

3. Discuss the development of Small-Scale and Cottage industries in India. Explain its present position, role, weaknesses and suggest remedies. 12½
4. What do you mean by occupational structure ? What changes you find in the occupational structure of our country ? Examine the contribution of service sector to GDP in India over the years. 12½
5. Discuss the composition and direction of India's foreign trade. Bring out the main changes in the composition of India's foreign trade over the years. 12½
6. Discuss the sources of agricultural credit in India. 12½
7. Analyse the 'Industrial Licensing' policy of india and point out the various changes incorporated in it from time to time. 12½
8. Examine the importance of health and education in economic development of a country. 12½
9. What do you mean by 'Balance of Payments' of a country ? Analyse the major factors responsible for rising deficits in the country's balance of Payments. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
which is compulsory

1. Write short answers on any **four** of the following : 7½×4
  - a) Role of agriculture in our economy.
  - b) Causes of low productivity of Indian agriculture.
  - c) Sources of Industrial finance in India.
  - d) Various forms of development of human resources in India.
  - e) Need for foreign capital in India.
  - f) Importance of foreign trade in a developing country like India.
  - g) Industrial Policy of 1991.
  - h) Human Development Index (HDI).
2. Analyse the various land reform measures undertaken in India. Explain their effectiveness. 12½

2. Discuss the symbol of the play, 'The Glass Menagerie'. What does it represent ? Does it represent the same things throughout the play or does its meaning change ? 12½
3. Sketch the character of Tom Wingfield. 12½
4. Describe the different ways in which white people treat African-Americans in 'Beloved'. How do the African-Americans respond to such treatment ? 12½
5. Was Sethe justified in Killing Beloved ? Why or why Not ? Give a reasoned answer. 12½
6. Discuss 'The Purloined Letter' as a successful detective story. 12½
7. Critically appreciate Anne Bradstreet's 'The Prologue' in your own words. 12½
8. Bring out the ideas contained in the poem, 'O Captain ! My Captain !' 12½
9. What is the significance of William Faulkner's 'Dry Septemeber' ? Give reasons for your answer.

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short answers on any *four* of the following : 7½×4
  - a) Why does Laura give the unicorn to Jim ?
  - b) Why Amands blame Tom for the failure of the evening ?
  - c) Is Beloved a ghost ? Is she a dead person come back to life ? Explain it briefly.
  - d) How would you feel about Sethe if Sethe were a man— a father who killed his child ?
  - e) Why does Hawkshaw jump from the car ? How do you know ? Explain it briefly.
  - f) Define the term, 'Social Realism in American Literature.
  - g) Who is Dupin ?
  - h) What is the significance of the title of the poem, "O Captain ! My Captain" !

2. Write a note on the advent of printing and its implications. 12½
3. Evaluate the role of Raja Ram Mohan Ray and Brahmo Samaj in the socio-religious reform movement in India. 12½
4. Narrate the causes and results of Swadeshi Movement. 12½
5. Discuss the background of the Non-co-operation Movement led by Gandhiji. 12½
6. Briefly discuss the states people movements. 12½
7. Describe the role of Muslim League in the Partition of India. 12½
8. Write an essay on the making of Indian Constitution. 12½
9. Discuss the role of Sardar Patel in the integration of Indian Princely states. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 7½×4
  - a) Arya Samaj.
  - b) Singh Sabha Movement.
  - c) Aims and objectives of the Indian National Congress.
  - d) Lal, Bal, Pal.
  - e) Causes of the Tribal Movement in India.
  - f) Role of RSS in the partition of India.
  - g) Dr. B.R. Ambedkar.
  - h) First Fifth Year Plan.

2018

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions from any *one* Group

**GROUP - A**

(FM)

1. What is Financial Planning ? Discuss the objectives and limitation of Financial Planning.

OR

From the following information calculate the net present value of the two projects and suggest which of the two projects should be accepted assuming a discount rate of 10%.

	<i>Project X</i>	<i>Project Y</i>
Initial Investment	₹20,000	₹30,000
Estimated Life	5 years	5 years
Scrap value	₹1,000	₹2,000

[ 2 ]

The profits before depreciation and after taxes (cash flows) are as follows :

	Year 1 ₹	Year 2 ₹	Year 3 ₹	Year 4 ₹	Year 5 ₹
Project X	5,000	10,000	10,000	3,000	2,000
Project Y	20,000	10,000	5,000	3,000	2,000

2. What do you understand by Cost of Capital ? Discuss its significance in capital budgeting decision.

OR

ABC Ltd. has the following value capital structure :

	(₹million)
10 million equity share of ₹10 each	100
11% preference share of ₹100 each (1,00,000 shares)	10
Retained Earnings	120
5,00,000 13.5% Debentures of ₹100 each	50
12% Term Loans.	80
	360

[ 3 ]

The next expected dividend per share is ₹1.50. The dividend per share is expected to grow at the rate of 7%. The market price per share is ₹20. Preference stock, redeemable after 10 yrs, is currently selling for ₹75 per share. Debenture redeemable after 6 yrs is selling for ₹80 per debenture. The tax rate for the company is 50%. Calculate the weighted average cost of capital using book value proportions.

3. Write short notes on on the following :

- a) Financial leverage
- b) Operating leverage.

OR

A firm has sales of ₹20,00,000, variable cost of ₹14,00,000 and fixed cost 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

[ 4 ]

firm wants to double its earnings before Interest and Tax (EBIT), how much of a rise in sales would be needed on a percentage basis ?

4. What do you understand by Capital Structure ? What are the major determinants of capital structure ?

OR

Discuss the various forms of dividends.

5. What is Working Capital Management ? What is the need to maintain the optimum working capital ? Discuss the consequences of inadequate and excess of working capital.

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) Percentage of net profit on sales      25%

[ 5 ]

- d) Average credit period allowed to customers                      8 weeks
- e) Average credit period allowed by suppliers                      4 weeks
- f) Average stock holding in terms of sales requirement                      12 weeks
- g) Allow 10% for contingencies.

### GROUP - B

( CB )

1. What is Consumer Behaviour ?

OR

Write short notes on the following :

- a) Routine Problem Solving
- b) Limited Problem Solving.

2. What do you mean by Perception ? Explain the process of perception.

OR

[ 6 ]

How motivation and involvement affect the buying decision of a consumer.

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

OR

Write short notes on the following :

- a) Emotional Man
- b) Economic Man.

4. What are the different roles played by family members in the consumer decision making process ? Elaborate with examples.

OR

Write short notes on the following :

- a) Group Influences
- b) Reference Group.

[ 7 ]

5. How is Industrial buying behaviour different from Consumer buying behaviour ? Explain.

OR

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

V-56-0.8



2. The Western Canon has traditionally imagined white European culture as humane and civilising. Eastern and African cultures have been depicted as primitive and savage. Does this idea hold true for Things Fall Apart ? Explain. 12½
3. Give a character sketch of Okonkwo. 12½
4. Examine the roles that women play in Chronicle of a Death Foretold. 12½
5. Discuss Aidoo's 'The Girl Who Can' as a Feminist story. 12½
6. Grace Ogot's 'The Green Leaves' brings out the bad effects of assumptions in our day to day life— Discuss. 12½
7. Walcott's 'A Far Cry from Africa' illustrates the consequences of displacement and isolation— Discuss. 12½
8. There is a reiteration of the co-existence of river's soul in Mamang Dai's 'Small Towns and The River' – Discuss. 12½
9. Write an essay on Post-Colonial Literature with reference to the texts you have read. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following in brief :  $4 \times 7\frac{1}{2}$ 
  - a) What is de-colonisation ? Give examples to support your answer.
  - b) What is the significance of Race and Gender in Feminist study ?
  - c) What are the cultural, social and literary aspects of globalisation ?
  - d) Why does Okonkwo hang himself ?
  - e) Why does Achebe often use untranslated Igbo words in Things Fall Apart ?
  - f) Why do you think that Gabriel Garcia Marquez has used real names in his text ?
  - g) What is magic realism ?
  - h) Comment on the imagery of 'treasure' in The Collector of Treasures.

2. Write a note on the struggle for Parliamentary Democracy and civil liberties in Great Britain. 12½
3. Discuss the Marxian theory of Socialism. 12½
4. Discuss the causes of the Russian Revolution of 1905. 12½
5. Analyse the causes and results of the Great Depression of 1929. 12½
6. Discuss the causes of the Spanish Civil War. 12½
7. Account for the rise of Facism in Italy. 12½
8. Make a critical analysis of the different notions of culture. 12½
9. Throw light on the Darwin theory of evolution. 12½

V-59-0.5

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short notes on any *four* of the following :  
4 × 7½
  - a) Chartist movement for Parliamentary reform in Great Britain.
  - b) Emancipation Decree of Tsar Alexander II.
  - c) Results of the Bolshevik revolution of 1917.
  - d) Explain the theories and mechanism of Imperialism.
  - e) Analyse the reasons for the success of Nazism in Germany.
  - f) Types of Abstract Art.
  - g) Ideologies of Empire
  - h) Sigmund Freud.

V-59

[Turn Over

3. Examine the role of agriculture on an economy. Discuss the causes of low productivity in Indian agriculture. 12½
4. Discuss the types and sources of agricultural credit in India. 12½
5. What is good governance ? Examine individuals responses to institutional failures in achieving various socio-economic goals. 12½
6. Define Sustainability. Discuss the various policy options available for poor countries like India for controlling environmental changes. 12½
7. Critically examine the role of 'Foreign Aid' in economic development of a country like India. 12½
8. How come poverty and growth influence environment ? Discuss the linkage between environment and development. 12½
9. Discuss in details the problems of labour market in India. Analyse the harmful consequences that follow from labour migration. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks  
Answer *five* questions including Q.No.1  
which is compulsory

1. Write notes on any *four* of the following : 4 × 7½
  - a) Demographic transitions
  - b) Land Reforms in India
  - c) Poverty reduction programmes in India
  - d) Multiple social equilibria
  - e) Sustainable economic development
  - f) Globalisation and privatisation in India
  - g) Environmental externalities
  - h) Importance of human capital in economic development.
2. Critically examine the relationship between population and economic development of a country. 12½

2. "Raja Rammohan Roy was the father of Indian renaissance". Comment on the statement with Rights of Individuals. 12½
3. "Swami Vivekananda founded an ideal society in India with Western Philosophy". Discuss. 12½
4. "Dr. B.R. Ambedkar is the Pioneer of Social justice movement in Post-Independent India. Discuss. 12½
5. Rabindra Nath Tagore was a critique of Nationalism. Discuss. 12½
6. Write an essay on 'Hindutva' as viewed by Savarkar. 12½
7. Explain Nehru's ideas on Secularism. 12½
8. 'Rammonohar Lohia was a true socialist'. Discuss. 12½
9. Write an essay on the development of modern Indian Political Thought. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer any **five** questions including Q.No.1 which is compulsory

1. Answer any **four** of the following : 7½ × 4
  - a) Compare between pre-colonial ideas of Brahmonic and Shramonic in India.
  - b) Examine Kautilya's views on role of the king.
  - c) Discuss the concept of Liberalism of Raja Rammohan Roy.
  - d) Views of Rammohan Roy on Rights of Women.
  - e) "Rama bai was defender of women". Discuss.
  - f) Write an essay on ideal society according to Vivekananda.
  - g) Describe "Swaraj" - as viewed by Gandhi.
  - h) Write a note on "community" as viewed by Iqbal.

2. What do you mean by social science ? Distinguish between social science and social laws. 12½
3. Give an explanatory note on human action. 12½
4. What is the nature of liberty ? What are the safeguards of liberty ? 12½
5. Analyse the important characteristics of Political Philosophy. 12½
6. What do you mean by human rights ? Point out its nature. 12½
7. Discuss Aristotle's view on the role and forms of Government. 12½
8. What is Power ? Discuss its nature. 12½
9. Elucidate the grounds of Political obligation. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 7½ × 4
  - a) 'Social science deals with Persons (organisms)' - Explain.
  - b) What is cause ? Is it different from reason ? Illustrate.
  - c) What is Positive Liberty ? Explain.
  - d) What do you mean by authority ? Elucidate.
  - e) "Political Philosophy is a study of the different forms of Government and their Operations"- Examine.
  - f) What is functional theory of rights ?
  - g) Explain Plato's notion of justice.
  - h) Distinguish between Dejure and Defacto authority.

2. Discuss the significance of population studies in the contemporary society. 12½
3. Explain the Malthusian theory of population. 12½
4. Briefly discuss the various theories of population. 12½
5. Provide a brief account of the demographic situation in India. 12½
6. Discuss briefly population composition in India. 12½
7. Analyse the various causes of migration. 12½
8. Analyse the shortcomings of the present population in India. 12½
9. Discuss the role of women's empowerment in population control. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory

1. Answer any **four** of the following : 7½ × 4
  - a) Discuss briefly causes of high infant mortality.
  - b) Write a short note on measures of fertility.
  - c) Discuss the sociological effects of migration.
  - d) Write a brief note on optimum population theory.
  - e) Discuss briefly rural and urban composition of population.
  - f) Write a brief note on National rural Health Mission.
  - g) Discuss briefly the objectives of Population planning and policies.

୨. ଚିତ୍ରଣା ଲିଖନର ସୂତ୍ର ସହିତ ଲିଖନକାଳୀନ ସତର୍କତା ଓ ଅନୁଚିତ ଦିଗଗୁଡ଼ିକ ଆଲୋଚନା କର । ୧୨.୫
୩. ଚିଠା ପ୍ରସ୍ତୁତିର ଦିଗ ସହିତ ଗୋଟିଏ ଆଦର୍ଶ ଚିଠାର ନମୁନା ପ୍ରଦାନ କର । ୧୨.୫
୪. ସାହିତ୍ୟ ଓ ସମ୍ବାଦ ମଧ୍ୟରେ ଥିବା ସାମ୍ୟ ଓ ବୈଷମ୍ୟର ସୂଚନା ଦିଅ । ୧୨.୫
୫. ସଂପାଦକୀୟ-ଲିଖନ-ଅନୁବିଧି ଉଲ୍ଲେଖ କର । ୧୨.୫
୬. ପୁସ୍ତକ ରଚନାରେ ବ୍ୟବହୃତ ଚିହ୍ନଗୁଡ଼ିକର ଉପଯୋଗିତା ବିଚାର କର । ୧୨.୫
୭. ପତ୍ରିକା ସଂପାଦନା କଳା ସଂପର୍କରେ ସୂଚନା ଦିଅ । ୧୨.୫
୮. ବ୍ୟାବହାରିକ ଲିଖନ କଳାର ପରିଭାଷା, ସ୍ୱରୂପ ଓ ବୈଚିତ୍ର୍ୟ ପ୍ରକାଶ କର । ୧୨.୫
୯. ପୁସ୍ତକ ରଚନା କାଳରେ ବହିର ଭାଷା କିପରି ହେବା ବିଧେୟ - ଆଲୋଚନା କର । ୧୨.୫

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

୧. ଯେ କୌଣସି *ଚାରୋଟି* ସଂକ୍ଷିପ୍ତ ଉତ୍ତର ଦିଅ : ୭.୫ × ୪
- କ) ବ୍ୟାବହାରିକ ଲିଖନ କଳାରେ କେଉଁ ପ୍ରସଙ୍ଗଗୁଡ଼ିକ ପ୍ରତି ସଚେତନ ହେବା ଆବଶ୍ୟକ - ଲେଖ ।
- ଖ) ନଥି ପ୍ରସ୍ତୁତି ଓ ଲିଖନ ସଂପର୍କରେ ସୂଚନା ଦିଅ ।
- ଗ) ଏକ ଆଦର୍ଶ ଚିଠାର ନମୁନା ପ୍ରଦାନ କର ।
- ଘ) ପ୍ରସ୍ତାବ ଲିଖନ ଓ ଅନୁମୋଦନ ବିଷୟରେ ଉଲ୍ଲେଖ କର ।
- ଙ) ଗଣମାଧ୍ୟମର ଉପଯୋଗିତା ଦର୍ଶାଅ ।
- ଚ) ସମ୍ବାଦର ସ୍ୱରୂପ ଓ ଲକ୍ଷଣ ପ୍ରକାଶ କର ।
- ଛ) ପାଣ୍ଡୁଲିପି କିପରି ପ୍ରସ୍ତୁତ କରାଯାଏ ?
- ଜ) ପାଠ ସଂପାଦନ କିପରି ହୁଏ ?

- |  |     |
|--|-----|
| 2. ग्रहाणां उच्चनीच्च मानं वर्णयत।                     | 12½ |
| 3. ग्रहाणां शतृमित्र ज्ञानं वर्णयत।                    | 12½ |
| 4. ग्रहाणां दृष्टिज्ञानं सविस्तरं प्रकटयत।             | 12½ |
| 5. ग्रहाणां कारकज्ञानं वर्णयत।                         | 12½ |
| 6. ज्यातिष शास्त्रे रसाधिपति निर्णयं कुरुत।            | 12½ |
| 7. ग्रहाणां स्थान ज्ञानं ज्योतिषशास्त्रानुसारं वर्णयत। | 12½ |
| 8. ग्रहाणां स्थान ज्ञानं च भूपरि प्रभावं प्रकटयत।      | 12½ |
| 9. मंगल ग्रहस्य भूपरि प्रभावं वर्णयत।                  | 12½ |
| 10. बृहस्पति ग्रहस्य भूपरि प्रभावं विमृशत।             | 12½ |

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. केषांचित् **चतुर्णां** प्रश्नानि समाधेयत : 7½ × 4
- क) ज्योतिष शास्त्रे पठाणि सामन्तस्य महत्वं वर्णयत।
- ख) ग्रहमण्डलस्य परिचयं दीयताम् ज्योतिष शास्त्रानुसारम्।
- ग) मंगला चरण श्लोकस्य महत्वं वर्णयत।
- घ) सप्तविंश नक्षत्राणां नामानि लिखतम्।
- ङ) राशिनां नाम विशेषं वर्णयत।
- च) काल पुरुषस्य अंगविभागं वर्णयत।
- छ) ग्रहाणां वर्णज्ञानं वर्णयत।
- ज) भूपरि ग्रह प्रकरणस्य महत्वं वर्णयत।

2. निम्नलिखित प्रश्नों में से किन्हीं चार प्रश्नों के उत्तर दीजिए :

12½ × 4

- क) साहित्यिक हिंदी और प्रयोजन मूलक हिंदी में क्या अंतर है ? विस्तार से विवेचन कीजिए।
- ख) संविधान में राजभाषा हिंदी को लेकर क्या-क्या प्रावधान हैं ? अपने शब्दों में लिखिए।
- ग) राष्ट्रभाषा और राजभाषा के रूप में हिंदी के महत्व और उपयोगिता पर प्रकाश डालिए।
- घ) भाषा का मानकीकरण क्या है ? हिन्दी उच्चारण और वर्तनी के मानक रूप की आवश्यकता पर प्रकाश डालिए।
- ङ) जनसंचार माध्यम का क्या अभिप्राय है ? जनसंचार माध्यम के प्रकारों संक्षेप में उल्लेख कीजिए।
- च) प्रारूप की परिभाषा स्पष्ट करते हुए प्रारूप तैयारी करने के लिए महत्वपूर्ण बातों की चर्चा कीजिए।
- छ) परिभाषिक शब्दावली किसे कहते हैं ? हिन्दी की परिभाषिक शब्दावली के निर्माण में क्या-क्या समस्याएँ आती हैं ? विस्तार से लिखिए।
- ज) हिन्दी की शैलियों में हिंदी और उर्दू में क्या अंतर है ? चर्चा कीजिए।

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. निम्नलिखित प्रश्नों में से किन्हीं चार प्रश्नों के संक्षिप्त उत्तर दीजिए :

7½ × 4

- क) सामान्य हिंदी से आप क्या समझते हैं ? अपने शब्दों में लिखिए।
- ख) प्रयोजनमूलक हिंदी का महत्व स्पष्ट कीजिए।
- ग) संविधान की अष्टम अनुसूची में शामिल की गई भाषाओं का विवरण प्रदान कीजिए।
- घ) राजभाषा अधिनियम-1963 की चर्चा कीजिए।
- ङ) हिन्दुस्तानी हिंदी के स्वरूप पर प्रकाश डालिए।
- च) मानक हिंदी वर्तनी से क्या आशय है ? इस पर चर्चा कीजिए।
- छ) जनसंचार माध्यम का अर्थ स्पष्ट करते हुए श्रेष्ठ माध्यम पर लिखिए।
- ज) प्रारूप और टिप्पण लेखन में अंतर स्पष्ट कीजिए।

2. Describe how aerial photography is used in the field of petroleum exploration. 9
3. Explain the role of aerial photography in engineering site investigations. 9
4. Explain how satellite borne sensors help in managing disasters. 9
5. Describe how remote sensing is used in ground water investigations. 9
6. With a neat sketch show the symbols used in geological maps. 9
7. Demonstrate how satellite help in mineral exploration. 9
8. Write a note on GIS. 9
9. Briefly describe a field tour you have last undertaken. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write notes on any *four* of the following : 6 × 4
  - a) Aerial Photograph
  - b) Geological Map
  - c) Natural Disaster
  - d) Types of Satellites
  - e) GPS
  - f) Field Mapping
  - g) Sensors in satellites
  - h) Geological structures.

7. What do you mean by price elasticity of demand ?  
How will you obtain this measure on the basis of time series data ? Discuss various difficulties that are likely to occur in this connection.
8. Describe Pareto law of income distribution. Explain, situations where Pareto's law holds good.
9. Briefly discuss different form of national income accounting.

V-69-0.1

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 6 × 4
- a) Explain the various methods of scaling scores, bringing out the underlying importance of normal distribution.
- b) Discuss the importance of statistics in the field of education and psychology.
- c) Briefly explain the concept of reliability and validity of test scores in educational and psychological experiments.
- d) Describe the experimental methods commonly used for estimating the reliability of a test and indicate their relative merits.

[ 2 ]

- e) Describe demand and supply curves mentioning the uses and limitations of these curves.
  - f) Define price elasticity of demand and discuss its use in economic analysis.
  - g) Describe Leontief's method of estimating price elasticity of demand for time series data and give the limitation of this method.
  - h) Discuss the concept of national income and social accounting. Discuss different measurements of national income.
2. How the items of a test are scaled in terms of difficulty, (assuming that the underlying trait has normal distribution) ? How this scaling helps in item selection ? 9
3. Why scaling of raw scores considered necessary ? Describe any two of the commonly used derived scales, mentioning their advantages and disadvantages. What are the advantages of reporting percentile norms while standardising a test ? 9

[ 3 ]

4. Explain the importance of reliability and validity in test standardization ? Discuss the relationship between the two. Describe various methods of obtaining reliability coefficients and validity coefficients. 9
5. Define reliability and validity of a test. Explain and compare the following methods of assessing reliability of a test.
- a) Test-retest method
  - b) Split-Half technique.
6. Explain the concept of reliability of a test and obtain the expression for
- a) coefficient of reliability
  - b) index of reliability.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following :
  - a) What is meant by universalisation of Primary Education ? 6
  - b) Explain quality concerns in elementary education. 6
  - c) State any three problems of Secondary Education that our country is facing now.  $3 \times 2$
  - d) State the need of vocationalisation of secondary education in our country. 6
  - e) State three functions of RUSA for higher education in our country.  $3 \times 2$
  - f) Explain what is meant by equilisation of educational opportunities. 6

[ 2 ]

- g) What is environmental education and why is it now important for our country. 3+3
- h) Explain what is life-skills education. 6
2. Describe the view points of RCFCE Act, 2009 as regards right of children to free and compulsory education in our country. 9
3. Describe the functions of District Primary Education Project (DPEP) in our state. 9
4. Describe the functions of Rastriya Madhyamika Shikshya Abhijan (RMSA) in our country. 9
5. Discuss the challenges for secondary education in our country. 9
6. What are the challenges as regards quality and inclusiveness of higher education in our country? 4½+4½
7. State briefly the constitutional provisions for education in India. 9

[ 3 ]

8. What is national integration and why is it important now? What strategies can education take for promoting national integration among pupils? 2½+2½+4
9. Discuss the concerns for value education, peace education and human rights education now in our country. 3+3+3

V-70-0.4



2. Bring out the concept of disaster management. 9
3. Discuss various aspects of disaster management. 9
4. Highlight the occurrence, characteristics and management of floods. 9
5. Discuss the characteristics and management of Cyclones. 9
6. Elaborate on National Disaster Management Plans. 9
7. Describe the role of community participation in disaster preparedness plans. 9
8. Write the role of NGOs in disaster management programmes. 9
9. Discuss the government policies and programmes in disaster management. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write brief notes on any *four* of the following :  
6 × 4
  - a) Hazard
  - b) Disaster
  - c) Disaster prevention
  - d) Disaster preparedness
  - e) Earthquake Zones
  - f) Drought management
  - g) Contingency Planning for disaster preparedness
  - h) Disaster management plans.

