief account of current and voltage distribution in linear Antenna. 5

OR

Show the basic blocks of a black and white television Transmitter and Receiver and explain their functions. What is synchronisation ? 10 + 2

[ 2 ]

Write notes on the following Padārthas of  
Vaishesika : 10 + 10

- a) Sāmānya
- b) Abhāva.

4. Explain and examine the Sāmkhya view of  
satkāryavāda. 20

OR

Discuss the proofs for the existence of Prakṛiti in  
Sāmkhya system. 20

5. Explain and examine the theory of error of Kumārila  
Bhatta. 20

OR

Discuss Sankar's concept of Brahman. 20

V-233-0.2



**II-UG-Phil(EL)-II**  
(Back)

**2015**

Full Marks - 100

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. State and explain the Jain theory of Anekāntavāda. 20

OR

Discuss the Jain view of Ethics.

2. Write notes on the following : 6 + 8 + 6

- a) There is suffering
- b) There is cause of suffering
- c) There is cessation of suffering.

OR

Discuss the Buddhist theory of momentariness. 20

3. State and examine the Nyāya view of perception as  
one of the Pramānas. 20

OR

V-233

[Turn Over