2. Describe the Indian village system. 9
3. Discuss the problems of tribal people. 9
4. Describe the tribal movement and quest for identity. 9
5. Analyze the impact of urbanization and industrialization on tribal and rural population. 9
6. Describe about sanskritization and westernization in India. 9
7. What is Dominant caste ? Describe its feature. 9
8. Discuss the constitutional provisions for the scheduled caste and scheduled tribes. 9

V-67-0.2

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
which is compulsory

1. Write short notes on any **four** of the following :

6 × 4

- a) Caste system
- b) Land-alienation
- c) Indebtness
- d) Tribal displacement
- e) Dominant caste
- f) Pseudotrabalism
- g) Other backward classes
- h) Globalization and environment.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following :
  - a) Define phase space and find the volume of unit cell. 3+3
  - b) Distinguish between microcanonical, canonical and grand canonical ensemble. 2+2+2
  - c) What is Gibb's Paradox ? How this paradox is solved ? 3+3
  - d) Establish Sackur-Tetrode equation. 6
  - e) Discuss the distribution of energy in black body radiation drawing necessary graphs. Give its salient features. 4+2
  - f)
    - i) What is meant by Ultraviolet catastrophs ? 4
    - ii) Show that Planck's constant  $h$  has the dimension of angular momentum 2

[ 2 ]

- g) What are Bosons ? Give some of its properties. 2+4
- h) Discuss the effect of temperature on Fermi Dirac distribution function. Draw the necessary graph to show the effect. 4+2
2. Deduce Boltzmann's entropy probability relation
- $$S = K_B \log_3 \Omega (E)$$
- Symbols have their usual meanings. 9
3. Derive Maxwell-Boltzmann distribution law for the molecules in a gas. 9
4. State and prove the theorem of equipartition of energy. Give merits of the theorem. Discuss the conditions when the theorem of equipartition of energy fails to explain the classical statistics. 1+5+1+2
5. What is the significance of partition function  $Z$  in statistical physics ? Obtain an expression for partition function. How it is related to different thermodynamic function of an ideal gas. 2+5+2

[ 3 ]

6. State and deduce Rayleigh Jean's formula. Mention its drawbacks. 7+2
7. Write down Planck's law for radiation. Deduce Wein's distribution law, Stefan Boltzmann law and Wein's displacement law from Planck's law. 1+2+3+3
8. What are Fermions ? Write down the postulates of Fermi Dirac Statistics. Derive an expression for the probability of distribution of particles governed by Fermi Dirac statistics. 1+2+6
9. Discuss the phenomenon of Bose Einstein condensation. 9

- c) What is mutarotation ? Explain it with mechanism. 1+3
6. Establish the ring structure of D-glucose. 9
7. a) What is a dye ? Write the characteristics of a dye. 1+3
- b) Discuss the molecular orbital theory of colour and constitution. 5
8. a) Write notes on the following : 3 × 2
- i) Phenol-formaldehyde resin
- ii) Buna-S rubber
- b) Define and explain degree of polymerisation with example. 3
9. Discuss : 3 × 3
- i) Biodegradable Polymers
- ii) Conducting Polymers
- iii) Polyesters.

**2018**

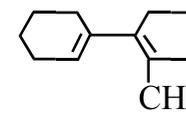
Full Marks - 60

Time - 3 Hours

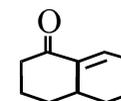
The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory1. Answer any **four** of the following :

a) i) Explain with examples the terms chromophore and auxochrome. 2+2

ii) Calculate  $\lambda_{\max}$  of the following compound

2

b) Write Woodward Fieser rules for calculation of  $\lambda_{\max}$  in  $\alpha, \beta$ -unsaturated carbonyl compounds and hence calculate  $\lambda_{\max}$  of the following compound. 4+2

c) i) How can you distinguish between a normal alkane and a cycloalkane by IR spectroscopic method ? 3

[ 2 ]

- ii) Match the approximate positions of characteristic absorption bands of the carbonyl groups in the IR spectral of the following compounds. 3
- -CHO, CH<sub>3</sub>-CHO, CH<sub>3</sub>-CO-CH<sub>2</sub>-CH<sub>3</sub>  
(Given absorption bands are 1715cm<sup>-1</sup>, 1700 cm<sup>-1</sup> and 1740 cm<sup>-1</sup>)
- d) i) How can you distinguish between ethyl alcohol and ethyl-amine by IR spectroscopy ? 2
- ii) What do you know by finger print region in IR spectra ? 2
- iii) Why is TMS used as standard reference in NMR spectroscopy ? 2
- e) Explain NMR spectra of : 3+3
- i) Acetaldehyde
- ii) Acetophenone
- f) How will you convert : 3+3
- i) Aldopentose to aldohexose
- ii) Glucose to fructose.
- g) i) How is phenolphthalein prepared ? 3
- ii) What is congo red ? How is it prepared. 1+2

[ 3 ]

- h) Define and explain polymer with examples. Discuss addition and condensation Polymerisation with one example of each. 2+4
2. a) What is the effect of conjugation in U.V. absorption ? 2
- b) Explain blue shift and red shift. 3
- c) Calculate the wave number and frequency of visible radiation having wave length 5900<sup>o</sup>A. 2 × 2
3. a) Discuss different types of molecular vibrations involved in I.R. Spectroscopy. 5
- b) Calculate the number of vibrational degree of freedom in CO<sub>2</sub> molecule. 4
4. a) Explain the basic principles of NMR spectroscopy. 5
- b) Give an account of spin-spin coupling and splitting of signals in NMR spectra. 4
5. a) What are Carbohydrates ? 2
- b) What happens when glucose is treated with phenyl hydrazine ? 3

3. Give an account on tissue culture applications. 9
4. Define gene cloning. List the various approaches for obtaining the DNA fragments for cloning and describe any one of them in some detail. 9
5. What is PCR ? Briefly describe the various steps of PCR. 9
6. Give an account on cloning vectors. 9
7. What are transgenic plants ? Discuss the process of transgenesis with reference to any herbicide resistant plant. 9
8. Define cDNA. Briefly describe the procedure for preparation of cDNA library and its uses. 9
9. Describe horticultural, industrial as well as medical applications of Biotechnology. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks  
Answer *five* questions including Q.No.1  
which is compulsory

1. Write short notes on any *four* of the following  
:  $6 \times 4$ 
  - a) Totipotency
  - b) Cryopreservation
  - c) cDNA library
  - d) edible vaccines
  - e) Protoplast isolation
  - f) Composition of Culture medium
  - g) Androgenesis
  - h) Reporter genes.
2. What is tissue culture ? Give a brief historical account of tissue culture techniques. 9

3. Discuss different methods of dating of fossils. 9
4. Describe isolation as a factor of evolution. 9
5. What is speciation ? Discuss different types of speciation with suitable examples. 9
6. Give an account on Lamarckism. 9
7. Discuss Hardy-Weinberg Law. How does it help in genetic equilibrium. 9
8. What is biological species concept ? Write its advantages and limitations. 9
9. Explain various process of macroevolution with suitable examples. 9

V-75-0.5

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
which is compulsory

1. Write short notes on any **four** of the following  
:  $6 \times 4$ 
  - a) Fossils
  - b) Neo-Darwinism
  - c) Genetic drift
  - d) Sibling species
  - e) K-T extinction
  - f) Variation
  - g) Sexual selection
  - h) Neanderthal man.
2. Give a critical review on Darwinism. 9

V-75

[Turn Over

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 6 × 4
- a) Show that RANDOMIZED-QUICK-SORT's expected running time is  $\Omega(n \log n)$ .
  - b) Define the Greedy method with an example.
  - c) What is meant by Dynamic programming ? Explain it with a suitable example.
  - d) Define NP-Complete problem with an example.
  - e) Show the step-by-step process of operation in following set of data using quick sort :  
15, 44, 88, 11, 66, 94, 2, 18, 55, 68

[ 2 ]

- f) Write short notes on :
    - i) Cycle Matching
    - ii) Redblack Tree
    - iii) Computational Geometry.
  - g) Discuss different asymptotic functions and notations used in an algorithm.
  - h) Write short notes on :
    - i) Fractional Knapsack
    - ii) Graph Coloring
    - iii) Maxflow Matching.
2. Explain the process of heap sort. Write an algorithm to construct a min heap. What is time complexity of the sorting process ? 9
3. Describe and justify Prim's algorithm for finding the minimum spanning tree of an undirected graph. Find out the time complexity of it. 9
4. Write and explain Dijkstra's algorithm for shortest paths with an example. 9

[ 3 ]

5. Design a divide and conquer algorithm for finding the minimum and the maximum element of n numbers using no more than  $3n/2$  comparisons. 9
6. Describe and justify Kruskal's algorithm for finding the minimal spanning tree of an undirected graph. What is the time complexity of it ? 9
7. What is approximation ratio ? Write the algorithm of a vertex-cover problem. 9
8. Explain and solve travelling salesman problem with triangle inequality. 9
9. What are the four factors that decide the efficiency of the Backtracking Algorithm ? Define and explain 4-queens problems using backtracking. 9

[ 4 ]

Write short notes on the following :

- a) Discriminant Analysis
- b) Conjoint Analysis.

4. Discuss multidimensional scaling in detail.

OR

Write short notes on the following :

- a) Factor Analysis
- b) Cluster Analysis.

5. Discuss different parts of a report and its presentation.

OR

Write short notes on the following :

- a) Power Point in Research
- b) Software Packages for Research.

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

**2018**

Full Marks - 80

Time - 3 Hours

The questions are of equal value

Answer *all* questions from any *one* Group

**GROUP - A**

( FMS )

1. What do you mean by Financial System ? State the functions of Financial System.

OR

Write short notes on the following :

- a) Capital Markets
- b) Bill Markets.

2. Define Stock Exchange. Discuss the functions of Stock Exchange.

OR

Discuss briefly the functions of SEBI in relation to the Stock Exchange.

[ 2 ]

3. What is Merchant Banking ? Discuss the services of Merchant Banking.

OR

Write short notes on the following :

- a) New Issue Management
  - b) Credit Rating.
4. Discuss the functions, objectives and benefits of Mutual Funds.

OR

Write short notes on the following :

- a) Venture Capital
  - b) Factoring.
5. Explain any ten points of distinction between Lease financing and Hire purchase financing.

OR

Write short notes on the following :

- a) Project Counselling
- b) Project Appraisal.

[ 3 ]

**GROUP - B**

( MR )

1. What are the significance of Marketing Research ?

OR

Write short notes on any *two* of the following :

- a) Research Design
  - b) Research Process
  - c) Marketing Research
  - d) Sampling.
2. What do you mean by Qualitative Research ? Discuss the various methodologies of qualitative research.

OR

Discuss briefly the data collection, coding, tabulation and data presentation.

3. What is Multiple Regression Analysis ? State the importance and application of Multiple Regression Analysis ?

OR

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory1. Answer any *four* of the following :  $7\frac{1}{2} \times 4$ 

a) Use simplex method to solve the LPP :

Maximize  $z = 3x_1 + 2x_2$

subject to the constraints :

$$x_1 + x_2 \leq 4, x_1 - x_2 \leq 2 ; x_1, x_2 \geq 0.$$

b) Let a primal problem be

Maximize  $f(x) = Cx$

subject to :  $Ax \leq b, x \geq 0; x^T, C \in \mathbb{R}^n$ 

and the associated dual be

Minimize  $g(w) = b^T w$

subject to :  $A^T w \geq C^T, w \geq 0; W^T, b^T \in \mathbb{R}^m.$

[ 2 ]

If  $x_0(w_0)$  is an optimum solution to the primal (dual), then prove that there exists a feasible solution  $w_0(x_0)$  to the dual (primal) such that

$$cx_0 = b^T w_0.$$

- c) Obtain the dual problem of the following primal problem :

Minimize  $z = x_1 - 3x_2 - 2x_3$

subject to the constraints :

$$3x_1 - x_2 + 2x_3 \leq 7, 2x_1 - 4x_2 \geq 12, -4x_1 + 3x_2 + 8x_3 = 10$$

$x_1, x_2 \geq 0$  and  $x_3$  is unrestricted.

- d) Find the initial basic feasible solution to the following transportation problem using VAM.

Given the cost matrix :

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Supply
S <sub>1</sub>	20	25	28	31	200
S <sub>2</sub>	32	28	32	41	180
S <sub>3</sub>	18	35	24	32	110
Demand	150	40	180	170	

[ 3 ]

- e) Solve the following transportation problem :

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Supply
S <sub>1</sub>	3	7	6	4	5
S <sub>2</sub>	2	4	3	2	2
S <sub>3</sub>	4	3	8	5	3
Demand	3	3	2	2	

- f) Describe Hungarian method to solve an Assignment problem.

- g) Solve the following assignment problem in order to minimize the total processing time. The amount of time in hours required for the jobs per machine are given in the following matrix :

		Machines				
		A	B	C	D	E
Jobs	I	4	3	6	2	7
	II	10	12	11	14	16
	III	4	3	2	1	5
	IV	8	7	6	9	6

[ 4 ]

h) Solve the following  $2 \times 2$  game graphically :

$$\begin{array}{c} \text{Player B} \\ \text{Player A} \end{array} \begin{pmatrix} 2 & 1 & 0 & -2 \\ 1 & 0 & 3 & 2 \end{pmatrix}$$

2. Solve the L.P.P. by Big M method :  $12\frac{1}{2}$

$$\text{Minimize } z = 4x_1 + x_2$$

subject to the constraints :

$$3x_1 + x_2 = 3, 4x_1 + 3x_2 \geq 6, x_1 + 2x_2 \leq 4; x_1, x_2 \geq 0.$$

3. Solve the L.P.P. by two-phase simplex method:  $12\frac{1}{2}$

$$\text{Maximize } z = -4x_1 - 3x_2 - 9x_3$$

subject to the constraints :

$$2x_1 + 4x_2 + 6x_3 \geq 15, 6x_1 + x_2 + 6x_3 \geq 12 ;$$

$$x_1, x_2, x_3 \geq 0.$$

4. Use duality to solve the following L.P.P. :  $12\frac{1}{2}$

$$\text{Maximize } z = 2x_1 + x_2$$

subject to the constraints :

$$x_1 + 2x_2 \leq 10, x_1 + x_2 \leq 6, x_1 - x_2 \leq 2,$$

$$x_1 - 2x_2 \leq 1 ; x_1, x_2 \geq 0.$$

[ 5 ]

5. One unit of product A contributes Rs.7 and requires 3 units of raw material and 2 hours of labour. One unit of product B contributes Rs.5 and requires 2 units of raw material and 3 hours of labour. Availability of raw material at present is of 240 units and there are 200 hours of labour.  $12\frac{1}{2}$

i) Formulate it as a linear programming problem.

ii) Write its dual and also its economic interpretation.

6. Given  $x_{13} = 50$  units,  $x_{14} = 20$  units,  $x_{21} = 55$  units,  $x_{31} = 30$  units,  $x_{32} = 35$  units and  $x_{34} = 25$  units. Is it an optimal solution to the transportation problem :  $12\frac{1}{2}$

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Supply
S <sub>1</sub>	6	1	9	3	70
S <sub>2</sub>	11	5	2	8	55
S <sub>3</sub>	10	12	4	7	90
Demand	85	35	50	45	

If not, modify it to obtain a better feasible solution.

[ 6 ]

7. A marketing manager has 5 salesmen and there are 5 sales districts. Considering the capabilities of the salesmen and the nature of the districts, the estimates made by the marketing manager for the sales per month (in 1000 rupees) for each salesman in each district would be as follows : 12½

	A	B	C	D	E
I	32	38	40	28	40
II	40	24	28	21	36
III	41	27	33	30	37
IV	22	38	41	36	36
V	29	33	40	35	39

Find the assignment of salesmen to the districts that will result in the maximum sales.

8. Solve the following game by linear programming technique : 12½

	Player B		
Player A	1	-1	3
	3	5	-3
	6	2	-2

[ 7 ]

9. Show that the L.P.P. :

$$\text{Maximize } z = 107x_1 + x_2 + 2x_3$$

subject to the constraints :

$$14x_1 + x_2 - 6x_3 + 3x_4 = 7, \quad 16x_1 + x_2 - 6x_3 \leq 5,$$

$$3x_1 - x_2 - x_3 \leq 0 ; \quad x_1, x_2, x_3, x_4 \geq 0.$$

has an unbounded solution.

12½

V-78-0.4



**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following :  $7\frac{1}{2} \times 4$
- a) Explain the significance of capital budgeting.
  - b) Explain briefly the pay-back period method of capital budgeting.
  - c) Write a brief note on risk-return trade off.
  - d) Calculate the compound value of Rs.10,000 at the end of 3 years at 12% rate of interest when interest is calculated on (a) yearly basis and (b) quarterly basis.
  - e) Explain briefly the various forms of dividend.

[ 2 ]

- f) Calculate operating leverage, financial leverage and combined leverage from the following data :

Sales (1,00,000 units)	= ₹2,00,000
Variable cost per unit	= ₹0.70
Fixed cost	= ₹65,000
Interest charges	= ₹15,000

- g) What are the various motives for holding cash ?  
 h) What are the objectives of inventory management ?

2. Explain the objectives of Financial Management.  
 12½

3. From the following information, calculate the net present value of the two projects 'X' and 'Y' and suggest which of the two projects should be accepted assuming a discount rate of 10%.

	<i>Project 'X'</i>	<i>Project 'Y'</i>
Initial Investment	₹20,000	₹30,000

[ 3 ]

The profit before depreciation and after taxes (cash flow) are as follows :

	1st Yr.	2nd Yr.	3rd Yr.	4th Yr.	5th Yr.
	₹	₹	₹	₹	₹
Project 'X'	5,000	10,000	10,000	3,000	2,000
Project 'Y'	20,000	10,000	5,000	3,000	2,000

The present value of ₹1 @ 10% discount factor for 1st, 2nd, 3rd 4th and 5th year respectively are 0.909, 0.826, 0.751, 0.683 and 0.621

Suggest which project should be selected and why ?  
 12½

4. A company has the following capital structure :

<i>Sources of funds</i>	<i>Book value</i>	<i>After-tax cost (in %)</i>
	₹.	
Equity Capital	6,75,000	15
Preference capital	3,75,000	18
Debenture	4,50,000	6

[ 4 ]

- a) Calculate the weighted average cost of capital using book-value weights.
- b) The company wishes to raise further ₹6,00,000 for the expansion of project as below :

Equity capital	₹1,50,000
Preference capital	₹1,50,000
Debenture	₹3,00,000

Assuming that specific costs do not change, compute the weighted marginal cost of capital. 12½

5. Discuss the important factors that should be considered while determining the capital structure of a company. 12½
6. What do you understand by capital budgeting process ? Enumerate briefly the major steps involved in capital budgeting. 12½

[ 5 ]

7. The following information is available in respect of a firm :

Earning per share	₹ 20
Rate of capitalisation	10%

Calculate the market price of the company's quoted share under Walter's Model when the dividend pay-out-ratio is 50% and 75% if it can earn a return of (a) 15% (b) 10% (c) 5%. 12½

8. Discuss briefly the various sources of working capital funds. 12½
9. A proforma cost sheet of Phulera Limited provides the following information :

*Elements of cost*

Material	40%
Direct Labour	20%
Over heads	20%

[ 6 ]

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) Materials will be in process on an average of 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 months. You may assume that sales and production follow a consistent pattern.

[ 7 ]

Estimated life	5 years	5 years
Scrap value	₹1,000	₹2,000

You are required to prepare a statement of working capital requirements for the above level of activity. 12½

V-79-3



2. Discuss the contribution of Martin Seligman to positive Psychology. 9
3. Elaborate the contribution of Abraham Maslow to Positive Psychology. 9
4. What do you mean by happiness ? Discuss in details the setpoint theory of happiness. 9
5. Elaborate the life satisfaction and affective state theories of happiness. 9
6. What do you mean by well being ? Discuss different models of wellbeing. 9
7. Explain different factors affecting and promoting wellbeing among people. 9
8. What is Positive Psychology ? Explain, how the Positive Psychology is related to optimism, gratitude and with mindfulness. 9
9. Elaborate in details the effect of Yoga, Meditation and Spiritual intelligence on development of Positive Psychology. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks  
Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 6 × 4
  - a) Elaborate the historical roots and goals of positive Psychology.
  - b) Discuss the positive individual traits and positive subjective experience.
  - c) Discuss different conditions and mechanisms of flow.
  - d) Elaborate the nature and sources of happiness.
  - e) Discuss the Resilience Psychology of Well-being.
  - f) Elaborate the Psychology and meaning of well being.
  - g) Discuss, different conditions responsible for increasing, optimism.
  - h) Elaborate in details the effects of exercise for building positive psychology.

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 7½×4
- a) What is agricultural income U/S 2(IA) of Income-Tax Act, 1961 ?
  - b) Who is an Assessee U/S 2(7) of Income-tax Act 1961 ?
  - c) Write a brief note on perquisites exempted from tax.
  - d) What deductions are allowed from the Annual value in computing taxable income from house property ?

[ 2 ]

- e) Give seven instances of incomes falling U/S 56(1) of Income tax Act, 1961, chargeable under the head income from other sources.
- f) Mr. Ramchandra purchased a house in 1976 at Bhubaneswar for ₹50,000. He incurred the following expenses for the improvement of the house. Renovation of the house ₹25,000 and additions of two rooms after one year ₹20,000. The Fair Market value of the house on 1.4.81 was ₹1,10,000. He sold the house in June 2016 for ₹16,00,000. He purchased another house property within 2 months for ₹3,00,000 and invested ₹50,000 in capital Gains Account Scheme. Calculate taxable capital gain for the Previous Year 2016-17. Cost of inflation index for 1981-82 was 100 and for 2016-17 is 1125.
- g) Discuss the provisions of section 80D of Income-tax Act, 1961 regarding health insurance premium.

[ 3 ]

- h) Under what circumstances (any five) incomes of other persons can be included in the income of the assessee under the Income-Tax Act, 1961 ?
2. Describe the provisions of Income-Tax Act 1961, regarding determination of residential status of an individual. 12½
3. What are the important types of provident funds of which a salaried employee may be member and state the provisions of Income-Tax Act, dealing with each type of provident fund. 12½
4. From the following particulars, find out the taxable salary income of Mrs Sujata sing working at Bhubaneswar (Population 8 lakhs) for the Assessment Year 2017-18. 12½
- a) Salary ₹12,000 p.m.
- b) DA ₹1500 p.m.

[ 4 ]

- c) Employer's contribution to employee's R.P.F.–  
14% Basic Salary
- d) Rent-free Accommodation (unfurnished)-fair  
rental value is ₹80,000
- e) Interest on P.F. balance @ 13 % p.a.-₹3,900.
- f) A car (1.4 lt. capacity) is provided by the  
employer. All expenses are borne by the  
employer. It is used both for performance of  
official duties and private purposes. Car was  
used by the employee for only 11 months during  
the year.
- g) She paid professional tax of ₹300 during the  
year.
- h) She received ₹500 p.m. as fixed medical  
allowance.
5. What is capital Gain ? Discuss briefly the procedure  
for computation of capital gain as prescribed by the  
Income-Tax Act, 1961. 12½

[ 5 ]

6. Explain the provisions of Income-tax Act, 1961,  
regarding set-off and carry forward of losses. 12½
7. Mr. Abinash is a Chartered Accountant at Balasore.  
He has submitted the following Income and  
Expenditure A/c for the year 2016-17. 12½

<i>Expenses</i>	<i>(₹)</i>	<i>Income</i>	<i>(₹)</i>
Office Rent	33,000	Audit fees	3,00,000
Salary to staff	75,000	Finalcial consultancy service	60,000
Charities	5,000	Interest in Bank Deposit	22,000
Gift to relatives	6,000	Dividends on units of UTI	6,000
Subscription for journals	2,400	Accountancy works	32,000
Drawings	16,000		
Car expenses	24,00		
Household expenses	8,600		
National savings certificates purchased	20,000		
Net Income	2,30,000		
	4,20,000		4,20,000

*Additional information :*

- a) Office rent ₹3,000 though paid is not recorded.
  - b) Depreciation of car during the year is ₹6,000.
  - c) 30% of car expenses are related to personal expenses.
8. Compute the tax liability of Mr. Bhimsen a physically handicapped person who is 65 years old on 1.4.16 for the Assessment Year 2017-18 from particulars given below : 12½
- a) Professional gain ₹3,50,00
  - b) Income from house property ₹90,000
  - c) Short-term capital gain ₹45,000
  - d) Long-term capital gain ₹20,000
  - e) Punjab state lottery prize ₹50,000
  - f) Agricultuaral Income ₹20,000

- g) Amount invested in NSC-VIII issue ₹30,000
- h) Amount deposited in his Public Provident Fund Account ₹30,000

9. Discuss briefly the procedure for e-filing of Income-tax return. 12½

2. Explain the objectives and functions of Production Management. 12½
3. Define Product Life Cycle (PLC). Describe various stages in the PLC. 12½
4. What are the various types of layouts? Explain plant location in detail. 12½
5. Describe the objectives of Material Management. 12½
6. Discuss the various methods and benefits of coding. 12½
7. Explain the objectives of inventory control. What are the factors affecting inventory control systems? 12½
8. Explain the planned maintenance system and its types. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 7½×4
  - a) Define Operations Management.
  - b) Explain the need for product design and development.
  - c) List the advantages of a plant layout.
  - d) Define production planning and control.
  - e) Explain the concept and objectives of work study.
  - f) List the functions of stores management.
  - g) Explain the concept of inventory control and costs.
  - h) Define the importance of maintenance management in a plant.

- h) Why does Charudutta help Samsthanka become free ?
2. Write a note on Indian Epic tradition. 12½
3. Write a note on Indian classical drama with reference to the texts you have read. 12½
4. Explain the games in the Mahabharat. "The Dicing" and "The Sequel to Dicing". 12½
5. Comment on the major themes in Kalidasa's Abhigyan Sakuntalam. 12½
6. Discuss Mrichakatikam as a romance. Bring out the twists and turns in the play. 12½
7. Discuss Clippatikaram as a typical epic of Tamil civilisation. 12½
8. Kannaki is a traditional female character trapped in the confines of patriarchy. Do you agree ? Bring out the unique features in her character to substantiate your answer. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory

1. Write short answers on any **four** of the following : 7½×4
- a) Write a brief note on Alankar.
- b) "Drama is a representation of the state of the three worlds". Explain the statement in the light of Bharat's Natyasastra.
- c) What is the Indian concept of the heroic ?
- d) Write a short note on Kunt's visit to Karna.
- e) Comment on Dhritarashtra's address to his son in the Assembly Hall.
- f) How does King Dushyanta remember Sakuntala ?
- g) Why does Maitreya advise Charudatta to avoid association with Vasantasena ?

2. Give an account of the Social crisis of Europe in 17th Century. 12½
3. Discuss the impact of 17th Century European crisis. 12½
4. Analyse the Political Currents of the English Revolution. 12½
5. Trace the development of science with a special reference to Physics, Chemistry, Biology and medicine. 12½
6. What is Mercantilism? Describe the development of Mercantilism in European countries. 12½
7. Analyse the scientific technological background of the Industrial Revolution. 12½
8. Account for the Economic Issues for the American Revolution. 12½
9. Throw light on the political causes of the American Revolution. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short answers on any *four* of the following : 7½×4
  - a) Economic crisis of the 17th Century Europe.
  - b) Causes and effects of the 'Thirty Years' War'.
  - c) Religious issues for Glorious Revolution.
  - d) Contributions of Galileo to Astronomy.
  - e) Baconian Science.
  - f) Fall of Mercantilism.
  - g) Agricultural background of the Industrial Revolution.
  - h) The Declaration of Independence.

2. Define Political culture and the dimension of Political Culture. 12½
3. Discuss the features of Indian Electoral System. 12½
4. Describe the main features of the party system. 12½
5. Explain the merits and demerits of party system. 12½
6. What is 'Nation' and 'State'? Discuss the Changing notions of the state. 12½
7. Examine the process of democratisation in post colonial countries. 12½
8. What is Federation ? Discuss the major trends in Federalism. 12½
9. Define confederation and explain its merits and demerits. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short answers on any *four* of the following : 7½×4
  - a) Classification of Political Culture.
  - b) Mixed Representation.
  - c) Emergence of Party system.
  - d) Right of self-Determination.
  - e) Conditions necessary for successful working of Political Party.
  - f) Characteristics of a Federation.
  - g) Types of Election System.
  - h) Prospects of Federalism.

2. Describe the relationship between economic efficiency and welfare. 12½
3. Describe the shift in demand curve and the absence of supply curve in a monopoly market. 12½
4. 'Monopoly is less efficient in long run as compared to a perfectly competitive market. Discuss. 12½
5. Explain the equilibrium of a firm under perfect competition with diagram. 12½
6. What is duopoly ? Explain the Bertrand model in price and output determination. 12½
7. Discuss how equilibrium wage is determined in the labour market. 12½
8. Explain why demand for Labour is derived demand and also wage variation. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 7½×4
  - a) Shifts in supply and demand curves.
  - b) Comparative statistics in long run equilibrium.
  - c) Price under perfectly competitive system.
  - d) Mathematical model of production under general equilibrium model.
  - e) Price discrimination.
  - f) Barriers to entry.
  - g) Tacit Collusion.
  - h) Monopsony in the Labour Market.

8. Put the Boolean expression into normal form.

$$(A + D)' (B' + C) + AD. \quad 12\frac{1}{2}$$

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

V-125 -0.3



1. Write short answers on any *four* of the following : 7½×4

- a) State and explain the nature of Symbolic Logic.
- b) Inference and implication.
- c) Symbolise the following sentences according to the calculus of proposition.
  - i) If there is an election, the Government will not remain in power.
  - ii) Either Jones will bribe the police or he will not remain in town.
  - iii) It is false that Mohan is both guilty and he not bribing the police.

[ 2 ]

- d) Construct the truth table of conjunctive, Disjunctive and implicative truth function.
- e) Prove that  $p \vee q$  is equivalent to  $\sim(\sim p \cdot \sim q)$ .
- f) What is Equivalence truth function ? Construct its truth table.
- g) Put the following expression in to normal form.  $AB' + A'$ .
- h) What is stroke function ? Convert the given basic truth function into equivalent stroke function and draw its truth table.

$$(\sim p \cdot \sim q) \supset q.$$

- 2. Distinguish between symbolic logic and classical logic. 12½
- 3. Construct truth table for the following propositional formulae. 12½
  - a)  $(p \vee q) \supset p$
  - b)  $(p \cdot q) \supset p$
  - c)  $(p \cdot q) \supset (p \vee q)$ .

[ 3 ]

- 4. What is an indirect truth table method ? Illustrate an indirect truth table of the given argument. 12½

If there is Sun, then there is light  
There is no light.  
Therefore there is no Sun.
- 5. Test the validity of the given argument by method of equivalent substitution  

If A Leaves the Country, then it is false that he is both innocent and secure from arrest. If he submits to an audit of the books, then he is innocent. If he is innocent, then he is secure from arrest. He will submit to an audit of his books. Therefore A will not leave the country. 12½
- 6. Test the validity of the given propositional formulae by reduction to conjunctive normal form (C.N.F).  
$$((p \supset q) \cdot (q \cdot r)) \supset (p \supset r). \quad 12½$$
- 7. What do you mean by predicate calculus ? Explain the relation between the propositional calculus and the predicate calculus. 12½

2. Define liberalization and discuss its features. 12½
3. What is Privatisation ? Discuss its impact on Indian economy. 12½
4. Examine the economic dimension of contemporary globalization. 12½
5. Write a brief note on anti-globalization movements. 12½
6. Discuss the technological dimension of contemporary globalization. 12½
7. Discuss the role of globalization in the Indian context. 12½
8. Describe the impact of globalization on social institutions in the Indian context. 12½
9. Highlight briefly the impact of globalization on women. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 7½×4
  - a) Discuss briefly the characteristics of globalization.
  - b) Discuss the nature of privatization.
  - c) Examine the impact of globalization on security.
  - d) Discuss briefly the political dimension of contemporary globalization.
  - e) Discuss briefly the nature of consumerism.
  - f) Write a short essay on rising inequality.
  - g) Highlight briefly the impact of globalization on religion.
  - h) Discuss the impact of globalization on culture.

2. Discuss the cognitive and psychodynamic perspective of abnormal behaviour. 9
3. Briefly describe the symptoms, causes and treatment of bipolar affective disorder. 9
4. Enumerate the symptoms and causes of dissociative and impulsive personality disorders. 9
5. What do you mean by dependant personality ? Discuss the symptoms and causes of this disorder. 9
6. Point out the characteristics and major subtypes of Schizophrenia. 9
7. Briefly point out the major steps of psychodynamic therapy. 9
8. Write short notes on any *two* of the following :  $4\frac{1}{2} \times 2$ 
  - a) Borderline Personality Disorder
  - b) Socio-Cultural Perspective
  - c) Projective Tests
  - d) Rating Scales
  - e) DSM-IV Classification.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short answers on any *four* of the following :  $6 \times 4$ 
  - a) What is meant by abnormal behaviour ? Discuss the Behavioural perspectives of abnormal behaviour.
  - b) Briefly enumerate any two assessment techniques of maladaptive behaviour.
  - c) Discuss the symptoms of anxiety disorder.
  - d) What are the causes and symptoms of bipolar disorder ?
  - e) What is a personality disorder ? Discuss the causes of avoidance personality disorder.
  - f) How Schizophrenia can be treated ?
  - g) What is cognitive behaviour therapy ?
  - h) Point out the symptoms of dysthymia.

3. Explain about the types of diffusionism. 9
4. Discuss on the emergence of fieldwork tradition in Anthropology. 9
5. Elaborately discuss on the Historical particularism? 9
6. Write the concept of Durkheim and social integration in Anthropology. 9
7. Write details about the structuralism? 9
8. Explain the interpretative approaches? 9

V-131 -0.2

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short answers on any *four* of the following : 4 × 6
- Classical Evolutionism
  - Diffusionsim
  - Fieldwork tradition
  - American cultural Tradition
  - Structural functionalism
  - Functionalism
  - Levi Strauss theory
  - Symbolic approach.
2. Discuss about the Evolutionism? 9

V-131

[Turn Over

2. Discuss the factors controlling the behaviour of rock materials upon stress. 9
3. Discuss the mechanism of Folding. 9
4. Classify Joints. 9
5. Define Unconformity. How unconformity can be recognised in the field ? 9
6. Define Fault. How faults can be recognised in the field ?
7. Give a suitable scheme of classification of folds. 9
8. Discuss the concept and Types of Shear Zones. 9
9. Describe the various methods of determination of strain in rocks. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 6 × 4
  - a) Write note on Strike and Dip
  - b) Distinguish Rake and Plunge
  - c) Distinguish Fault from Unconformity
  - d) Recognition of Fold in the Field
  - e) Note on Importance of Joints
  - f) Note on Types of Foliation
  - g) Note on Outlier and Inlier
  - h) Write note on Types of Lineation.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 6 × 4
  - a) Explain type-A and type  $A_1$  Critical Regions.
  - b) Explain uniformly most powerful unbiased tests.
  - c) Explain "Level of Significance" and power of a test.
  - d) Explain the concept of type-I and type-II errors with examples and bring their importance in Neyman-pearson testing theory.
  - e) Explain the Likelihood Ratio test and mention their properties.
  - f) Explain Wilcoxon Signed-Rank test.

[ 2 ]

- g) Explain the difference between parametric and Non parametric test.
- h) Explain Mann-Whitney U-test.
2. Write notes on the following : 9
- a) Simple and composite hypothesis
  - b) Uniformly most powerful Test
  - c) Size and power of a Test.
3. State Neyman-Pearson Lemma and explain the use of Neyman-Pearson Lemma in obtaining the Best Critical Region by an illustration. 9
4. If  $X_1, X_2, \dots, X_n$  be a random Sample from a normal population with unknown mean  $\mu$  and variance  $\sigma^2$  then develop the Likelihood Ratio test for testing  $H_0 : \mu = \mu_0$  against  $H_1 : \mu > \mu_0$  and  $H_1 : \mu < \mu_0$ . 9
5. Describe Sign test and Wilcoxon Signed-rank test and compare them. 9

[ 3 ]

6. Derive Run test stating clearly the assumptions made. Develop run test for testing whether two given samples are drawn from the same continuous population. 9
7. Obtain the most powerful test for testing the mean  $H_0 : \mu = \mu_0$  against  $\mu = \mu_1$  ( $\mu_1 > \mu_0$ ) when  $\sigma^2 = 1$  in a normal population. 9
8. Explain the statistical procedure for testing the following hypothesis regarding the standard deviation  $\sigma$  of a normal population
- $$H_0 : \sigma = \sigma_0 \qquad H_0 : \sigma = \sigma_1 > \sigma_0$$
- Will the test criterion remain same when  $\sigma_1$  is changed to  $\sigma \neq \sigma_0$  ? 9

2. Explain different components of curriculum with examples. 9
3. Describe learner-centered curriculum and explain how it is different from subject-centered curriculum. 9
4. Discuss psychological bases of curriculum. 9
5. Explain the meaning and nature of counselling. 9
6. Discuss guiding principles of National curricular framework-2005. 9
7. Describe concept and objectives of vocational guidance. 9
8. Explain different steps of pupil inventory service. 9
9. Discuss the meaning and significance of community centered curriculum. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 6 × 4
  - a) Explain the importance of core-curriculum.
  - b) Describe with examples 'integration' as a principle of curriculum construction.
  - c) Discuss the importance of curriculum in teaching-learning process.
  - d) Explain ICT-enabled curriculum.
  - e) Briefly describe assessment procedure as per NCF-2005.
  - f) Discuss different techniques of counselling.
  - g) Explain the scope of guidance.
  - h) Describe occupational information service.

2. Discuss the characteristics and problems of Census. 9
3. Describe different population density zones of world. 9
4. Write the distribution of population in India. 9
5. Define mortality and discuss the factors affecting mortality. 9
6. Give an account of rural-urban population composition in India.
7. Discuss the determinants of migration. 9
8. Explain Population Transition Theory. 9
9. Give a comparative account of the population policy of India and advanced countries.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 6 × 4
  - a) Scope of population geography
  - b) Economic density
  - c) Influence of climate on population distribution
  - d) Fertility
  - e) General Birth Rate
  - f) Brain drain
  - g) Age composition in India
  - h) Approaches to population planning in India.

8. Use convolution theorem to find the functions whose Laplace transforms are

i)  $\frac{1}{(s+a)(s+b)}$  3

ii)  $\frac{s^2}{(s^2+a^2)^2}$  3

iii)  $\frac{1}{(s^2+a^2)^2}$  3

where a and b are constants.

V-136 -0.5



**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
which is compulsory

1. Write short answers on any **four** of the following : 6 × 4
- Separate  $\log_e(\bar{z})$  into real and imaginary parts.
  - Find the value of  $\log(1+i)$ .
  - Determine the analytic function  $f(z) = u + iv$ .  
Where  $v = 6xy - 5x + 2$ .
  - Find the Fourier transform of  $f(x) = 1$  if  $|x| < 1$   
and  $f(x) = 0$  otherwise.
  - Find the Fourier transform of the Gaussian  
distribution function  $f(x) = Ne^{-\alpha x^2}$  where N and  
 $\alpha$  are constants.
  - Find the Laplace transform of  $t^n$ ,  $n > 1$

V-136

[Turn Over

[ 2 ]

g) Find the Laplace transform of the function

$$F(t) = \left[ \frac{e^{at} - 1}{a} \right]$$

h) Find the inverse Laplace transform of

$$\frac{s^2 + 2s - 3}{s(s - 3)(s + 2)}$$

2. a) Show that if  $f(z) = u + iv$  is an analytic function and  $\vec{F} = v\hat{i} + u\hat{j}$  is a vector, then  $\text{div } \vec{F}$  and  $\text{curl } \vec{F}$  are equivalent to the Cauchy-Riemann equations. 4½

b) Determine the analytic function, whose real part is  $x^3 - 4xy^2 + 5x^2 - 5y^2 + 6$ . 4½

3. a) Expand the function  $f(z) = \frac{1}{(z-1)(z-2)}$  4½

b) Evaluate the integral  $\oint_C \frac{dz}{z^2 + z}$  where C is a circle defined by  $|z| = 2$  4½

[ 3 ]

4. a) Find the poles and residues at the poles for

$$f(z) = \frac{z+1}{z^2 - 2z} \quad 4$$

b) Use method of contour integration, to prove that

$$\int_0^{2\pi} \frac{d\theta}{1 - 2p \cos \theta + p^2} = \frac{2\pi}{1 - p^2}$$

where p is a fixed real number in the interval  $0 < p < 1$ . 5

5. Find the Fourier transform of  $e^{-r^2/a^2}$  where a is a constant and  $r = \sqrt{x^2 + y^2 + z^2}$ . 9

6. An inductor of 3 henry is in series with a resistance of 30 ohms and an e.m.f. of 150 Volts. Assuming that the current is zero at  $t = 0$ , find the current at time  $t > 0$ . 9

7. Solve : 9

$$t^2 \frac{d^2x}{dt^2} + \frac{dx}{dt} + 4tx = 0$$

with  $x(0) = 3$  and  $x'(0) = 0$

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following :
  - a) Describe the splitting of d-orbitals in octahedral complexes. 6
  - b) i) Write the IUPAC names of the following complexes 3
    - a)  $[\text{Cr}(\text{NH}_3)_6]\text{Cl}$
    - b)  $\text{Ca} [\text{Fe}(\text{CN})_6]$
    - c)  $\text{K}_3 [\text{Al}(\text{C}_2\text{O}_4)_3]$ .

[ 2 ]

- ii) Write the formulae of the following complex compounds 3
- 1) dichloro tetra-aquo-Chromium (III) chloride
  - 2) Potassium tetracyano-nickelate (II)
  - 3) Tetrachloro mono (ethylene-diamine) platinum (iv)
- c) Give an account of geometrical isomerism in square planar and octahedral complexes. 3+3
- d) i) What happens when \_\_\_\_\_? 2 × 2
- 1) H<sub>2</sub>S gas is passed through acidified K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution.
  - 2) FeSO<sub>4</sub> solution is added to acidified KMnO<sub>4</sub> solution.
- ii) What do you mean by outer orbital and inner orbital complexes? 2

[ 3 ]

- e) Give reasons for the following : 2 × 3
- i) Cu<sup>2+</sup> complexes are coloured while those of Zn<sup>2+</sup> are colourless.
  - ii) Transition elements exhibit good catalytic properties.
  - iii) The electrons are added in 3d orbitals instead of 4p in the atoms of first transition series.
- f) What are actinides ? Give their electronic configurations. 2 + 4
- g) Discuss toxicity in the metal ions of Pb and As. 3 + 3
- h) i) Explain why tetrahedral complexes of Ma<sub>2</sub>b<sub>2</sub> type do not show geometrical isomerism whereas square planar complexes do. 3
- ii) Discuss the isomerism exhibited by [Co(NH<sub>3</sub>)<sub>5</sub>Br]SO<sub>4</sub>. 3

[ 4 ]

2. a) Write the postulates of Valence Bond Theory (VBT) of co-ordination compounds. What are its limitations ?  $4\frac{1}{2}+1\frac{1}{2}$
- b) Discuss the formation and structure of  $[\text{Fe}(\text{CN})_6]^{4-}$  on the basis of VBT. 3
3. Discuss the following characteristics of transition elements.  $3 \times 3$
- a) Formation of complexes
- b) Magnetic properties
- c) Formation of coloured compounds.
4. a) Explain :  $2 \times 2$
- i) Zn, Cd and Hg are not included in transition elements
- ii) Common oxidation states of first transition series elements increases up to Mn and then decreases.

[ 5 ]

- b) Find out the number of unpaired electrons present in  $\text{Ni}^{2+}$ . 2
- c) Prove that 'Mn' exhibits variable oxidation states. Give one example of a compound in all these oxidation states. 2
5. a) Describe the separation of lanthanides by ion-exchange method. 4
- b)  $\text{Gd}^{3+}$ ,  $\text{La}^{3+}$  and  $\text{Lu}^{3+}$  ions are colourless. Explain. 2
- c) Discuss the oxidation states of Lanthanides. 3
6. a) How does Cobalt react with 3
- i) mineral acids
- ii) Ammonia.
- b) What happens when \_\_\_\_\_ ?  $2 \times 3$
- i)  $\text{T}_2 - \text{O}_2$  reacts with Conc.  $\text{H}_2\text{SO}_4$

[ 6 ]

- ii) Vanadium is treated with hot and fused NaOH.
- iii) Chloroform is oxidised with acidified  $K_2Cr_2O_7$ .

7. Discuss the following characteristics of Lanthanides :  $3 \times 3$

- a) Colour formation
- b) Magnetic properties
- c) Oxidation states.

8. a) What are essential and non-essential elements necessary for living beings ? How are essential elements classified according to their action in biological system ? 6

- b) Mention any three examples of chelating agents used in medicine. 3

[ 7 ]

- 9. a) What are Carboxypeptidase ? Discuss the role of Carboxypeptidase in the biological system of human body. Explain with mechanism. 6
- b) Write a note on iron and its application in bio-system. 3

V-137-0.6



3. Draw a labelled diagram of double helix model of DNA and describe the salient features. 9
4. Discuss briefly the different steps of DNA replication in eukaryotes with the involvement of. 9
5. What is RNA editing? Describe the process and write its biological significance. 9
6. Define transcription. Describe the mechanism of transcription in *E. Coli* (bacterium) with suitable diagrams. 9
7. Name types of Ribosome found in living cells. Describe the ultra structure, chemical composition and function of Ribosome. 9
8. Describe "Operon Concept" of genetic control of protein synthesis. 9
9. "RNA is a genetic material" prove it by Frankel-Conrat's experiment. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short answers on any *four* of the following : 6 × 4
  - a) Nucleotide
  - b) Griffith's experiment on Pneumococcus bacteria
  - c) Denaturation of DNA
  - d) Exons
  - e) Adaptor hypothesis
  - f) Initiation factor
  - g) Nonsense Codon
  - h) Heat shock proteins.
2. With the help of "Clover Leaf Model" describe the structure of Transfer RNA. Write its function. 9

2. Define Carbohydrate. Give an account of classification of carbohydrates and properties of monosaccharides. 9
3. What is Glycolysis ? Describe the process in details and discuss the net gain of ATP at the end. 9
4. What are Steroids ? Give two examples of C-17 steroids that are widely distributed in animals. 9
5. Define Enzyme. Describe in details the mechanism of Enzyme action. 9
6. What is Urea ? Describe the urea synthesis in details. 9
7. Discuss the glycogen metabolism and mention its regulation. 9
8. Describe the process of oxidative phosphorylation in mitochondria. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory*Give labelled diagram wherever necessary*

1. Write short answers on any **four** of the following : 4 × 6
  - a) Glycoprotein
  - b) Glyconeogenesis
  - c) Transamination
  - d) Allosteric enzyme
  - e) Sphingolipids
  - f) Michaelis-Menten Equation
  - g) Zwitterionic nature of Amino acid
  - h) Deamination.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 4 × 6
  - a) How do we use design a packege ? How do we add a class or, an interface to a package ?
  - b) How Polymorphism can be achieved through methods ? Discuss method overloading with a suitable example.
  - c) Describe various control statements available in JAVA with example.
  - d) Write short notes on the following :
    - i) Class Variables
    - ii) Garbage Collection
    - iii) JAVA servlets.

[ 2 ]

- e) Write a program in JAVA to input to a number and check prime or not.
  - f) Describe different types of Inheritance available in JAVA with suitable diagrams.
  - g) What is the main function of "final" keyword ? Explain the use of final-keyword in a method with an example.
  - h) Write short notes on the following :
    - i) AWT Controls
    - ii) Type Conversion
    - iii) JAVA Strings.
2. How is method defined ? When do we declare a method or class abstract ? Discuss the different levels of access protection available in JAVA. 9
3. How exceptions are handled in JAVA ? What will happen if you will not handle exceptions in your program ? Explain with example. 9
4. What is Interface in JAVA? Whether an Interface can inherit another Ineterface ? If yes then give an example to show how can it be achieved ? 9

[ 3 ]

5. What is a thread ? Describe the complete life cycle of a thread. 9
6. What is an Applet ? Draw and explain the life cycle of an applet. 9
7. Write short notes on the following : 9
- i) Swing components of JAVA
  - ii) Method Overriding
  - iii) Wrapper Classes.
8. What is meant by token ? Describe various tokens available in JAVA with example. 9
9. Describe the concept of Multithreading with an example. 9

୨. ଲୋକ ଗୀତର ପ୍ରକାର ଭେଦ ସଂପର୍କରେ ଆଲୋଚନା କର । ୧୨.୫
୩. କାନ୍ଦଣା ଗୀତରେ ନାରୀ ଜୀବନର ଅଶୁଭ ଅଭିବ୍ୟକ୍ତି କିପରି ପ୍ରକାଶିତ ହୋଇଛି ଉଲ୍ଲେଖ କର । ୧୨.୫
୪. ଲୋକ କାହାଣୀର ପ୍ରକାରଭେଦ ଦର୍ଶାଅ । ୧୨.୫
୫. ଲୋକ କାହାଣୀର ସାମାଜିକ ଆବେଦନ ପ୍ରକାଶ କର । ୧୨.୫
୬. ଲୋକ ନାଟକର ବିଭିନ୍ନ ବିଭାବ ସଂପର୍କରେ ସୂଚନା ଦିଅ । ୧୨.୫
୭. ପ୍ରବାଦ ଓ ପ୍ରବଚନରେ କୃଷି ଓ କୃଷକ ପ୍ରସଙ୍ଗ କିପରି ସ୍ଥାନ ପାଇଛି ଉଲ୍ଲେଖ କର । ୧୨.୫
୮. ଲୋକ ନାଟକରେ ପ୍ରକାଶିତ ବିଭିନ୍ନ ରସ ସଂପର୍କରେ ଆଲୋଚନା କର । ୧୨.୫
୯. ପ୍ରବାଦ ଓ ପ୍ରବଚନରୁ ସାମାଜିକ ଜୀବନ ଚିତ୍ର ପ୍ରଦାନ କର । ୧୨.୫

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

୧. ଯେ କୌଣସି *ଚାରିଗୋଟି* ଚିହ୍ନ ଲେଖ : ୭.୫×୪
- କ) ଲୋକ ସଂସ୍କୃତି କହିଲେ କ'ଣ ବୁଝ—ଉଦାହରଣ ସହ ଲେଖ ।
- ଖ) ଲୋକ ସାହିତ୍ୟର ସ୍ୱରୂପ ଓ ଉପାଦେୟତା ପ୍ରକାଶ କର ।
- ଗ) ଲୋକ ଗୀତର ପ୍ରକାରଭେଦ ଦର୍ଶାଅ ।
- ଘ) ଲୋକ କାହାଣୀର ଲୋକପ୍ରିୟତାର କାରଣ ଲେଖ ।
- ଙ) ଲୋକ ସାହିତ୍ୟରେ ଜନଶୁତିର ଭୂମିକା ନିର୍ଣ୍ଣୟ କର ।
- ଚ) ଓଡ଼ିଆ ଲୋକୋକ୍ତିର ପ୍ରକାର ଭେଦ ସଂପର୍କରେ ଆଲୋଚନା କର ।
- ଛ) ଲୋକ ନାଟକରେ ଥିବା ଚରିତ୍ରର ବିବିଧତା ଉଲ୍ଲେଖ କର ।
- ଜ) ଛଉ ନାଟର ବୈଶିଷ୍ଟ୍ୟ ପ୍ରଦର୍ଶନ କର ।

7. Given that  $\frac{dy}{dx} = x + y$ , with the initial condition  $y = 1$  when  $x = 0$ . Find  $y$ , for  $x = 0.05$  and  $x = 0.1$ , correct up to four decimal places, taking step length  $h = 0.05$ . 9

8. Compute  $y(0.8)$ , by Runge-Kutta method correct to five decimal places, from the equation

$$\frac{dy}{dx} = xy, \quad y(0) = 2, \quad \text{taking } h = 0.2. \quad 9$$

V-142-0.5

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
which is compulsory

1. Write short answers on any **four** of the following :  $6 \times 4$
- Write down the approximate value of  $\frac{\pi}{4}$  correct to four significant figures and then find :
    - Absolute errors
    - Relative error
    - Relative percentage error.
  - Compute one root of  $e^x - 3x = 0$ , correct to two decimal places which between 1 and 2.
  - Find the root of  $x^3 - 8x - 4 = 0$ , which between 3 and 4, by Newton Raphson Method correct to four decimal places.

[ 2 ]

- d) Discuss the convergence of Gauss-Jacobi Iteration.
- e) Discuss Trapezoidal Rule.
- f) Evaluate numerically

$$\Gamma = \int_0^1 \frac{dx}{1+x}$$

using Gauss Legendre three point formula.

- g) Find  $y(0.10)$  and  $y(0.15)$ , by Euler's Method from the differential equation  $\frac{dy}{dx} = x^2 + y^2$ ,  $y(0) = 0$ , correct to four decimal places taking step length  $h = 0.05$ .

- h) Use Picard's method to compute  $y(0.1)$ , from the differential equation  $\frac{dy}{dx} = x + y$ ;  $y = 1$ , where  $x = 0$ .

- 2. Discuss Newton-Raphson Method and its convergence. 9

[ 3 ]

- 3. Solve the System of equations, by Gauss-elimination method,

$$2x_1 + 3x_2 + x_3 = 9$$

$$x_2 + 2x_3 = 6$$

$$3x_1 + x_2 + 2x_3 = 8$$

Correct upto three significant figures. 9

- 4. Discuss the convergence of Gauss-Seidal Iteration. 9

- 5. Using Lagrange's formula, find the polynomial of maximum degree determined by the set of points :  $(-5, 87), (-1, 7), (0, -3), (2, -1)$ . 9

- 6. Evaluate  $\int_0^1 (4x - 3x^2) dx$  taking 10 intervals by

i) Trapezoidal Rule

ii) Simpson's One-third Rule.

Compute the exact value and find the absolute and relative error in your result. 9

6. What are the provisions of law relating to valuation of Excisable goods ? 12½
7. Explain the procedure for obtaining registration under the Central Excise Act, 1944. 12½
8. What are the various methods for determination of value of imported goods ? 12½
9. Explain the various documents used in export trade. 12½

V-143-3

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short answers on any *four* of the following : 7½ × 4
- a) Discuss the provisions of law relating to imposition of penalties in service tax.
- b) Mr. Bal is a Practising Chartered Accountant within the meaning of Chartered Accountants Act, 1949 Information about his receipts from various professional services for the quarter ending 31.3.2016 is given below.
- i) Remuneration received by Providing Account service ₹2,50,000
- ii) Audit Fees Received ₹5,00,500
- iii) Certificate Fees ₹70,000

V-143

[Turn Over

[ 2 ]

- iv) Remuneration for services as Internal Auditor ₹3,50,000
- v) Fees for appearing in appeals ₹2,40,000
- vi) Remuneration received for teaching at a coaching centre as a visiting faculty ₹2,60,000

Compute taxable value of services and the amount of service tax payable. Above receipts are exclusive of service tax.

- c) What are the provisions of law for filing return under VAT ?
- d) What are the advantages of VAT ?
- e) What is Excise duty ? What are the conditions of charge of Excise duty ?
- f) Discuss the exemption schemes available to small scale industrial units (SSI).

[ 3 ]

- g) Compute the total custom duty payable from the following data.

The assessable value of imported goods is ₹20,00,000. The basic custom duty is 10%. Additional custom duty of customs or countervailing duty 12.5% Education cess is 2% and Secondary and High Education cess is 1%. Additional customs duty equal to sales tax, VAT, etc is 4%.

- h) Explain the procedure to be followed by the importer for clearance of goods.

- 2. State the general procedure to avail credit under CENVAT. 12½
- 3. Explain the features of Service Tax. 12½
- 4. Explain the provisions related with registration under VAT. 12½
- 5. What is VAT ? Explain the different methods of computation of Value Added Tax (VAT). 12½

**IV-UG-BBA (CC)-X (MIS)**

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 7½ × 4
  - a) Discuss the role of MIS in organizational structure.
  - b) What is transaction processing system and how does it support operational decision making ?
  - c) Write short notes on the following :
    - i) HIPPD
    - ii) Dialogue Design.
  - d) Draw a DFD for Library Management System of your Organization.

[ 2 ]

- e) Write short notes on the following :
- i) Hierarchical Charts
  - ii) System Security.
- f) Describe the necessity of information in the management of organizations.
- g) Why is the evaluation of MIS important ? Describe in detail various approaches for evaluating an MIS.
- h) Write short notes on the following :
- i) Database Design
  - ii) Integrated Systems.
2. What is MIS ? What are the various applications of MIS ? Explain with example. Explain why organizational study is mandatory for development of MIS ? 12½
3. Compare and contrast the types of files used in information systems. When is each type of file used ? 12½

[ 3 ]

4. i) What is MIS ? Discuss different classifications of MIS ? 5½
- ii) What is the importance of MIS ? Discuss the nature and scope of MIS. 7
5. Draw and explain the life cycle of Information System. 12½
6. What are the main organizational deficiencies in MIS planning and design ? Discuss with a case study. 12½
7. Write short notes on the following : 12½
- i) Coupling
  - ii) Cohesion
  - iii) Analysis of IS.
8. Discuss in details about the design procedures of Information System. 12½
9. What is meant by System ? Describe different types of systems used in MIS. 12½

[ 4 ]

Explain the needs of sales organisation. What are the principles of determining sales organisation ?

2. What is Sales Force Management ? Explain the planning for manpower-requirements and selection, Training and development. 13

OR

Write short note on : 6½ + 6½

- a) Motivation sales force  
b) Promotion policies.
3. What do you mean by control process ? Explain how the analysis of sales volume, costs and profitability affects the control process. 13

OR

How to evaluate the sales force performance ? Explain its objectives and objections.

**IV-PG-Com -XVII (FM/ASM)**

**2018**

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. Calculate the interest tax shield and value of Akshat Ltd. and Aarav Techno Ltd. in case their operating income (EBIT) is same i.e. ₹10,00,000. Akshat Techno Ltd. has 10% Debentures of ₹20,00,000. The cost of equity of Aarav Techno Ltd. is 15%. The rate of corporate tax is 40%. 14

OR

Describe the assumptions, equation and applications of Walter's model for the dividend theory. 14

2. Suman Ltd. sells goods at a gross profit of 25%. Ascertain the requirements of working capital of the entity. 13

[ 2 ]

*Additional Information :*

- i) Maintain a safety margin of 20%.
- ii) Cash to the extent of 40% of current liabilities is desired.
- iii) Work-in-progress is Nil.
- iv) Value finished goods at manufacturing costs. Stocks of raw materials and finished goods are kept at two months requirements.
- v) Sales at 3 months credit, ₹36,00,000
- vi) Materials consumed (suppliers credit is for 3 months), ₹12,00,000.
- vii) Wages (Lag in payment of half months), ₹5,00,000.
- viii) Manufacturing expenses outstanding at the end of the year ₹70,000, cash expenses are paid by entity in one month arrears.
- ix) Total administrative expenses (paid as above), ₹3,60,000.

[ 3 ]

- x) Sales expenses (paid quarterly in advance), ₹80,000.
- xi) Depreciation is a part of cost of production.

OR

What is the meaning of working capital ? Explain the methods of estimation of working capital requirement of a business entity. 13

3. What Cash Management ? What are the objectives of cash management ? Explain briefly various techniques of cash management. 13

OR

"Efficient cash management will aim at maximizing the cash inflows and slowing cash outflows". Comment.

### SECTION-B (ASM)

1. What do you mean by sales planning ? What are the process involved in sales planning ? What are the importance of sales planning for a modern business ? 14

OR

3. Briefly answer any *two* of the following : 8 × 2

- a) The causes of differences among Indian Peasants movement.
- b) Decline of students movement
- c) "Respect for and toleration of cultural diversity is the most essential need of a multicultural society". Examine.
- d) Negative impact of Globalization on Indian Polity and Society.

V-116-0.4



**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Discuss in brief the Trade Union movement in post-independence India and bring out the causes for its decline after liberalisation. 12

OR

Examine the new feminist movement in India. Analyse the trends.

2. Examine the factors that determine the continuity and change in political culture in India. 12

OR

Critically examine the impact of Globalisation on Indian society.

୩. ଯେ କୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଚିତ୍ରଣ ଲେଖ : ୪ + ୪

- କ) ଫୋନୀମ୍
- ଖ) ଅର୍ଦ୍ଧସ୍ଵର
- ଗ) ଧ୍ଵନିର ଦୀର୍ଘତା
- ଘ) ସଂଯୁକ୍ତ ସ୍ଵର ।

V-115 -0.4



2018

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

୧. ମାନସ୍ଵର କାହାକୁ କହନ୍ତି ? ଉଦାହରଣ କହ ଏହାର ପ୍ରକାରଭେଦ ଉଲ୍ଲେଖ କର । ୧୬

ଅଥବା

ଧ୍ଵନିର ଗୁଣ ପୃଷ୍ଠ ଭୂମିରେ ବଳାଘାତର ସ୍ଵରୂପ ପ୍ରକାଶ କର ।

୨ ନିମୋକ୍ତ ଗଦ୍ୟାଂଶଟିକୁ ଧ୍ଵନିମାତ୍ରିକ ପ୍ରତିଲିଖନ ଦ୍ଵାରା ଉପସ୍ଥାପନ କର ।

“ରାତ୍ରି କାଳରେ ଚନ୍ଦ୍ର ଉଜ୍ଜ୍ଵଳ ଦେଖାଯାଏ । ଚନ୍ଦ୍ର କ୍ରମେ କ୍ରମେ ବଦୁଥାଏ । ଯେଉଁଦିନ ସେ ସମ୍ପୂର୍ଣ୍ଣ ଗୋଲ ହୁଏ, ସେହିଦିନ ପୂର୍ଣ୍ଣିମା । ଯେଉଁଦିନ ଚନ୍ଦ୍ର ଏକାବେଳକେ ଦେଖାଯାଏ ନାହିଁ, ତାହାକୁ ଅମାବାସ୍ୟା କହନ୍ତି । ଚନ୍ଦ୍ରର ନିଜର ଆଲୁଅ ନାହିଁ । ଯେଉଁ ଆଲୁଅକୁ ଜ୍ୟୋତ୍ସ୍ନା ବୋଲାଯାଏ, ତାହା ଚନ୍ଦ୍ର ସୂର୍ଯ୍ୟଠାରୁ ପାଏ । ଚନ୍ଦ୍ର ପୃଥିବୀ ଅପେକ୍ଷା କ୍ଷୁଦ୍ର । ଚନ୍ଦ୍ର ପୃଥିବୀର ଚାରିଆଡ଼େ ମାସକେ ଥରେ ବୁଲେ ।” ୧୬

ଅଥବା

ଆଇ. ପି. ଏ. ର ସଂକେତ ଗୁଡ଼ିକର ସୂଚନା ପ୍ରଦାନ କର ।

V-115

[Turn Over

ii) Prove that a Fermat number  $n = 2^{2^k} + 1$  is a prime if and only if there exists an integer  $a$  such that

$a^{2^{2^k-1}} \equiv -1 \pmod n$ . Prove that if  $n$  is a prime, then 50% of all  $a \in (z/nz)^*$  have this property. Also prove that  $a$  can always be chosen to be 3, or 5, or 7, if  $k > 1$ . 4

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

b) Factor 4087 using  $f(x) = x^2 + x + 1$  and  $x_0 = 2$ . 4

OR

c) Let  $n = pq$  be a product of two distinct primes. Set  $d = \text{g.c.d.}(p - 1, q - 1)$ . Prove that  $n$  is a pseudoprime to the base  $b$  if and only if  $b^d \equiv 1 \pmod n$ . In terms of  $d$ , how many bases are there to which  $n$  is a pseudoprime. 4

d) Let  $n = 2701$ . Use the  $\beta$ -numbers  $52^2, 53^2 \pmod n$  for a suitable factor-base  $\beta$  to factor 2701. 4

2018

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

*Symbols used have their usual meanings.*

1. a) If  $x$  is sufficiently large, then show that 4

$$\lim_{x \rightarrow \infty} \frac{\pi(x)}{x / \log x} = \lim_{x \rightarrow \infty} \frac{\psi(x)}{x} \geq \log 2$$

b) As  $x \rightarrow \infty$ , prove that 4

$$\sum_{n \leq x} \frac{\wedge(x)}{n} = \log x + O(1);$$

$$\sum_{p \leq x} \frac{\log p}{p} = \log x + O(1).$$

OR

c) Let  $\ell_1 = \lim_{x \rightarrow \infty} \frac{\pi(x)}{x / \log x}$ ,  $L_1 = \overline{\lim}_{x \rightarrow \infty} \frac{\pi(x)}{x / \log x}$

$$\ell_2 = \lim_{x \rightarrow \infty} \frac{\vartheta(x)}{x}, \quad L_2 = \overline{\lim}_{x \rightarrow \infty} \frac{\vartheta(x)}{x}$$

[ 2 ]

$$\ell_3 = \lim_{x \rightarrow \infty} \frac{\Psi(x)}{x}, \quad L_3 = \overline{\lim}_{x \rightarrow \infty} \frac{\Psi(x)}{x} \quad 4$$

Then prove that  $\ell_1 = \ell_2 = \ell_3$  and  $L_1 = L_2 = L_3$

- d) If  $n$  is a positive integer, then show that there exists a prime  $p$  such that  $n < p \leq 2n$ . 4
2. a) Prove that a closed, bounded, convex, symmetric set  $S$  in  $\mathbb{R}^n$  of measure  $V(S) \geq 2^n$ , contains a lattice point other than the origin. 8

OR

- b) Prove that a bounded, measurable, convex, symmetric set  $S$  in  $\mathbb{R}^n$ , of measure  $V > 2^n$ , contains a lattice point different from origin. 8
3. a) Find the inverse of 4  

$$A = \begin{pmatrix} 2 & 3 \\ 7 & 8 \end{pmatrix} \in M_2(\mathbb{Z}/26\mathbb{Z}).$$
- b) You intercept the ciphertext "OFJDFOHFXOL", which was enciphered using an affine transformation of single-letter plaintext units in the 27-letter alphabet (with blank = 26). You know that the first word is "I" ("I" followed by blank). Determine the enciphering key and read the message. 4

OR

[ 3 ]

- c) Using the Silver-Pohlig-Hellman algorithm, find the discrete log 153 to the base 2 in  $F_{181}^*$ . (2 is a generator of  $F_{181}^*$ .) 4
- d) Suppose that plaintext message units are single letters in the usual 26-letter alphabet with A-Z corresponding to 0-25. You receive the sequence of ciphertext message units 14, 25, 89, 3, 65, 24, 3, 49, 89, 24, 41, 25, 68, 41, 71. The public key is the sequence {57, 14, 3, 24, 8} and the secret key is  $b = 23$ ,  $m = 61$ . Use the above public key to send the message TENFOUR. 4
4. a) For all odd prime powers  $q = p^r$  upto 27 find the order and type of the group of  $F_q$ -points on the elliptic curves  $y^2 = x^3 - x$  and  $y^2 = x^3 - 1$  (in the later case when  $p \neq 3$ ). 8

OR

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

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

**2018**

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 in detail the concept of Economic analysis and write its impact and effect on the company in recent years. 13

OR

Write in details the application in technical analysis : 13

- a) Trends
- b) Indicator
- c) Indices.

2. How would you estimate the rate of return and standard deviation of port folio. State it with suitable illustration. 13

OR

[ 2 ]

Write notes on the following :  $6\frac{1}{2} \times 2$

- a) Marko-Witz risk-return optimisation.
- b) Port folio total risk single index model.

3. How would you value the following securities illustrate with imaginary figures.  $7 \times 2$

- a) Debentures
- b) Equity share.

OR

Explain in detail the Evaluation criteria and procedure of :  $7 \times 2$

- a) Risk adjusted measures of return
- b) Market timing.

### SECTION-B

*(IM)*

1. Discuss the complexities and issues those are found in international advertising and Public relation. 13

OR

[ 3 ]

Discuss the functions types of channels of distribution for international marketing and how would you select a suitable channel for foreign distribution. 13

2. Discuss in detail about the international marketing planning and the issues relating to the international marketing planning. 13

OR

Explain in detail about the international marketing operations. 13

3. Discuss the emerging issues and developments in international marketing in the context of international marketing services. 14

OR

Critically examine the following :  $7 \times 2$

- a) Information technology and international marketing
- b) Role of WTO.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answers any *four* of the following :  $4 \times 6$ 
  - a) Explain the principle of encoding, when the data is digital and signal is analog.
  - b) What is meant by switching? Describe different switching techniques in a network.
  - c) What is meant by addressing? Describe different addressing schemes available in communication networks.
  - d) Write short notes on the following :
    - i) Virtual LANs
    - ii) Checksum
    - iii) Protocols.

[ 2 ]

- e) Explain in details the architecture of IEEE 802.
  - f) Write short notes on the following :
    - i) ATM
    - ii) Block Coding
    - iii) Data Rate Limits.
  - g) Draw and explain the architecture of TC/IP Protocol.
  - h) Draw and explain the architecture of SONET.
2. What is mean by multiplexing ? Describe different types of multiplexing techniques in a network. 9
3. Why does one require Error Control for data transmission ? Describe CRC method of error detection in a communication link. 9
4. Write short notes on the following : 9
- i) Transmission Modes
  - ii) Framing
  - iii) Ethernet.

[ 3 ]

5. What is meant by Transmission Media ? Describe different types of guided and unguided Media available in the data Transmission. 9
6. Write short notes on the following :
  - i) Channelization
  - ii) Digital Subscriber Line
  - iii) Virtual Circuit Networks.
7. Draw and explain different layers of OSI. How is it differentiated from TCP/IP. 9
8. Describe different Transmissions Impairments available in the Data communication networks. 9
9. Describe different types of digital transmissions available in data communication with diagrams. 9

7. State and prove Merten's theorem. 12½

8. Show that the function

$$f(x) = \begin{cases} e^{-1/x}, & x \neq 0 \\ 0, & x = 0 \end{cases}, \text{ has}$$

derivatives of all orders at  $x \neq 0$  but it does not have a toylor expansion. 12½

V-167-0.5

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
which is compulsory

1. Answers on any **four** of the following: 7½×4

a) Let  $f(x) = \begin{cases} 1, & x \in \mathbb{Q} \cap [a, b] \\ 0, & x \in (\mathbb{R} - \mathbb{Q}) \cap [a, b] \end{cases}$

where prove that  $f$  is Ricmann integrable. If not then justify your answer.

b) Show that  $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{k}{k^2 + n^2} = \log \sqrt{2}$

c) Test the Convergence of the integrals

$$\int_0^1 \frac{\log x}{\sqrt{x}} dx \quad \text{and} \quad \int_0^{\infty} \frac{dx}{x^{4/5}}$$

[ 2 ]

d) Show that  $f_n(x) = n^2 x^n (1-x)$   $x \in [0,1]$  converges pointwise (but not uniformly) to a function which is continuous on  $[0, 1]$ .

e) Show that  $\tan^{-1} x = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots$

for  $-1 \leq x \leq 1$  and  $\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$

f) Obtain the Taylor's expansion of  $\frac{\sin x}{x}$  and determine the radius of convergence

g) Let  $x_n = \frac{(-1)^n}{n}$ . Then find  $\overline{\lim} x_n$  and  $\underline{\lim} x_n$ .

h) Test the conditional and absolute convergence

of the series :  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^{1/5}}$

[ 3 ]

2. Let  $f \in B[a, b]$ . Then  $f \in R[a, b]$  if and only if there exists  $\theta \in \mathbb{R}$  such that  $\lim_{\|P\| \rightarrow 0} s(f, P, t) = \theta$  and in that case  $\theta = \int_a^b f(x) dx$ . 12½

3. Show that the improper integral  $I = \int_1^{\infty} \frac{\sin t}{t^p} dt$  is convergent if  $p > 0$ . 12½

4. Show that  $\Gamma(p) = \int_0^{\infty} e^{-t} t^{p-1} dt$  converges for each  $p > 0$  and test the convergence of  $\int_{-\infty}^{\infty} e^{-12t} dt$ . 12½

5. Let  $(f_n)$  be a sequence of real or complex valued functions with domain  $E$ . The sequence  $(f_n)$  is uniformly convergent if and only if for  $\epsilon > 0$  we can find  $n_0 \in \mathbb{N}$ , depending on  $\epsilon$  but not  $x$  such that  $|f_m(x) - f_n(x)| < \epsilon \forall m, n > n_0$  and  $\forall x \in E$ . 12½

6. State and prove Weierstrass M-test. 12½

**IV-UG-Com (CC)-IX (CMA)**

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 7½ × 4
- a) Explain any five important advantages of Cost Accounting.
  - b) What do you mean by Bin Card ? Distinguish between a Bin card and a stores ledger.
  - c) A worker takes 80 hours to do a job for which time allowed is 100 hours. Wage rate is ₹2.50 per hour. Calculate the work cost of the job if payment of wages is made under Halsey Premium Plan.

[ 2 ]

*Additional Information :*

- i) Material cost ₹120
  - ii) Factory overheads 125% of wages.
- d) What is elementwise classification of overhead ?
- e) What are the main points of difference between job costing and process costing ?
- f) Discuss briefly the important advantages of Budgetary control.
- g) Give a list of possible causes of Material Usage Variance and Rate of pay variance and the persons responsible for such causes.
- h) What is Break-even-analysis ? Discuss the assumptions of the technique.
2. Distinguish between Cost Accounting and Financial Accounting. 12½

[ 3 ]

3. "The perpetual inventory system is an integral part of material control". Discuss this statement bringing out clearly the salient features and advantages of the system. 12½
4. The following balance were extracted from the books of a building contractor on 31st March 2016.
- Contract No. 786
- Materials issued to site ₹1,90,000
- Wages paid ₹1,20,000
- Wages outstanding ₹5,500
- Direct expenses ₹60,000
- Establishment charges ₹52,000
- Special plant installed at cost ₹2,00,000
- Cost of work not certified ₹25,000
- Value of special plant on 31.3.16 ₹1,70,000
- Material at site on 31.3.16 ₹21,000

[ 4 ]

Total contract price ₹12,00,000

Cash received ₹5,94,000

Cash received is 90% of work certified.

The work was commenced on 1.4.2015. Prepare contract A/c for the year ending 31.3.2016 in respect of above contract. 12½

5. What do you mean by Overhead ? Explain the various bases of apportionment of overhead to departments with illustrations as to the items of expenses. 12½
6. From the following data prepare a flexible budget for production of 40,000 units and 75,000 units distinctively showing variable cost and fixed cost as well as total cost. Also indicate element wise cost per unit. Budgeted output is 1,00,000 units and budgeted cost per unit is as follows : 12½

[ 5 ]

Direct material ₹95

Direct labour ₹50

Production overhead (variable) ₹40

Production overhead (fixed) ₹5

Administrated overhead (fixed) ₹5

Selling overhead (10% fixed) ₹10

Distribution overhead (10% fixed) ₹15

7. From the following data, calculate Labour Variance i.e.
- a) Labour Cost Variance
  - b) Rate of Pay Variance
  - c) Labour efficiency Variance (d) Labour Mix Variance.

The budgeted labour force for producing product A is :

[ 6 ]

20 Semi-Skilled Workers @ ₹0.75 per hour for 50 hours.

10 Skilled Workers @ ₹1.25 per hour for 50 hours.

The actual labour force employed is :

22 Semi-Skilled Workers @ ₹0.80 per hour for 50 hours, 8 Skilled Workers @ ₹1.20 per hour for 50 hours. 12½

8. Following are the data relating to Essar Ltd. for the year ending 31st March 2016 : 12½

Variable Cost	₹6,00,00
Fixed Cost	₹3,00,000
Net Profit	₹1,00,000
Total Sales	<u>₹10,00,000</u>

Find out :

- a) Break-even-point
- b) P/V ratio

[ 7 ]

c) Margin of safety ratio

d) Sales required to earn a profit of ₹1,50,000.

9. Explain the procedure of preparing a cash flow statement. 12½

V-168-3

□□

3. Describe the morphology of a Brachiopoda shell with diagram. 9
4. Describe the morphology of a Gastropoda shell with diagram. 9
5. Discuss the Evolution of Man. 9
6. Give a detail account of siwalik fauna and their significance. 9
7. Describe the morphology of Foraminifera with sketches. 9
8. Give a detail account of Extinction of Dinosaurus. 9
9. Describe the morphology of cephalopoda with neat sketches. 9

V-166-0.3

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answers on any *four* of the following : 6 × 4
  - a) Condition of Fossilisation
  - b) Cornea Structure
  - c) Geological History of Trilobite
  - d) Gondwana Flora
  - e) Morphology of Graptolite
  - f) Cephalon
  - g) Evolution of Pelecypoda
  - h) Regularia and Irregularia Echinoidea.
2. Give an account of the modes of preservation of fossils. 9

V-166

[Turn Over

- h) How does Mahasweta Devi present Dopti as a symbol of retaliation ?
2. Write a note on confessional mode in the poetry of plath and D Souza. 12½
3. Describe and analyse the character of Bertha in Katherine Mansfield's Bliss". 12½
4. How does Alice Walker show the power of women solidarity in The color Purple ? 12½
5. Mahasweta Devi's Draupadi is an attempt to give voice to oppressed gendered subaltern. 12½
6. How in death presented in Dickinson's "Because I could not stop for Death....". 12½
7. "My life is full of joy.... . I can scarcely contain the joy and keep it to myself" says Ramabai Ranads. Discuss her life in the light of above statement. 12½
8. Rash Sundari's Amar Jiban stands at the confluence of two orders—of patriarchy and of women's power—Discuss. 12½
9. Write a short essay on the confessional mode in Women's writing after your study of the selected texts. 12½

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short answers on any *four* of the following : 4 × 7½
- a) What is the role that patriarchy plays in sexual relations ?
- b) Role in integral to gender studies in Feminist studies—Discuss in brief.
- c) Bring out the main features of confessional writing.
- d) Why is Lady Lazarus often referred to as a "holocanst poem" ?
- e) "I wish I could be a Wise Woman smiling endlessly"— What does D Souza mean in the lines.
- f) What does the Color Purple symbolise ?
- g) What is the paradox created by the title and theme of 'Bliss'

2. Examine the importance of the memoirs and travelogues for study of Mughal India. 12½
3. Write in brief the basic principles of the Imperial Culture of Mughal rule. 12½
4. Illustrate the causes and results of the war of succession fought during Shah Jahan's time. 12½
5. Explain in detail the religious policy of Aurangzeb. 12½
6. Examine the causes of agrarian and jagir crisis in Mughal India. 12½
7. Trace the development of Painting as an art form during Mughal Period. 12½
8. Give an account of the Deccan Policy of Aurangzeb. 12½
9. Review the growth of markets and urban centres in Mughal Age. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short notes on any *four* of the following :  
7½ × 4
  - a) Vernacular Literary Tradition as sources.
  - b) Tujuk-i-Jahangir.
  - c) The Junta.
  - d) Features of Mansabdari System.
  - e) North West frontier Policy of Aurangzeb.
  - f) Revolts of the Sikhs.
  - g) Rise of Maratha.
  - h) Oceanic Trade during Mughal Age.

2. What is Globalisation ? Discuss the historical background of the growth and development of globalisation. 12½
3. Discuss the causes of the fading territorial Sovereignty in the modern globalised World. 12½
4. Examine the significance of the Global Economy. 12½
5. Discuss the objectives and functions of International Monetary Fund. 12½
6. Define Migration and discuss the major issues related with global migration. 12½
7. Discuss the role of NGOs in the global social movements. 12½
8. Define Climate Change and explain causes of the climate change. 12½
9. Describe the features of the Global Conventions concerning Environmental Protection-1975. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 7½ × 4
  - a) Explain the features of Globalisation.
  - b) Discuss the debate on Sovereignty and territory.
  - c) Describe the background of Global Economy.
  - d) Examine the objectives and goals of World Bank.
  - e) Examine the influence of globalisation on the global culture.
  - f) Define Social Movement and discuss the theories of global social movement.
  - g) Explain the features of the Rio Earth Summit-1992.
  - h) What is Human Security ? Explain the principles of human security.

2. Explain the principle of maximum social advantage. 12½
3. Examine the causes of rapid growth of public expenditure in the modern states. 12½
4. Explain the characteristics of a good tax system. 12½
5. Discuss about various kinds of budgets. 12½
6. Discuss the benefit and ability to pay approaches of taxation. Is it possible to observe this principle always ? 12½
7. Distinguish between internal and external Public debt. In your opinion which one is more burdensome ? 12½
8. State and explain the various methods of redemption of public debt ? 12½
9. How does the growth of public debt affect production, distribution and level of national income ? 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short notes on any *four* of the following :  
4 × 7½
  - a) Scope of Public Finance.
  - b) Market failure
  - c) Classification of Public expenditure
  - d) Division of tax burden.
  - e) Classification of taxes.
  - f) Tax revenue of Central Government.
  - g) Balanced budget Multiplier.
  - h) Sources of Public debt
  - i) Tax Versus debt.

3. Is Soul immortal ? Discuss with reference to Bhagabatgita. 12½
4. Explain different kinds of Karma in the lines of Bhagabatgita. 12½
5. How Sakāma Karma is different from Niskāma Karma ? Discuss. 12½
6. How Sattva is different from tamas ? Explain. 12½
7. Critically examine the nature of Uttama Purusa. 12½
8. Expand the meaning of the following : 12½  
 Karmaneva hi Sansiddimasthita  
 Janakadayan  
 Lokasangraha Mevapi, Sampasyah  
 Kartmarhasi  
 OR  
 Karmanye Vadhikaraste  
 Ma Phalesu Kadacana  
 Makarma Phala heturbhurma  
 te Sangostva Karmani.

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short notes on any *four* of the following concepts of Bhagabatgita. 7½ × 4
- Trigunas.
  - Akarma and Vikarma.
  - Sāncita Karma and Prarabdha Karma.
  - Svadharmā.
  - Nirvana.
  - Rajasika Sukha.
  - Pravrtti and Nirvtti.
  - Uttam Purusa.
2. Define and discuss the concept of Karma-Yoga according to Bhagabatgita. 12½

2. Define family disorganisation and discuss its effects on Indian Society. 12½
3. Define social disorganisation and discuss its causes. 12½
4. Examine Durkheim's sociological analysis of the theory of deviant behaviour. 12½
5. Define juvenile delinquency and discuss its causes. 12½
6. Analyse the causes of unemployment in India. 12½
7. Critically discuss the retributive theory of punishment. 12½
8. Discuss the effects of domestic violence in India. 12½
9. Critically analyse sexual violence as a major problem of social deviation in India. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer any *four* of the following : 7½ × 4
  - a) Briefly discuss the consequences of social disorganisation.
  - b) Write a brief note on personality disorganisation.
  - c) Discuss the relevance of delinquent sub-culture theory.
  - d) Discuss the sociological definition of crime.
  - e) Discuss briefly remedial measures of poverty.
  - f) Discuss the consequences of unemployment problem in India.
  - g) Discuss briefly the causes of indebtedness in the Indian context.
  - h) Suggest measures to control sexual violence in India.

3. Discuss about critical evaluation of major approaches in research methods. 9
4. Explain mean and standard deviation through a set of data. 9
5. What is correlation ? Explain it with a suitable example. 9
6. Describe on privacy and confidentiality in research. 9
7. Narrate on preparing a text for submission and publication. 9
8. Give an account on issues of academic fraud and plagiarism. 9
9. Discuss briefly on critical evaluation of major approaches in research methods. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short notes on any *four* of the following : 6 × 4
  - a) Cultural relativism.
  - b) Maintenance of field diary and logbook.
  - c) Tools and techniques of data collection.
  - d) Genealogy
  - e) Conflicts of interest.
  - f) Plagiarism
  - g) Variance
  - h) Mode.
2. Give an account on etic and emic perspectives. 9

3. Give an account of the development of human geography. 9
4. Discuss the physical traits used for identification of races of mankind. 9
5. Write an essay on the origin of man. 9
6. Describe the oriental culture world. 9
7. Highlight the social life of Bhils. 9
8. Discuss major religions of the world. 9
9. Elaborate the socio-economic life of Todas. 9

V-180-0.3

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short notes on any *four* of the following : 6 × 4
  - a) Possibilism.
  - b) Nasal Index.
  - c) Proto-Austroloid
  - d) Marriage system of Bushmen.
  - e) Semang tribe.
  - f) Major Indian languages.
  - g) Brahmins.
  - h) Social Life of Gonda.
2. Discuss the deterministic approach in man-environment relationship. 9

V-180

[Turn Over

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory1. Answer any *four* of the following :  $6 \times 4$ 

- a) Describe Moving Average Method of Measuring Trend.
- b) What is meant by a Time Series ? Indicate its importance in business and economics.
- c) Fit a straight line Trend by method of least square method to the given set of data.

Year	1975	1976	1977	1978	1979	1980	1981
Production	77	88	94	85	91	98	90

- d) Explain the Seasonal Variation of a Time Series data and mention on the various methods of measuring seasonal variation.

[ 2 ]

- e) Explain cyclic variation in a Time Series data and explain the various components of a business cycle.
- f) If  $L(p)$  and  $P(q)$  represent respectively Laspeyre's Price Index No. and Paasches Price Index No. then show that
- $$\frac{L(p)}{L(q)} = \frac{P(p)}{P(q)}$$
- g) Show that Fisher's Index No. satisfies both TRT and FRT.
- h) Mention the difference between Fixed Base Index and Chain Base Index.
2. Describe the nature of components of a Time Series. Explain the additive and multiplicative models of a Time Series stating clearly the assumptions and discuss their relative merits. 9
3. Fit a Parabolic Curve of second degree to the given set of data and estimate the value for 1984 9

Years	1978	1979	1980	1981	1982
Sales of Lakhs	10	12	13	10	8

[ 3 ]

4. Describe the Link Relative method of measuring the seasonal variation. 9
5. Describe the variate difference method for obtaining the variance of the random component in a Time Series. 9
6. What is an Index Number ? Describe briefly the problems that are involved in the construction of Index Number of Prices. 9
7. Define the following Index Number and mention their merits and demerits 9
- Laspeyre's Index Number
  - Paasches Index Number
  - Fisher's Index Number .
8. What is Cost of living Index Number ? Explain the various methods of construction of cost of living Index Number and mention their uses. 9

2. Explain the importance of a research proposal and describe the steps involved in writing a research proposal. 9
3. Describe different methods of acquiring knowledge. 9
4. Discuss different steps of experimental research. 9
5. What is a research problem ? Explain the consideration which should be kept in mind while identifying a research problem. 9
6. Discuss the significance and the principal elements of literature review. 9
7. Differentiate between parametric and non-parametric data. Explain with example how quantitative data are analyzed by non-parametric test. 9
8. Explain the importance of qualitative research in Education and describe any method of qualitative research. 9
9. What is an attitude scale ? Discuss the various steps of construction of attitude scale. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 6 × 4
  - a) Explain the nature of Science
  - b) Describe the characteristics of Historical studies in educational research.
  - c) Describe various assumptions of parametric test.
  - d) Discuss the significance of 'Summary' as a component of research report.
  - e) Explain various requirements to ensure the quality of research proposal.
  - f) Differentiate between structured and unstructured interview.
  - g) Describe different types of primary sources in data collection.
  - h) Explain the importance of hypothesis.

2. Discuss various principles of tests construction. 9
3. Define validity. Discuss different types of validity. 9
4. Discuss different individual, group and performance tests with examples. 9
5. How general abilities of individuals can be assessed ? 9
6. What are the self-report inventories ? Discuss the limitations of these inventories. 9
7. Discuss different types of non-projective tests with examples. 9
8. Write short notes on any *two* of the following : 9
  - a) Computer Assessment
  - b) Interpersonal interaction
  - c) Parameters of Assessment
  - d) Item Analysis
  - e) Development of norms.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 6 × 4
  - a) Define assessment. Discuss the scope of human assessment with examples.
  - b) Discuss the basic facts about psychological assessment.
  - c) What do you mean by standardization ? How can a test be standardized ?
  - d) Define reliability. Briefly discuss any two types of reliability.
  - e) Point out the limitations of traditional tests with examples.
  - f) Discuss various methods of scaling.
  - g) Point out the limitations of projective tests for assessing personality.
  - h) Distinguish between verbal and nonverbal tests.

**Group-B**

5. Write down different steps to create a chart in MS-Excel. Discuss different types of charts available in Excel with diagrams. 12½
6. a) How will you insert horizontal page break and vertical page break while printing a worksheet in EXCEL ? Write different steps to navigate worksheet. 8
- b) How text and graphics objects are animated in a slide ? Write all the steps. 4½
7. a) 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
- b) How can you insert a graphic image in to a slide ? Write down the steps. 4½
8. Write short notes on the following : 12½
- Layout
  - Functions in Excel
  - Query Design
  - Handouts.

**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer any *two* questions from Group-A and any *two* from Group-B**Group-A**

- a) Write down the different steps to design a Report. Give an example. 5

b) What is SQL ? 2½
- a) What is meant by workbook ? Write different steps to create a workbook. Write the steps involved to save and Protect workbook. 5

b) What is slide transition ? 2½
- a) Write down the different steps to create a table in MS-Access. 4

b) Write down the different steps to insert tables and charts in a slide. 3½
- Discuss different database models available in MS-Access. 7½

- b) Using the h-parameters, obtain expressions for its current gain, input resistance, voltage gain and output resistance. 2+2+2+2
7. a) The frequency of a Hartley oscillator is to vary from 60KHz to 120KHz. The tuning capacitor can be changed from 100pF to 400pF. The transistor employed in the circuit has  $h_{fe} = 90$  and  $\Delta h_c = 0.2$ . Find the values of inductances, neglecting mutual inductance between them. 5
- b) A certain Colpitts oscillator uses a tank circuit with  $L = 20\text{mH}$ ,  $C_1 = 200\text{ pF}$  and  $C_2 = 300\text{pF}$ . What is the frequency of Oscillation ? 4
8. Describe the use of an operational amplifier as
- a) Differentiator 3
- b) Integrator 3
- c) Logarithmic amplifier. 3

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following :
- a) Write down the equation for characteristics of PN-junction diode (defining each term). What is reverse saturation current and what are the origins of it ? 2+1+3
- b) Write notes on Avalanche breakdown and Zener breakdown. 3 + 3
- c) A transistor having  $\alpha = 0.975$  and reverse saturation current  $I_{co} = 10\mu\text{A}$ , is operated in CE configuration. What is  $\beta$  for this configuration ? If the base current is  $250\mu\text{A}$ , calculate the emitter current and collector current. 2+2+2
- d) Draw the circuit diagram and output characteristics of a transistor in the common-emitter mode. Explain the nature of the curves qualitatively. 2+2+2

[ 2 ]

- e) What are the fundamental difference among class A, class B and class C amplifiers ? Define ideal voltage amplifier and ideal current amplifier. 3+3
- f) Why are CC and CB amplifiers not suitable for cascading ? What are the factors which make a CE amplifier suitable for cascade connection ? What is a coupling network in connection with a multistage amplifier ? 2+2+2
- g) What is Barkhausen criterion ? State the basic conditions for oscillations in a feedback amplifier. What are the primary requirements to obtain steady oscillations at a fixed frequency ? 2+2+2
- h) What are the characteristics of an ideal OPAMP ? Describe the use of an OPAMP as an adder. 3 + 3
2. a) The reverse saturation current at 300K of a PN-junction Ge diode is  $5\mu\text{A}$ . Find the voltage to be applied across the junction to obtain a forward current of 50 mA ? 3

[ 3 ]

- b) Explain the working principles of Light Emitting diode and solar cell. 3 + 3
3. Explain the operation of a bridge rectifier with the help of a circuit diagram. State its advantages and disadvantages when compared with a full-wave rectifier. 5+2+2
4. Derive the expressions for the voltage gain of an RC-coupled amplifier in the mid and low frequency ranges. 9
5. a) Explain the current amplification factors  $\alpha$  and  $\beta$  for CB and CE configurations, respectively. 2
- b) Obtain a relation between  $\alpha$  and  $\beta$ . 3
- c) Explain the phenomenon of punch-through in a transistor. 4
6. a) Draw the circuit diagram of a small-signal single-stage low frequency transistor amplifier in the CE mode. 1

5. a) What is quinhydrone electrode ? How is the pH of a solution determined by using this electrode ? 1+5  
 b) Derive Nernst equation. 3
6. a) Calculate the standard e.m.f. of the cell, Fe/Fe<sup>2+</sup> || Cu<sup>2+</sup> / Cu and write down the cell equation.  
 (Given that, E<sup>0</sup> Cu/Cu<sup>2+</sup> = - 0.34V and E<sup>0</sup> Fe/Fe<sup>2+</sup> = - 0.44V ). 4  
 b) Describe the construction of a standard hydrogen electrode. How is the electrode potential of Zn/Zn<sup>2+</sup> electrode determined ? 2 + 3
7. Derive an expression to calculate the emf of a cell when the concentration of reactants and products are known. 9
8. Write notes on the following : 3 × 2  
 a) i) Induced dipole-moment  
 ii) Dipolemoment in polyatomic molecules.  
 b) Discuss one method for measurement of dipolemoment. 3

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer any *four* of the following :
- a) Briefly describe Hittorf's method for determination of transport number of Ag<sup>+</sup> and NO<sub>3</sub><sup>-</sup> in AgNO<sub>3</sub> solution. 6
- b) Explain solubility and solubility product. Derive the relation between them. 3 + 3
- c) Define reversible electrode. Write the principle in which Galvanic cell works. Give the electrode reactions. 2+2+2
- d) Explain the term activity co-efficient. How can you determine activity co-efficient of an electrolyte from e.m.f. measurement ? 2 + 4

[ 2 ]

- e) How is standard electrode potential of an electrode measured using 6
- standard hydrogen electrode
  - Calomel electrode, as reference electrode ?  
Explain with suitable example.
- f) i) Devise an electrochemical cell in which the net reaction is : 4  
$$\text{H}_2(\text{g}) + 2\text{AgI}(\text{s}) \rightleftharpoons 2\text{Ag}(\text{s}) + 2\text{H}^+ + 2\text{I}^-$$
- Why KCl is not used in the salt bridge in case of Cu–Ag cell ? 2
- g) Define and explain dipole moment with an example. Write its units. How is it represented ? 2+1+1+2
- h) i) Derive Clausius-Mosotti equation. 4
- Explain why  $\text{CO}_2$  molecule has zero dipole moment while  $\text{H}_2\text{O}$  molecule has a net dipole moment value. 2
2. a) Discuss conductometric titrations of a weak acid and a strong base. 3

[ 3 ]

- b) A solution containing 10.09g  $\text{CuSO}_4$  in 189.9g of water was electrolysed. After electrolysis 275.4g of the solution around the anode was found to contain 15.4 g of  $\text{CuSO}_4$ , 3.096 g of silver was deposited in a coulometer placed in series. Calculate the Hittorf's numbers of  $\text{Cu}^{2+}$  and  $\text{SO}_4^{2-}$  ions. 4
- c) What is meant by ionic product of water ? 2
3. a) Explain the term degree of hydrolysis. 2
- Discuss the titration curves obtained in the conductometric titration of  $\text{AgNO}_3$  with KCl. 3
  - Discuss : 2 + 2
    - Debye-Falkenhagen effect
    - Wien effect.
4. a) Explain different types of reversible electrodes with electrode reactions. 4
- How is solubility product of a sparingly soluble salt determined by e.m.f. measurement ? 5

4. Briefly discuss Bentham and Hooker's system of classification along with its merits and demerits. 9
5. Discuss one phylogenetic system of classification you have studied. 9
6. Describe the principle and rule of Botanical nomenclature. 9
7. Briefly describe APG(III) classification. 9
8. What do you mean by operational taxonomic units and their relevance to biosystematics. 9
9. Discuss Cronquist's system of classification. 9

V-187-0.6

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write notes on *four* of the following : 6 × 4
  - a) Virtual herbarium
  - b) Taxonomic hierarchy
  - c) Contribution of Linnaeus
  - d) Coevolution
  - e) Phylogenetic tree
  - f) Principles of priority
  - g) Typification
  - h) Monophyly.
2. Discuss different aspects of Biosystematics. 9
3. Describe the concept of Taxa with regard to family, Genus and species. 9

V-187

[Turn Over

3. Describe the phenomenon of Linkage by giving suitable example. 9
4. Describe and illustrate how Deletion, Inversion and Translocation occur in nature. 9
5. What is Sex determination ? Describe various examples of Chromosomal Mechanism of Sex Determination. 9
6. Describe the extra nuclear inheritance by mitochondria. 9
7. Give an account of Sex Linked inheritance through Sex limited genes and Sex influenced genes. 9
8. Describe the difference between Dominance and Epistasis State the different kinds of Epistatic Interaction. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write notes on *four* of the following : 6 × 4
  - a) Sex determination in Drosophila.
  - b) Genic Balance mechanism.
  - c) Transgressive variation.
  - d) Pleio tropy.
  - e) Extra nuclear inheritance by Mitochondria.
  - f) Two factor and three factor crosses.
  - g) Molecular basis of mutation.
  - h) Incomplete Dominance.
2. Explain Mendel's Laws of Dominance and Segregation with suitable example. 9

9 Write short notes on the following : 9

- i) BSP Trees
- ii) Ray-Casting
- iii) Hierarchical Modeling.

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
which is compulsory

1. Answers any **four** of the following : 4 × 6

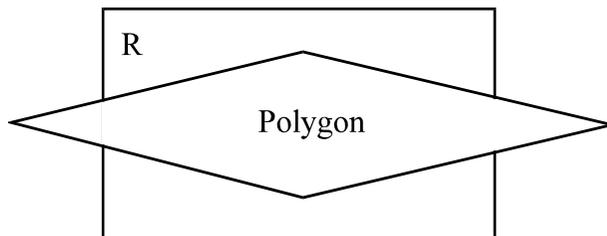
- a) Translate a square ABCD with the coordinates A(1, 1), B(5, 1), C(5, 5), D(1, 5) by 2-units in x-direction and 3-units in y-direction.
- b) Write short notes on the following :
  - i) Composite Transformation
  - ii) Components of Computer Graphics
  - iii) Graphical Input Devices.
- c) What is meant by Animation ? Discuss various types of Animations
- d) Discuss the Z-buffer method for visible surface detection.

V-189-0.5



[ 2 ]

- e) Write short notes on the following :
- i) Orthogonal Vs. Oblique Projection
  - ii) Bezier Vs. B-Spline Curves
  - iii) Line Vs. Polygon Clipping.
- f) What is mean by Illumination Models ? Describe any two Illumination Models.
- g) Describe different Polygon-Rendering Methods.
- h) What is mean by Computer Graphics ? Discuss the working principle of raster scan system.
2. Write down the Bresenham's circle draw algorithm. Draw a circle of radius 6 using this algorithm. 9
3. Write down the Sutherland Hudgeman polygon clipping Algorithm. Clip the polygon against the window R by using this algorithm. 9



[ 3 ]

4. Explain with examples control points, Blending function used in Bezier curve. Describe the procedure for drawing the Bezier curve passing through four control points. 9
5. Distinguish between parallel and perspective projections. Develop the matrix transformation for perspective projection. 9
6. Differentiate between Geometric and Coordinate Transformation ? Discuss the Translation and Scaling transformations in 3D. Justify the use of homogeneous Co-ordinate system in this representation. 9
7. Write short notes on the following : 9
- i) Antialiasing
  - ii) Visible surface detection methods
  - iii) Dithering Techniques.
8. Distinguish between Clipping and Zooming. Write and explain the Cohen-Sutherland two dimensional line clipping algorithm. 9

6. a) State and prove Rank-Nullity theorem.  $2+6\frac{1}{2}$   
 b) Let a linear transformation  $T : V_2 \rightarrow V_3$  be defined by  $T(x_1, x_2) = (x_1 + x_2, 2x_1 - x_2, 7x_2)$ . Let  $B_1 = \{e_1, e_2\}$  and  $B_2 = \{f_1, f_2, f_3\}$  be the standard bases of  $V_2$  and  $V_3$  respectively. Determine the matrix  $(T : B_1, B_2)$ .  $4$

7. a) Reduce the matrix

$$\begin{bmatrix} 2 & -3 & 1 & -1 \\ 3 & 0 & 1 & 6 \\ 1 & 2 & -2 & -1 \end{bmatrix}$$

to row reduced echelon form.  $6$

- b) Extend the set  $\{(3, -1, 2)\}$  to two different bases for  $V_3$ .  $6\frac{1}{2}$

8. Reduce the matrix

$$A = \begin{bmatrix} 1 & 2 & -2 \\ 2 & 1 & 2 \\ -2 & 2 & 1 \end{bmatrix}$$

to the diagonal form hence reduce the quadric  $x^2 + y^2 + z^2 + 4yz - 4zx + 4xy = 27$  to its principal axes.  $8 + 4\frac{1}{2}$

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory

1. Answer any **four** of the following :  $7\frac{1}{2} \times 4$

- a) Define integral domain. Prove that any field is an integral domain.  
 b) Define left ideal of a ring. For  $a \in R$ , let  $Ra = \{xa \mid x \in R\}$ . Prove that  $Ra$  is a left ideal of  $R$ .  
 c) Define span of a set. Let  $W$  be the set of all vector of the form

$$\begin{bmatrix} s + 3t \\ s - t \\ 2s - t \\ 4t \end{bmatrix}$$

Show that  $W$  is a subspace of  $\mathbb{R}^4$ .

- d) Define Basis. Prove that the set  $\{(1, 1, 0)\}, \{(1, 0, 1), (0, 1, 1)\}$  is a basis for  $v_3$ .

[ 2 ]

e) Define linear transformation. Prove that  $T: v_3 \rightarrow v_2$  which is defined by  $T(x_1, x_2, x_3) = (x_1 - x_2, x_1 + x_3)$  is linear.

f) Let  $U$  be a vector space of dimension  $n$  and  $T: U \rightarrow V$  be a linear and onto map. Prove that  $T$  is one-one iff  $\dim v = n$ .

g) Find Kernel, rank and nullity of the following matrix

$$A = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 2 & 0 \\ 1 & -1 & -1 \end{bmatrix}$$

h) Determine the eigen values and the corresponding eigen spaces for the following matrix.

$$A = \begin{bmatrix} 3 & 1 \\ 6 & 2 \end{bmatrix}$$

2. a) Define characteristic of an integral domain. Prove that the characteristics of an integral domain is either 0 or a prime number. 2 + 6

b) Prove that a finite integral domain is a field. 4½

[ 3 ]

3. a) If  $\phi$  is a homomorphism of  $R$  into  $R^1$  with Kernel  $I(\phi)$ , then 8

i)  $I(\phi)$  is a subgroup of  $R$  under addition

ii) If  $a \in I(\phi)$  and  $r \in R$  then  $ar$  and  $ra$  are in  $I(\phi)$ .

b) The homomorphism  $\phi$  of  $R$  into  $R'$  is an isomorphism iff  $I(\phi) = (0)$  4½

4. a) Define field. Let  $R$  be a commutative ring with unit element whose only ideals are  $(0)$  and  $R$  itself. Then  $R$  is a field. 2+6½

b) If  $F$  is a field, Prove that its only ideals are  $(0)$  and  $F$  itself. 4

5. a) Define vector space. If  $U$  and  $W$  are two subspaces of a vector space  $V$ , prove that  $U + W = U$  iff  $W \subset U$ . 2 + 4

b) Define linearly dependent of a set. If a set is L.D, then prove that any super set of it is also L.D. 2+4½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 7½×4
  - a) What is meant by Workbook ? Write different steps to create a workbook. Write the steps involved to save and protect workbook.
  - b) How can you create a new template based on an existing template ? Write down different steps.
  - c) Write down different steps to edit Database using Forms.
  - d)
    - i) How to copy a slide from one presentation to another ? write all steps.
    - ii) What is Slide show.
  - e) Discuss the concept of "Mail Merge" with an example.

[ 2 ]

- f) Write down different characteristics of Word Processing. Write down different steps to insert Header and Footer in a word document.
  - g) Discuss the step to enter a formula in Excel worksheet. Differentiate between relative and absolute cell reference.
  - h) Discuss different types of Financial and Logical functions in MS-Excel with examples.
2. Discuss different types of charts available in MS-Excel. Write different steps to insert a chart in excel sheet. 12½
3. Name the different task performed by the computerised inventory control system. What are the different types of reports used for inventory stores ? Describe briefly the method of accounting invoices. 12½
4. What is a form ? Write steps to create a form using the form wizard. How will you run an existing form ? Explain function of each button of the form's control panel in a table form. 12½

[ 3 ]

5. What is report ? Write steps to create a report using the report wizard. Explain the steps required to do Group /Total in a report. Write steps to print a report. 12½
6. a) How can you insert a graphic image in to a word document ? 6
- b) Write the steps involved to go to a particular page directly in a multipage document ? 6½
7. Differentiate between Spreadsheet and Worksheet. Create a spreadsheet for payroll statements. 12½
8. Write short notes on the following : 12½
- i) Report Generator
  - ii) Handling operators in formula
  - iii) Page Formatting.
9. Discuss different Spreadsheet functions with examples. 12½

2. Describe the code of stratigraphic classification and nomenclature. 9
3. Give a stratigraphic account of Dharwar supergroup of rocks. 9
4. Describe the stratigraphy of Vindhyan supergroup of rocks. 9
5. Describe the stratigraphy of Aravalli supergroup of rocks. 9
6. Give a stratigraphic account of Odisha. 9
7. Give a stratigraphic account of Triassic of Spiti. 9
8. Give a stratigraphic account of cretaceous of Trichinopoly. 9
9. Discuss the Principle of stratigraphy. 9

V-190-0.3

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
which is compulsory

1. Write short answer on any **four** of the following : 6 × 4
  - a) Explain Lithostratigraphic Cor-relation.
  - b) Write note on Tectonic Elements of Peninsular India.
  - c) Two-fold classification of Gondwana supergroup.
  - d) Give a stratigraphic account of Delhi supergroup.
  - e) Not on Iron-ore-Group.
  - f) Economic minerals found in Cuddapah supergroup of rocks.
  - g) Stratigraphy of Tertiary of Assam.
  - h) Age and Economic Importance of Deccan Traps.

2. Discuss meaning and characteristics of society. 12½
3. Write a note on various school activities and resources. 12½
4. What do you mean by learner-friendly school environment ? How can it be ensured ? 12½
5. Discuss characteristics and types of culture. 12½
6. What is social change ? Discuss the role of education in social change. 12½
7. What do you mean by globalisation ? Describe the role of education in making society globalised ? 12½
8. Describe the role of education in accelerating socio-economic development of a nation. 12½
9. Define sustainable development. Discuss the role of education in it.

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write notes on *four* of the following : 4×7½
  - a) State important features of an urban society.
  - b) How education and society are interrelated ?
  - c) What attributes do make a school formal agency ?
  - d) How can human resources be tapped for betterment of a school ?
  - e) How school-community interface be strengthened ?
  - f) Explain the concept of 'cultural lag'.
  - g) What are the various aspects of socialisation ?
  - h) Explain the concept of inclusive development.

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**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
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  - c) What attributes do make a school formal agency ?
  - d) How can human resources be tapped for betterment of a school ?
  - e) How school-community interface be strengthened ?
  - f) Explain the concept of 'cultural lag'.
  - g) What are the various aspects of socialisation ?
  - h) Explain the concept of inclusive development.

[ 2 ]

II-PG-Phy -VIII

2. a) Deduce the relevant expressions for the power radiated by oscillating electric dipole and deduce its angular distribution. 15

OR

- b) Explain Rayleigh Scattering on the basis of theory of scattering of electromagnetic wave by bound electrons. 15
3. a) Prove the covariance of Maxwell's equation for electromagnetic field under Lorentz transformation. 10

OR

- b) How the electromagnetic energy and momentum can be expressed in a covariant form ? 4 + 4
- c) What is Maxwell's field tensor ? Discuss. 2

V-234-0.3



2018

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Solve Maxwell equations for electric and magnetic field using Green's function technique. 10
- b) Define Stokes parameters. Explain the significance of each of them. 5

OR

- c) For transverse electric waves propagating in a rectangular wave guide with perfectly conducting walls find 5 + 5
- i) The cut off frequency
- ii) The electric and magnetic field components for the dominant mode
- d) Discuss the invariance of Coulomb gauge. 5

V-234

[Turn Over

2. a) What is meant by an ideal differential amplifier? Draw the equivalent circuit of a differential amplifier and derive expressions for differential gain and common mode gain. Define common mode rejection ratio and find an expression for it. 12

OR

- b) State and prove de Morgan's theorem. 2 + 3  
 c) Convert binary 1011 to Grey code. 1  
 d) Determine the binary equivalent of the octals.  
 i) 3574  
 ii) 34.562. 2  
 e) Draw the circuit and discuss the operation of exclusive OR gate. Write down the truth table. 4
3. a) Deduce the expression for radiative electric field and magnetic field due to a dipole antenna. Calculate the power radiated from this antenna. 7 + 5

OR

- b) Discuss the principle of colour mixing. With a neat block diagram explain the TV transmission in a colour TV. 3 + 9

**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Draw the circuit and explain the working of a Wein Bridge Oscillator. Obtain an expression for its frequency. 9  
 b) Give a comparison between the mechanism in double resonator Klystron and reflex Klystron. 4  
 c) Mention the advantages of VTVM over a multimeter. 3

OR

- d) Discuss the principle, construction and the operation of a Diac. Give the necessary diagrams. Discuss the characteristic features. 6  
 e) Draw the schematic diagram of CRO and discuss the functions of different parts. Explain the mechanism and wave form display on a CRO screen. 10

2018

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Prove that Every group is isomorphic to a subgroup of  $A(S)$  for some appropriate  $S$ . 8

OR

- b) If  $G$  is an abelian group of order  $O(G)$ , and if  $p$  is a prime number, such that  $p^\alpha \mid O(G)$ ,  $p^{\alpha+1} \nmid O(G)$  then prove that  $G$  has a subgroup of order  $p^\alpha$ . 8

2. a) Let  $f(x) = a_0 + a_1x + a_2x^2 + \dots + a_nx^n$  be a polynomial with integer coefficients. Suppose that for some prime number  $p$ ,  $p \nmid a^n$ ,  $p \mid a_1, p \mid a_2, \dots$ ,  $p \mid a_0$ ,  $p^2 \nmid a_0$ . Then show that  $f(x)$  is irreducible over rationals. 8

OR

[ 2 ]

- b) If  $p$  is a prime number of the form  $4n + 1$ , then show that  $p = a^2 + b^2$  for some integers  $a, b$ . 8
3. a) If  $L$  is a finite extension of  $K$  and if  $K$  is a finite extension of  $F$ , then prove that  $L$  is a finite extension of  $F$ . Moreover,  $[L : F] = [L : K][K : F]$  8

OR

- b) If  $p(x)$  is a polynomial in  $F[x]$  of degree  $n \geq 1$  and is irreducible over  $F$ , then show that there is an extension  $E$  of  $F$ , such that  $[E : F] = n$ , in which  $p(x)$  has a root. 8
4. a) It is impossible, by straightedge and compass alone, to trisect  $60^\circ$ . Prove this. 8

OR

- b) Prove that the polynomial  $f(x) \in F[x]$  has a multiple root if and only if  $f(x)$  and  $f'(x)$  have a nontrivial (that is, of positive degree) common factor. 8

[ 3 ]

5. a) If  $K$  is a field and if  $\sigma_1, \dots, \sigma_n$  are distinct automorphisms of  $K$ , then show that it is impossible to find elements  $a_1, \dots, a_n$ , not all 0, in  $K$  such that  $a_1 \sigma_1(u) + a_2 \sigma_2(u) + \dots + a_n \sigma_n(u) = 0$  for all  $u \in K$ . 8

OR

- b) Let  $K$  be a normal extension of  $F$  and let  $H$  be a subgroup of  $G(K, F)$ ; let  $K_H = \{x \in K \mid \sigma(x) = x \text{ for all } \sigma \in H\}$  be the fixed field of  $H$ , then prove that 8
- i)  $[K : K_H] = O(H)$
- ii)  $H = G(K, K_H)$ .

V-235-0.4

□□

What do you mean by target costing ? Does target costing require that profitability be viewed on a period by period basis or on a long term basis ? Explain. 13

3. What do you understand by Management Reporting ? What are the essential requirements of a Good Report ? 13

OR

Explain general principles of reporting and illustrate the models of reporting. 13

V-236-0.8



**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. "Marginal costing is essentially a technique of cost analysis and cost presentation". Discuss the statement with reference to the application, merits and limitations of marginal costing. 14

OR

'XY' Ltd manufactures auto parts. The following costs are incurred for processing 1,00,000 units of a component :

Direct material cost	₹5 lakhs
Direct labour cost	₹8 lakhs
Variable factory overhead	₹6 lakhs
Fixed factory overhead	₹5 lakhs

[ 2 ]

The purchase price of the component is ₹22. The fixed overhead would continue to be incurred even when the component is bought from outside although there would be reduction to the extent of ₹2,00,000.

You are required to :

- i) Should the part be made or bought, considering that the present facility when released following a buying decision would remain idle ?
- ii) In case the released capacity can be rented out to another company for ₹1,50,000, what would be the decision ?

14

2. The following Balance Sheet are given :

<b>Liabilities</b>	<b>2016 (₹)</b>	<b>2017 (₹)</b>
Equity share capital	3,00,000	4,00,000
Redeemable Pref. capital	1,50,000	1,00,000
General Reserve	40,000	70,000
Profit and Loss Account	30,000	48,000
Proposed Dividend	42,000	50,000
Creditors	55,000	83,000
Bills payable	20,000	10,000
Provision for Taxation	40,000	50,000
	<u>6,77,000</u>	<u>8,17,000</u>

[ 3 ]

<b>Assets :</b>	<b>2016 (₹)</b>	<b>2017 (₹)</b>
Goodwill	1,15,000	90,000
Land and Building	2,00,000	1,70,000
Plant	80,000	2,00,000
Debtors	1,60,000	2,00,000
Stock	77,000	1,09,000
Bills Receivable	20,000	30,000
Cash in Hand	15,000	10,000
Cash at Bank	10,000	8,000
	<u>6,77,000</u>	<u>8,17,000</u>

*It is also given that :*

- a) Depreciation of ₹20,000 on land and building and ₹10,000 on plant has been charged in 2017.
- b) Interim dividend of ₹20,000 has been paid in 2017.
- c) Income tax ₹35,000 has been paid during 2017.

Prepare Cash Flow Statement for the year 2017. 13

OR

- c) Compactness implies limit point compactness, but not conversely. Prove this.
- d) Let  $f : X \rightarrow Y$  be continuous, where  $Y$  is an ordered set in the order topology. If  $X$  is compact, then show that there exist points  $c$  and  $d$  in  $X$  such that  $f(c) \leq f(x) \leq f(d)$  for every  $x \in X$ .
5. a) Prove that every compact Hausdorff space is normal.
- b) Let  $X$  be a topological space. Let one-point sets in  $X$  be closed. Prove that  $X$  is regular if and only if given a point  $x$  of  $X$  and a neighborhood  $U$  of  $x$ , there is a neighborhood  $V$  of  $x$  such that  $\overline{V} \subset U$ .

OR

- c) Prove that every well-ordered set  $X$  is normal in the order topology.
- d) Suppose that  $X$  has a countable basis. Then prove that every open covering of  $X$  contains a countable subcollection covering  $X$ .

**2018**

Full Marks - 40

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. a) Let  $X$  be a topological space. Suppose that  $\mathcal{C}$  is a collection of open sets of  $X$  such that for each  $x$  in  $X$  and each open set  $U$  of  $X$ , there is an element  $c$  of  $\mathcal{C}$  such that  $x \in C \subset U$ . Then prove that  $\mathcal{C}$  is a basis for the topology of  $X$ .
- b) If  $\mathcal{B}$  is a basis for the topology of  $X$ , and  $\mathcal{C}$  is a basis for the topology of  $Y$ , then the collection  $\mathcal{D} = \{B \times C \mid B \in \mathcal{B} \text{ and } c \in \mathcal{C}\}$  is a basis for the topology of  $X \times Y$ . Prove this.

OR

- c) Let  $X$  be a Hausdorff space ; Let  $A$  be a subset of  $X$ . Then prove that the point  $x$  is a limit point of  $A$  if and only if every neighborhood of  $x$  contains infinitely many points of  $A$ .

[ 2 ]

- d) Let  $A$  be a subset of the topological space  $X$ ; let  $A'$  be the set of all limit points of  $A$ . Then show that  $\bar{A} = A \cup A'$ .
2. a) Let  $X$  and  $Y$  be topological spaces. The map  $f : X \rightarrow Y$  is continuous if  $X$  can be written as the union of open sets  $U_\alpha$  such that  $f|U_\alpha$  is continuous for each  $\alpha$ . Prove this.
- b) Let  $f : A \rightarrow X \times Y$  be given by the equation  $f(a) = (f_1(a), f_2(a))$ . Then prove that  $f$  is continuous if and only if the functions  $f_1 : A \rightarrow X$  and  $f_2 : A \rightarrow Y$  are continuous.

OR

- c) If each space  $X_\alpha$  is a Hausdorff space, then show that  $\prod X_\alpha$  is a Hausdorff space in both the box and product topologies.
- d) Let  $f : A \rightarrow \prod_{\alpha \in J} X_\alpha$  be given by the equation  $f(a) = (f_\alpha(a))_{\alpha \in J}$ , where  $f_\alpha : A \rightarrow X_\alpha$  for each  $\alpha$ . Let  $\prod X_\alpha$  have the product topology. Then prove that the function  $f$  is continuous if and only if each function  $f_\alpha$  is continuous.

[ 3 ]

3. a) Prove that the union of a collection of connected sets that have a point in common is connected.
- b) If  $Y$  is a subspace of  $X$ , a separation of  $Y$  is a pair of disjoint nonempty sets  $A$  and  $B$  whose union is  $Y$ , neither of which contains a limit point of the other. Show that the space  $Y$  is connected if there exists no separation of  $Y$ .

OR

- c) Prove that the real line  $\mathbb{R}$  is connected and so is every interval and ray in  $\mathbb{R}$ .
- d) Prove that the space  $I \times I$  in the dictionary order topology is connected but not path connected.
4. a) Let  $Y$  be a subspace of  $X$ . Then Prove that  $Y$  is compact if and only if every covering of  $Y$  by sets open in  $X$  contains a finite subcollection covering  $Y$ .
- b) Prove that every closed interval in  $\mathbb{R}$  is compact.

OR

**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. What do you mean by Sampling ? Describe in brief the various methods of random sampling. 14

OR

- a) Write short notes Type I Errors and Type II Error. 6
- b) Two groups of 50 handicaps each were taken to study the association of blindness with deafness and the observations were tabulated as Under :

<i>Attributes</i>	<i>Blind</i>	<i>Not blind</i>	<i>Total</i>
Deaf	10	40	50
Non Deaf	30	20	50
Total	40	60	100

Using the  $\chi^2$  test at 5% level, verify the association of blindness with deafness. 8

[ 2 ]

2. a) Define correlation and explain the various methods of studying correlation. 8
- b) Determine the value of n, where r is 0.80 and its Probable Error is 0.025. 5

OR

- c) Explain in brief, the various methods of studying regression between any two variables. 8
- d) From the data given below compute the two regression coefficients and formulate the two regression equations :

$$\sum X = 510, \sum Y = 7140, \sum X^2 = 4150$$

$$\sum XY = 54900, \sum Y^2 = 740200, N = 102$$

Also determine the value of Y when X = 7. 5

3. a) State the different types of control chart and explain in brief the various types of control charts for variables. 8
- b) Write down the steps are to be taken for the Construction of Number of defectives per Unit Chart (C-Chart). 5

OR

[ 3 ]

- c) Using the constant  $A_1$ , determine the two control limits and hence, display the mean chart from the following data relating to a process control :

Population mean = 2.615

Population S.D = 0.015

Size of the sample = 9 8

- b) What do mean by Statistical Quality Control ? Write down its Advantages and limitations. 5

V-231-0.8



- b) The equation of heat conduction in a rod of length  $l$  is

$$\frac{\partial^2 v}{\partial x^2} = \frac{1}{k} \frac{\partial v}{\partial t}$$

If  $V = V_0 x$  when  $t = 0$  and  $\frac{\partial v}{\partial x} = 0$  when  $x = 0$  and also when  $x = l$  for all values of  $t(>0)$ , show that

$$V = \frac{1}{2} V_0 l - \frac{4 V_0 l}{\pi^2} \sum_{n=1}^{\infty} \frac{\exp\{-k(2n-1)^2 \pi^2 t / l^2\}}{(2n-1)^2} \cos \frac{(2n-1)\pi x}{l}.$$

V-239-0.4

**2018**

Full Marks - 40

Time - 3 Hours

The questions are of equal value

Answer *all* questions

1. a) Find the eigen values and eigen functions of the following Sturm-Liouville problem :

$$\frac{d}{dx} \left[ x \frac{dy}{dx} \right] + \frac{\lambda}{x} y = 0; \quad y(1) = 0, \quad y(e^\pi) = 0.$$

OR

- b) Solve the boundary value problem using the appropriate Green's function :

$$y'' = \sin \pi x; \quad y(0) + y(1) = 0; \quad y'(0) + y'(1) = 0.$$

2. a) Find the power series solution of the following initial value problem :

$$(x^2 + 2) y'' - xy' - 3y = 0; \quad y(0) = 2, \quad y'(0) = 3.$$

OR

V-239

[Turn Over

[ 2 ]

- b) Find the power series solution of the differential equation

$$X^2 y'' + xy' + \left( x^2 - \frac{1}{4} \right) y = 0.$$

3. a) Discuss the existence and uniqueness of a solution of the initial value problem

$$\frac{dy}{dx} = y^{1/3}, \quad y(0) = 0.$$

OR

- b) Compute the first four Picards approximations of the following initial value problem :

$$y' = \sin x + y^2, \quad y(0) = 0.$$

4. a) Find the steady temperature distribution  $u(x, y)$  in the uniform unit square

$$0 \leq x \leq 1 : 0 \leq y \leq 1 ;$$

When the edge  $y = 1$ , is maintained at the temperature  $x(1-x)$ , the other three edges being thermally insulated so that  $\frac{\partial u}{\partial n} = 0$  along them.

OR

[ 3 ]

- b) Show that the only solution of the two-dimensional Laplace equation depending only

$$\text{on } r = \sqrt{x^2 + y^2} \text{ is } u = c \log r + k.$$

5. a) A taut string of length  $\ell$  has its ends

$x = 0, x = \ell$  fixed. The point where  $x = \frac{1}{3}\ell$  is

drawn aside a small distance  $h$  and released at time  $t = 0$ . At any subsequent time  $t > 0$  the displacement  $y(x, t)$  of the string satisfies the one dimensional wave equation

$$\frac{\partial^2 y}{\partial x^2} = \frac{1}{c^2} \frac{\partial^2 y}{\partial t^2}$$

Determine  $y(x, t)$  at any time  $t > 0$ .

OR

3. Write short notes on any *two* of the following :  $8 \times 2$

- a) Civil Society and the State.
- b) Eco-feminism.
- c) Features of Political development, according to Lucial Pye.
- d) Globalization and Civil Society.

V-233-0.6



**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. Discuss the philosophical foundations of civil society. 12

OR

Briefly explain the dominant perspectives on feminism.

2. Evaluate the relationship between multi-culturalism and nation-building. 12

OR

Examine the views of Almond and Huntington on political development.

[ 2 ]

II-PG-Pol.SC -X

- c) Validity of experiments
- d) Qualitative Data.

**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

V-242-0.6



1. a) Explain the significance of experimental method in social research. 12

OR

- b) Discuss the utility and limitations of historical research.

2. a) Analyse various aspects of Report writing. 12

OR

- b) Discuss the various types of Research Reports.

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

- a) Importance of descriptive research
- b) Content Analysis

V-242

[Turn Over

2018

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) If  $R$  is a partial ordering relation on a set  $X$  and  $A \subseteq X$ , show that  $R \cap (A \times A)$  is a partial ordering relation on  $A$ . 8

OR

- b) Let  $A = \{a, b, c, d\}$  and  $P(A)$  its power set. Show that  $\langle P(A), \subseteq \rangle$  is a partially ordered set and draw the Hasse diagram. 8

2. a) Let  $\langle L, \leq \rangle$  be a lattice. Prove that for any  $a, b, c \in L$ , the following inequalities hold :

$$a \oplus (b * c) \leq (a \oplus b) * (a \oplus c)$$

$$a * (b \oplus c) \geq (a * b) \oplus (a * c) \quad 4$$

- b) Write the Boolean expression  $x_1 \oplus x_2$  in an equivalent sum-of-product canonical form in three variables  $x_1, x_2$  and  $x_3$ . 4

OR

[ 2 ]

- c) Show that in a lattice if  $a \leq b$  and  $c \leq d$ , then  $a * c \leq b * d$ . 4
- d) Obtain the values of the Boolean forms  $x_1 * (x_1^1 \oplus x_2)$  and  $x_1 \oplus (x_1 * x_2)$  over the ordered pairs of the two-element Boolean algebra. 4
3. a) Show that the function  $[x/2]$  which is equal to the greatest integer which is  $\leq x/2$  is primitive recursive. 4
- b) Let  $\lfloor \sqrt{x} \rfloor$  be the greatest integer  $\leq \sqrt{x}$ . Show that  $\lfloor \sqrt{x} \rfloor$  is primitive recursive. 4

OR

- c) Let  $D(x)$  denote "number of divisors of  $x$ ". Show that  $D(x)$  is primitive recursive. 4
- d) Show that if  $f(x, y)$  defines the remainder upon division of  $y$  by  $x$ , then it is a primitive recursive function. 4
4. a) Give a grammar which generates the language  $L(G) = \{a^n b^n c^n \mid n \geq 1\}$  and write a derivation for the string  $a^2 b^2 c^2$ . 4

[ 3 ]

- b) If  $a$  is an integer and  $m$  is a prime, then show that  $a^m \bmod m = a \bmod m$ . 4

OR

- c) Find the minimum distance of the given code  $\langle 1, 0, 0, 1 \rangle, \langle 0, 1, 0, 0 \rangle, \langle 1, 0, 0, 0 \rangle, \langle 1, 1, 1, 1 \rangle$ . 4
- d) Obtain a grammar which will generate the language  $L(G) = \{a^n b a^n \mid n \geq 1\}$ . 4
5. a) Design a finite-state acceptor that adds two integers using their binary expansions. 8

OR

- b) Find a Turing machine that recognizes the set  $\{0^n 1^n \mid n \geq 1\}$ . 8

3. Answer any *two* of the following :  $8 \times 2$

- a) Briefly explain the cultural impact of globalization.
- b) Is NPT, 1968 is discriminating ? Justify your answer.
- c) Throw some light on the Indo-Pak relations during Modi regime.
- d) What is the status of Indo-US Civil Nuclear cooperation Agreement ?

V-238-0.6



**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Make an assessment of the functioning of the United National and suggest reforms. 12

OR

- b) Examine the role of science and technology in international relations.

2. a) Elucidate the basic contours of India's foreign policy in the post-1991 period. Point out how continuity and change have been blended. 12

OR

- b) Evaluate India's approach to the growing menace of global terrorism.

b) In relation to marketing operations explain in detail its organising and controlling aspects.

3. a) Define Marketing. Discuss the social, ethical and legal aspects of Marketing. 13

OR

b) Write short-notes on the following :

i) Green Marketing

ii) Cyber Marketing.

V-240-0.8



**2018**

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *all* questions

1. a) Define Promotion-mix. Discuss the various elements of promotion-mix. Also explain the various factors affecting the choice of promotion tool. 14

OR

b) Define Advertising and Personal Selling. Explain various modes of advertising with their relative merits and demerits. Also give the difference between Advertising and Publicity.

2. a) Define Marketing Research. Give the detailed procedure to be followed for conducting marketing research. Also give the importance of marketing research. 13

OR

2. Explain the concept GDP, GNP and NNP at market price and factor cost. 12½
3. Discuss the expenditure method of measuring national income. 12½
4. Analyse the circular flow of income in a 3-sector economy. 12½
5. Describe the cash transactions approach of the quantity theory of money. 12½
6. What is Index number ? Describe how Index number is helpful in measuring the changes in the value of money. 12½
7. What is deflation ? What are the measures to control deflation ? 12½
8. Describe the principle of effective demand. 12½
9. Discuss the Investment Multiplier and point out its limitations. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer in short on any *four* of the following : 7½×4
  - a) Macro and Microeconomics.
  - b) Stock and Flow.
  - c) Personal Income and Personal disposable income
  - d) Functions of Money.
  - e) National Income and economic Welfare.
  - f) Inflation.
  - g) Consumption function.
  - h) Investment Function.

2. Describe the process of the Urban growth in North, Central and the Deccan. 12½
3. Define social stratification. Explain the role of Class and Varna in the Post-Vedic Indian society. 12½
4. "Chandragupta Maurya was the first Indian emperor of Ancient India". Comment. 12½
5. What is Varnashram. Explain the role of four ashrams in the four stages of life of Indians. 12½
6. Explain the original and philosophical characteristics of the Hinayana form of Buddhism. 12½
7. Describe the contributions of Mauryan art and architecture to Indian culture. 12½
8. Explain the features of Gupta Policy and administration. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write short notes on any *four* of the following : 7½×4
  - a) Trade and Trade routes during 300 B.CE to circa CE 300.
  - b) Role played by coinage in early Medieval Trade.
  - c) Urban settlement in early Medieval India.
  - d) Ashrams.
  - e) Philosophy of Mahayan Buddhism.
  - f) Develop of Tamil Literature in early Medieval India.
  - g) Develop of Sanskrit Literature in early Medieval India.
  - h) Ashokan Pillar.

4. What is the nature of religion ? Discuss after Tagore. 12½
5. Tagore's idealism is humanistic. Explain. 12½
6. Write notes on Aurovindo's concept of : 6+6½  
 a) Caitya Purusa  
 b) Gnostic Being.
7. What is Satyagraha according to Gandhi ? Explain Disobedience, Non-Cooperation and Fasting as the forms of Satyagraha. 3½+9
8. Explain briefly the sense-experience, intellect and intuition as three sources of knowledge. Which of them gives us the knowledge of reality. 8+4½

V-248-0.3

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1  
 which is compulsory

1. Explain briefly any **four** of the following : 7½×4  
 a) Vivekananda's view of Vedanta.  
 b) Vivekananda's concept of man  
 c) Tagore's concept of Jivan-devata  
 d) Tagore's concept of man  
 e) Aurobindo's Saccidananda  
 f) Five cardinal virtues in Gandhism.  
 g) Gandhian concept of Swaraj.  
 h) The Absolute of Radhakrishnan.
2. Discuss Vivekananda's concept of man. 12½
3. What is universal religion ? Explain after Vivekananda. 12½

V-248

[Turn Over

2. Describe the Law of Three Stages of Auguste Comte. 12½
3. Write a detailed note on Comte's positivism. 12½
4. Discuss Herbert Spencer's concept of organismic Analogy. 12½
5. Analyse Karl Marx's Dialectical materialism. 12½
6. Explain the sociological significance of Durkheim's Theory of Division of labour. 12½
7. Explain Emile Durkheim's 'Rules of Sociological Method'. 12½
8. For Max Weber, Social Action is the subject matter of sociology. Explain. 12½

V-249-0.3

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answer on any *four* of the following :  
7½×4
  - a) Discuss briefly Comte's Hierarchy of Sciences.
  - b) Write a note on Spencer's Theory of social evolution.
  - c) Explain briefly Karl Marx's Sociology of Capitalism.
  - d) Write a note on Marx's Theory of class struggle.
  - e) Explain Durkheim's Theory of suicide.
  - f) Briefly discuss Weber's Theory of relationship between economy and religion.
  - g) Discuss the features of Bureaucracy as explained by Max Weber.
  - h) Explain Weber's concept of Authority.

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[Turn Over

3. Describe the axial relation, symmetry elements and forms present on the normal class of orthorhombic system. 9
4. Describe the axial relation, symmetry elements and forms present in the normal class of Hexagonal system. 9
5. Classify crystals into six systems. 9
6. Describe different physical properties of minerals not dependant upon light. 9
7. Describe the chemical, physical and optical properties of silica group of minerals. 9
8. Describe the chemical, physical and optical properties of Feldspathoid group of minerals. 9
9. Describe the physical, optical and chemical properties of Amphibole group of minerals. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 6 × 4
  - a) Write note on Hermann-Mauguin symbol.
  - b) Note on Axial relation of Isometric system
  - c) Write a note on Forms of Triclinic system.
  - d) Note on space Lattice.
  - e) Write a note on Alumino-Silicate minerals.
  - f) Write the Physical and optical properties of Biotite.
  - g) Note on carbonate minerals.
  - h) Note on Chain Silicate Structure.
2. Describe the axial relation, symmetry elements and form present in the normal class of Isometric system. 9

3. Discuss the factors of weather and climate. 9
4. Explain different types of inversion of temperature. 9
5. Give an account of the factors affecting wind. 9
6. Discuss the formation and types of jet streams. 9
7. Describe different types of clouds. 9
8. Write in brief the types of fogs. 9
9. Discuss the characteristics and formation of extra-tropical cyclones. 9

V-255-0.3

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer in brief on any *four* of the following :  
6 × 4
- Troposphere.
  - Ionosphere.
  - Convection
  - Sub-tropical high pressure belt.
  - Westerlies
  - Evaporation
  - Condensation
  - Shape and size of tropical cyclones.
2. Describe the composition of the atmosphere. 9

V-255

[Turn Over

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following :  $6 \times 4$

a) Examine the continuity of the function

$$f(x) = \frac{\sin \pi [x]}{2} \text{ at } x=0.$$

b) Differentiate  $5^{\sin^2}$

c) Integrate  $\int \sec^2 x \operatorname{cosec}^2 x \, dx$

d) Integrate  $\int \log x \, dx$

[ 2 ]

e) Use the method of separation of symbols to prove that

$$U_0 + U_1 + U_2 + \dots + U_n = {}^{n+1}C_1 U_0 + {}^{n+1}C_2 \Delta U_0 + {}^{n+1}C_3 \Delta^2 U_0 + \dots + {}^{n+1}C_{n+1} \Delta^n U_0$$

f) State and prove Newtons forward interpolation formulae.

g) Evaluate  $\log_e 7$  by Simpsons  $\frac{3}{8}$  th rule.

h) Test the convergence of  $U_n = 2 + (-1)^n \frac{1}{n}$ .

2. a) Evaluate  $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2}$  9

b) Evaluate  $\lim_{x \rightarrow 0} \frac{\sin x^0}{x}$

3. a) Find the derivative of  $x^4$  with respect to  $x^5$ . 9

b) Find  $\frac{dy}{dx}$  if  $x = a(\theta + \sin \theta)$   $y = a(1 + \cos \theta)$

[ 3 ]

4. Find the extreme points of the following function  $y = f(x) = 2x^3 - 15x^2 - 36x + 18$ . 9

5. a) Integrate  $\int \frac{\sin x}{\sin(x - \alpha)}$  9

b) Integrate  $\int \cos^5 x \, dx$ .

6. Test the convergence of the series 9

$$x + \frac{1}{2} \frac{x^3}{3} + \frac{1}{2} \cdot \frac{3}{4} \cdot \frac{x^5}{5} + \dots$$

7. State and prove Simpson's one-third rule for numerical integration. 9

8. State and prove Lagranges interpolation formulae. 9

2. Define educational psychology. Discuss its relevance for the school teachers. 9
3. What is development ? Explain any three important principles of development. 9
4. Discuss Gardner's theory of intelligence.
5. What is individual difference ? Discuss the role of education in meeting the differences in individuals. 9
6. What are the various factors influencing learning ? 9
7. Differentiate between classical conditioning and operant conditioning. 9
8. Define personality. What are different techniques of assessing human personality ? 9
9. What is mental health ? Discuss important factors influencing mental health of a teacher. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory

1. Answer any **four** of the following : 4 × 6
  - a) How educational psychology is an applied science.
  - b) How experimental method is different from the survey method in studying human behaviour ?
  - c) Point out the patterns of physical development during adolescence stage.
  - d) How a pre-operational child is different from a concrete-operational child ?
  - e) How heredity causes individual difference ?
  - f) What are the stages of creative thinking process ?
  - g) Explain 'law of effect' with examples.
  - h) Explain rationalisation as a popular defence mechanism.

- h) Describe different characteristics of Inductive and deductive reasoning.
2. With suitable diagram, discuss the structure and function of the Ear. 9
3. Define Perception. Discuss the figure of ground and perception of distance of depth. 9
4. What is learning ? Discuss different principles used in observational learning. 9
5. What is memory ? Discuss different causes of forgetting. 9
6. What is communication ? Discuss different properties and structure of language. 9
7. Discuss different stages of language development. 9
8. Define thinking. Discuss different concepts, categories of prototypes of thinking. 9
9. What is reasoning ? Discuss different steps used in problem solving. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory

1. Answer any **four** of the following : 6 × 4
- a) Define Sensation. Elaborate the nature of Sensory threshold.
- b) What is perception ? Describe perceptual constancies and illusions in perception.
- c) Elaborate the conditions used in operant conditioning.
- d) Discuss all about Semantic and procedural memory with suitable examples.
- e) Elaborate the nature and means of effective communication.
- f) Describe the critical period controversy in language.
- g) Discuss, different factors responsible of influencing decision making.

6. A charged capacitor discharges through a circuit continuing inductance and resistance. Under what conditions the discharge will be oscillatory in character. Find an expression for the frequency of the oscillations. 9
7. State Maxwell's equations in both C.G.S. and S.I. units for electro-magnetic field in vacuum and in an isotropic linear medium. 9
8. a) State superposition theorem as applied to circuits with ac-sources and reactive components. 2
- b) State and explain the maximum power transfer theorem. 7

V-259-0.6

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer any *four* of the following :
- a) Find the potential of a uniformly charged spherical shell of radius R. 6
- b) Dielectric constant of gas at N.T.P is 1.000074. Calculate dipole moment of each atom of the gas when it is held in an external field of  $1 \times 10^4 \text{ Vm}^{-1}$ . 6
- c) Calculate the capacitance of a capacitor consisting of two concentric spheres of radius a and b, respectively, separated by (i) air (ii) a dielectric of dielectric constant k (or relative permittivity  $\epsilon_r$ ). 6
- d) Find the magnetic field at a distance z above the centre of a circular loop of radius R, which carries a steady current I. 6

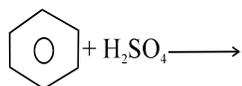
[ 2 ]

- e) A thick slab extending from  $z = -a$  to  $z = +a$  (and infinite in the  $x$  and  $y$  directions) carries a uniform volume current  $\vec{J} = J\hat{x}$ . Find the magnetic field, as a function of  $z$ , both inside and outside the slab. 6
- f) A wire of length 200cm held perpendicular to  $XY$  plane is moved with a velocity  $\vec{v} = 2\hat{i} + 3\hat{j} + \hat{k}$  m/s through a region of uniform magnetic field  $\vec{B} = \hat{i} + 2\hat{k}$  weber/m<sup>2</sup>. Calculate the electric field  $\vec{E}$  developed in the wire and potential difference between its ends. 3+3
- g) State and prove reciprocity theorem in mutual induction. 1+5
- h) Prove that  $\vec{E} = \cos(y - t)\hat{k}$ ,  $\vec{B} = \cos(y - t)\hat{i}$  constitute a possible electromagnetic field. 6
2. a) Apply Gauss's theorem to calculate the electric field due to an infinity long, uniformly charged, hollow cylinder. 5
- b) Explain if the result is applicable to a hollow conducting cylinder. 2

[ 3 ]

- c) What is an equipotential surface ? 1
- d) Can two equipotential surfaces intersect ? 1
3. Using Biot and Savart's law, find the magnetic field  $B$  due to an infinite straight wire carrying current  $I$ . 9
4. a) An iron rod of length 1 meter and cross-section 4 cm<sup>2</sup> is in the form of a closed ring. If the permeability of iron is  $50 \times 10^{-4}$  Hm<sup>-1</sup>, what is the number of ampere turns required to produce a magnetic flux of  $4 \times 10^{-4}$  wb through the closed ring ? 4½
- b) A magnetic field of  $1.6 \times 10^3$  MKS units produces a flux of  $2.4 \times 10^{-5}$  Wb in a bar of iron of cross-section 0.2cm<sup>2</sup>. What are the permeability and susceptibility of the specimen ? 4½
5. An alternating e.m.f.  $E = E_0 \sin(\omega t)$  is applied to the ends of a coil having a resistance  $R$  and self-inductance  $L$ , Calculate the current in the circuit. 9

6. a) Write down the reaction and mechanism of oxymercuration-demercuration. 5  
 b) Addition of HBr to alkene by Markownikoff's rule and anti-markownikoff's rule. 4
7. Write a note on the following ; 3 × 3  
 a) Friedel Craft alkylation  
 b) Wurtz fitting reaction  
 c) Kolbe's synthesis.
8. Complete the reaction with mechanism 3 × 3  
 a)  $\text{CH}_2 = \text{CH}_2 \xrightarrow[2. \text{Zn}/\text{H}_2\text{O}]{1. \text{O}_3}$   
 b)  $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2 + \text{CH}_2 = \text{CH}_2 \longrightarrow$   
 c)  $\text{CH}_3 - \text{CH}_2 = \text{CH}_2 + \text{BH}_3 \longrightarrow$
9. a) Discuss the effect of substituents on orientation and reactivity of Benzene ring. 6  
 b) Compute the reaction with mechanism. 3

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory

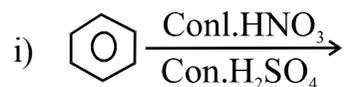
1. Answer any **four** of the following :
- a) Discuss the formation, structure and stability of carbanions. 6
- b) i) What is hybridisation of carbon in alkene and draw the structure of ethylene? 3  
 ii) Explain the shape of aldehydic group. 3
- c) What are E<sub>1</sub> and E<sub>2</sub> reactions? Explain with the examples. 6
- d) Explain E and Z designations of geometrical isomers. 6
- e) Write notes on the following : 3×2  
 i) Hyperconjugation  
 ii) Homolytic and Heterolytic cleavage.

[ 2 ]

f) Explain the term 3 + 3

i) Specific rotation

ii) Chiral centre.

g) How can you prepare propyne ? How does it reacts with 6i)  $\text{NaNH}_2$ ii)  $\text{AgNO}_3$ iii)  $\text{H}_2\text{O} / \text{H}_2\text{SO}_4 / \text{HgSO}_4$ .h) Complete the reaction with mechanism. 3+3

2. Explain the different types of conformation of cyclohexane and their stability. What are axial and equatorial hydrogen of chair form of cyclohexane ? 9

3. What is geometrical isomerism ? How can Cis and Trans isomers are distinguished by physical properties ? Explain with examples. 9

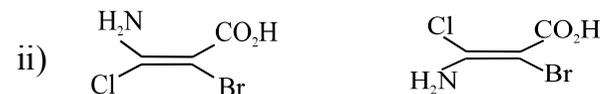
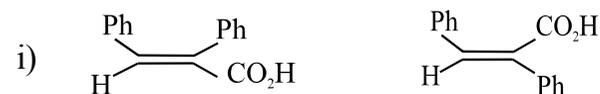
[ 3 ]

4. a) Explain the following terms. 2 × 3

i) Enantiomers

ii) Diastereomers

iii) Chirality.

b) Allocate the symbol E or Z to each of the following compounds. 35. a) Write down the structural formulas of the following compounds. 3

i) 4-Chloro-2-Isopropyl-3methylcyclopentanone

ii) 4-amino-2ethyl-2-pentanal

iii) 1-Amino-4 methylpentan-2-one.

b) Discuss the formation, structure and stability of free radicals. 6

3. Discuss the general characteristics and life cycle of Phytophthora. 9
4. Give an account of the causal organism, mode of infection, symptoms and control of disease loose and covered smut. 9
5. Discuss the general characteristics, ecology and life cycle of Agaricus. 9
6. Give an account on general characteristics and reproduction in Lichen. 9
7. Discuss about application of Fungi in food industry. 9
8. Discuss the general characteristics, occurrence and classification of Allied Fungi. 9
9. Give an account on Mushroom culture. 9

V-261-0.6

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Write notes on any *four* of the following : 6 × 4
  - a) A sexual reproduction in Saccharomyces.
  - b) Fairy Rings
  - c) Types of Plasmodia
  - d) Ectromycorrhiza and their significance
  - e) mycoherbicides
  - f) Black stem rust on wheat
  - g) Heterokaryosis in ascomycota
  - h) Status of slime molds.
2. Give an account of life cycle of Aspergillus. 9

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[Turn Over

3. Give an account of structure and function of compound eye in Arthropoda. 9
4. Describe Torsion in Gastropoda and add a note on different views on its significance. 9
5. Write the structure of Trochophore larva and discuss its evolutionary significance. 9
6. Describe water vascular system in Asteroidea. 9
7. Classify Phylum Arthropoda upto class with characters and examples. 9
8. Discuss the social life and behaviour of Honey bee. 9
9. Give an account of respiration in Arthropoda. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write notes on any *four* of the following : 6 × 4
  - a) Nephridia in Earthworm.
  - b) Metamorphosis in Insects.
  - c) General characters of Peripatus.
  - d) Formation of Pearl in bivalves.
  - e) Moulting
  - f) Bipinnaria Larva.
  - g) Metamerism in Annelida.
  - h) Zoea Larva.
2. What is coelom ? Discuss the evolution of coelom in Annelida. 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 4 × 6
- a) Explain the concept of object oriented programming. What are the difference between object based and object oriented programming.
  - b) Discuss how the concept of polymorphism is implemented in C++ language.
  - c) When we declare member of a class STATIC ? What is their implication ? Explain with examples.
  - d) Explain the concept of friend function with a suitable example.
  - e) Write a C++ program segment to overload the "+" operator to add two complex numbers.

[ 2 ]

- f) Describe different types of modes in File with example.
  - g) Write short notes on the following :
    - i) Command-Line Arguments
    - ii) Abstract Class.
  - h) Describe the concept of Inline function with an example.
2. Differentiate between constructor and destructor. Explain the concept of copy constructor with an example. 9
3. What is scope resolution operator ? How is it useful for defining the data member and member function of a class ? 9
4. What is inheritance ? Describe different types of inheritance with examples. 9
5. Differentiate between Virtual function and pure-Virtual function. Describe the concept of Virtual function with an example. 9

[ 3 ]

6. Differentiate between Call-by-reference and Return-by-reference. Write a program in C++ to swap two numbers using Call-by-reference. 9
7. Write short notes on : 9
  - i) Member Referencing Operators
  - ii) C++ Streams
  - iii) Member Classes.
8. Describe different types of Expressions in C++ with examples. What is meant by Type Cast Operator ? 9
9. When we declare member of a class STATIC ? What is their implication ? Explain with examples. 9

- g) What is mean by communication ? Explain its importance.
- h) What are the objectives of industrial relations.
2. Describe the social responsibilities of management towards consumers and employees. 12½
3. Define a company and distinguish between a private company and a public company. 12½
4. Explain delegation. What difficulties are encountered in delegating authority ? 12½
5. What is Maslow's theory of motivation ? How does proper motivation plans contribute to effectiveness of management ? 12½
6. Discuss the objectives and functions of Human Resource Management. 12½
7. What is departmentation ? Explain various bases of departmentation. 12½
8. What is planning ? Discuss the process of planning. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer any *four* of the following : 7½ × 4
- a) Describe the role played by small business in the development of the country.
- b) What do you mean by franchising? Discuss the features of franchising.
- c) Describe the characteristics of sole proprietorship form of organisation.
- d) Explain the main features of a multinational corporation.
- e) How far planning is useful to management ?
- f) Differentiate between Delegation and Decentralisation.

2018

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following :  $7\frac{1}{2} \times 4$
- a) Let  $F$  be a field and let  $x, y \in F$ , prove that  
 $(-x)y = -(xy) = x(-y)$
  - b) Let  $F$  be an order field and let  $a, b \in F$ , then  
prove that either  $a < b$  or  $a = b$  or  $a > b$  and only  
one of these relations hold.
  - c) Show that every subset of a countable set is a  
countable set.
  - d) Prove that a sequence  $\{x_n\}$  is convergent to ' $l$ ' if  
and only if every subsequence of  $\{x_n\}$  is  
convergent to ' $l$ '.
  - e) Show that the series  $\sum_{n=2}^{\infty} \frac{1}{n(\log n)^\alpha}$   
converges if  $\alpha > 1$  and diverges if  $\alpha \leq 1$ .

[ 2 ]

f) Test the convergence of the series  $\sum a_n$ , where  $a_n$  is given by  $\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} \frac{n!}{n^n}$ .

g) Let  $a_n \in \mathbb{C}$  If  $\sum a_n$  is absolutely convergent but the converse is not necessarily true. Prove this.

h) Define Cauchy sequence of real number and prove that every cauchy sequence is bounded.

2. Show that  $\mathbb{Q}$ , the set of rational, is an order field but not complete. 12½

3. Let  $a, b \in \mathbb{R}$  and  $a < b$ , prove that  $\mathbb{R}$  is an uncountable set. 12½

4. Show that every cauchy sequence of real number is convergent. 12½

5. Suppose that  $a_n \geq a_{n-1} \geq 0$ . Prove that the series  $\sum a_n$  converges if and only if the series

$$\sum_{k=0}^{\infty} 2^k a_{2^k} = a_1 + 2a_2 + 4a_4 + 8a_8 + \dots$$

converges. 12½

[ 3 ]

6. Test the convergence of the series  $\frac{1}{3} + \frac{1.2}{3.5} + \frac{1.2.3}{3.5.7} + \frac{1.2.3.4}{3.5.7.9} + \dots$  12½

7. Show that the following two statement are equivalent. 12½

a)  $\mathbb{C}$  is complete

b) Every absolutely convergent series in  $\mathbb{C}$  is convergent.

8. Test the conditional and absolute convergence of the series

$$\sum_{n=1}^{\infty} \left( \frac{1}{\sqrt{n}} + \frac{(-1)^n}{n} \right) \quad \text{12½}$$

V-265-0.6



**II-UG-BBA(CC)-III (BM)**

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following :  $7\frac{1}{2} \times 4$
- a) The difference between the S.I and C.I of a certain sum for 2 years at 10% p.a. is ₹150. Find out the sum.
- b) Solve the following system of equations using Cramer's rule  
 $5x - 7y + z = 11$ ,  $6x - 8y - z = 15$ ,  $3x + 2y - 6z = 7$
- c) Mr. went to market to purchase 3kg of sugar, 10kg. of wheat and 1kg of salt. In a shop near to Mr. A residence, these commodities are priced at ₹15, ₹8 and ₹6 per kg respectively. If cost of travelling to local market is ₹25, find the net savings of Mr. A using matrix multiplication.

[ 2 ]

d) Evaluate  $\lim_{x \rightarrow \infty} (\sqrt{x^2 + 1} - x)$

e) If  $y = f(x) = \frac{x+3}{x+4}$ , show that  $f(y) = \frac{4x+15}{5x+19}$

f) Find out the differential coefficient of the following functions.  $\frac{e^x - 1}{e^x + 1}$

g) Evaluate  $\int (3x+2)^{10} dx$ .

h) The A.M and G.M between two numbers are 11 and 10.89, respectively. Find out the items.

2. A machine costing ₹85,000 is expected to fetch a scarp value of ₹15,000 after working for 10 years. If money is worth 5% p.a. compound, find the amount to be contributed to sinking fund out of the profits annually to replace the asset on time. 12½

3. Prove that 12½

$$\begin{vmatrix} (b+c)^2 & b^2 & c^2 \\ a^2 & (c+a)^2 & c^2 \\ a^2 & b^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$$

[ 3 ]

4. Evaluate  $\lim_{x \rightarrow 0} \frac{10^x - 2^x - 5^x + 1}{x^2}$  12½

5. Find out the derivative of the following functions

$$y = \frac{e^x \log^x 10}{x+1} \quad 12½$$

6. Evaluate the following integral

$$\int \frac{2x+1}{x^3 + x^2 - 2x} dx \quad 12½$$

7. Evaluate  $\int_2^3 (x^3 - 9x^2) dx$  12½

8. A man buys a house on the condition that he shall pay ₹8,000 now, and that equal sums at the end of first and second years. What will be the spot cash value of the house of C.I. payable annually be calculated at 5% p.a ? 12½

2. Define freedom and discuss how freedom forms as the basis of emancipation and development. 12½
3. What is liberty ? What is its relation with law ? 12½
4. Explain the notion of Egalitarianism and highlight the rational grounds of discrimination and affirmative action. 12½
5. Do you hold the view that justice is a virtue that strengthens harmony ? 12½
6. Write a critical note on the concept of human rights. 12½
7. Make a brief note rights of the girl child. 12½
8. Rights have to be culture specific. Discuss with reference to the issue of culture relativism. 12½
9. Critically discuss the issue of capital punishment. 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answer on any *four* of the following :  
7½×4
  - a) Elaborate the concept of negative freedom.
  - b) Significance of freedom of brief, expression and dissent.
  - c) Justify equality as a matter of levelling.
  - d) Write a brief note on affirmative action.
  - e) Distinguish between Procedure and Substantive justice.
  - f) Explain the concept of global justice.
  - g) Write a short note on Natural Rights theory.
  - h) Explain the concept of Three Generation of Risks.

- g) Describe the common features of 'Glorious Revolution'.
- h) Write the main theme of the first Voyage made by Gulliver.
2. 'Gulliver's Travel' is a satire. Discuss. 12½
3. Narrate the Plot Construction of 'Robinson Crusoe'. 12½
4. Discuss the causes for the growth of Popularity of the novel in the Eighteenth Century. 12½
5. Critically summarise the Essay 'Man is Black'. 12½
6. Write a summary of R. Steele's Prose Fiction 'Recollections'. 12½
7. Make a note on Lilliputians as described by Jonathan Swift in 'Gulliver's Travels'. 12½
8. 'Robinson Crusoe' is an allegory. Explain. 12½
9. What is Elegy ? Write a essay on Thomas Gray's "Elegy written in a country Churchyard". 12½

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer any *four* of the following : 7½×4
- a) In what sense was the Eighteenth Century pre-eminently an age of prose and reason.
- b) Describe Dryden and Pope as Neoclassicists.
- c) Jonathan swift is the greatest prose satirist of England. Discuss.
- d) Describe the summary of J.Addison's Essay 'Reflections on Westminster Abbey'.
- e) There is innumerable causes of decay and destroy of friendship told by Samuel Johnson. Justify it considering the Essay 'Decay of Friendship'.
- f) Write a short note on Thomas Grey's Poem 'Elegy Written in a Country Churchyard'.

3. Briefly discuss the dating methods of Archaeology. 9
4. Give details about the different types of geoclimatic events of Pleistocene epoch. 9
5. Describe the tools and techniques of Lithic Age. 9
6. Briefly discuss the classification of tools of the Palaeolithic tools of different Ages. 9
7. Describe in detail about the Archaeological sites of India. 9
8. Describe in detail about the archaeological site of Konso, Olorgesailie, Pirro Nord, Damanisi. 9

V-254-0.2

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write short answer on any *four* of the following : 4 × 6
  - a) Meaning of Archaeological Anthropology
  - b) Radio carbon dating method
  - c) Interglacial stage
  - d) Write about one of the Palaeolithic tools details.
  - e) Neolithic techniques with examples.
  - f) Stratigraphy.
  - g) Konso
  - h) Kuliana.
2. Write the definition of Archaeological Anthropology and discuss the methods of studying archaeological anthropology ? 9

V-254

[Turn Over

3. Describe the Income Method of measuring National Income. Point out its limitations. 12½
4. Define money and describe its functions. 12½
5. Define deflation and describe the causes of deflation. 12½
6. Analyse the circular flow of Income in a 3-sector economy. 12½
7. Describe the cash transactions approach of the quantity theory of money. 12½
8. "Supply creates its own demand". Elucidate. 12½
9. What is consumption function ? Examine its importance. 12½

V-292-0.3

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 7½×4
  - a) GDP at market price and factor cost.
  - b) Stock and flow variable.
  - c) Nominal GDP
  - d) Index number
  - e) National Income and economic welfare.
  - f) Hyperinflation.
  - g) Investment multiplier
  - h) Aggregate demand.
2. Distinguish between Macroeconomics and Microeconomics. Why study Macroeconomics? 12½

V-292

[Turn Over

2. Discuss the religious composition of Indian Society. 12½
3. Discuss the bases of Hindu Social Organisation. 12½
4. Examine the social importance of doctrine of Karma 12½
5. Define Joint family and discuss its changing dimensions. 12½
6. Define Class and discuss the differences between Caste and Class. 12½
7. Explain the process of Westernization in India. 12½
8. Define modernization and discuss its characteristics. 12½.

V-296-0.6

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 7½×4
  - a) Discuss Linguism as a major threat to National Integration.
  - b) Discuss Regionalism as a major threat to National Integration.
  - c) Assess the relevance of Ashrama Vyavastha in traditional Hindu social organisation.
  - d) 'Hindu marriage is a sacrament'. Discuss.
  - e) Describe the recent changes in Hindu marriage.
  - f) Describe the traditional theory of origin of caste system.
  - g) Discuss the constitutional and legal provisions for scheduled castes.
  - h) Discuss the process of Secularization in India.

V-296

[Turn Over

3. Write a note on relationship of History with Political Science. 12½
4. Discuss the main ideas of St. Augustine as developed in his "City of God". 12½
5. Throw light on historical writing of Herodotus. 12½
6. Explain the contribution of Arnold Toynbee's to hisotriography. 12½
7. "Can history be regarded as a study of caution and change"—Explain. 12½
8. Discuss the chief sources of data collection for historical writings. 12½

V-293-0.5

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer any *four* of the following : 7½×4
  - a) Thucyaides.
  - b) Value of History.
  - c) Scope of History.
  - d) History and Archeology.
  - e) History and Anthropology.
  - f) Karl Marx.
  - g) Historical objectivity.
  - h) R.G Collingwood.
2. define the term "History". Discuss the main aims of its study. 12½

V-293

[Turn Over

- g) Distinguish between Peace Keeping and Peace Making.
- h) Make a short note on Afganistan War.
2. Discuss the functions and role of the United Nations. 12½
3. Describe the composition and functions of the UN Security Council. 12½
4. Write an essay on International Labour Organisation (ILO). 12½
5. Examine the functions and role of United Nations Childrens Fund (UNICEF). 12½
6. Describe the UN Millennium Development Goals. 12½
7. Discuss the causes and consequences of Vietnam War. 12½
8. What reforms would you suggest in the United Nations. 12½.

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 7½×4
- a) Explain the basic objectives of the United Nations.
- b) Write a short note on the composition of the UN General Assembly.
- c) Mention the role and functions of Economic and social Council (ECOSOC).
- d) Highlight the functions of International Court of Justice (ICJ).
- e) Write a brief note on the composition and functions of United Nations Educational Scientific and cultural Organisation (UNESCO)
- f) Describe the main functions of the United Nation High Commissioner for Refugees (UNHCR).

- g) Distinguish between Peace Keeping and Peace Making.
- h) Make a short note on Afganistan War.
2. Discuss the functions and role of the United Nations. 12½
3. Describe the composition and functions of the UN Security Council. 12½
4. Write an essay on International Labour Organisation (ILO). 12½
5. Examine the functions and role of United Nations Childrens Fund (UNICEF). 12½
6. Describe the UN Millennium Development Goals. 12½
7. Discuss the causes and consequences of Vietnam War. 12½
8. What reforms would you suggest in the United Nations. 12½.

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 7½×4
- a) Explain the basic objectives of the United Nations.
- b) Write a short note on the composition of the UN General Assembly.
- c) Mention the role and functions of Economic and social Council (ECOSOC).
- d) Highlight the functions of International Court of Justice (ICJ).
- e) Write a brief note on the composition and functions of United Nations Educational Scientific and cultural Organisation (UNESCO)
- f) Describe the main functions of the United Nation High Commissioner for Refugees (UNHCR).

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write notes on any *four* of the following : 7½×4
  - a) Paradox of Implication.
  - b) Binary constants.
  - c) The Predicate calculus.
  - d) Singular Propositions.
  - e) The Null Class.
  - f) Proper names and descriptions
  - g) De Morgan's Law
  - h) Axioms of Syllogistic Logic.
  
2. Find out the important characteristics of symbolic logic. 12½

[ 2 ]

3. Construct truth table for the following :  $6 + 6\frac{1}{2}$

a)  $((p \supset p) \cdot (\sim p \supset \sim p)) \supset (p \supset p)$

b)  $((q \supset p) \cdot (p \supset r)) \supset (q \supset r)$

4. Prove by in direct truth table method that the following formula is a tautology :  $12\frac{1}{2}$

$$((p \supset q) \cdot (\sim q \vee r)) \supset (\sim r \supset \sim p)$$

5. Test the validity of the following arguments by the method of Equivalent substitution :  $6 + 6\frac{1}{2}$

a) i)  $P \supset \sim(Q.R)$

ii)  $S \supset Q$

iii)  $Q \supset R$

iv)  $S$

Therefore :  $\sim P$

b) i)  $\sim(P \supset Q) \supset (R \supset \sim S)$

Therefore :  $(P.R) \supset (S \supset Q)$

[ 3 ]

6. Distinguish between :  $6 + 6\frac{1}{2}$

a) Free and Bound Variables

b) The Particular and Universal quantifiers.

7. What is the defining property of a class ? Represent the following classes by a Venn diagram :  $2\frac{1}{2} \times 5$

a) blue-eyed girls who are black-haired

b) blue-eyed girls who are not black-haired

c) black-haired girls who are not blue-eyed

d) Neither blue-eyed nor black-haired girls

8. Reduce the following Boolean expressions into normal form :  $6 + 6\frac{1}{2}$

a)  $AB' + A' + C$

b)  $AB + A'C + C'$

V-295-0.4



2. Discuss important issues and trends in educational testing and assessment. 9
3. Describe different types of assessment. 9
4. What are different forms of essay-type questions ? Give your suggestions for proper scoring of essay questions. 9
5. Evaluate peer-appraisal as an alternative technique of assessment. 9
6. What do you mean by interview ? Discuss the techniques of interview with its advantages. 9
7. What is the necessity of reporting the performance of students ? What are the key considerations for reporting the performance of learners in a class. 9
8. What do you mean by credit system ? Discuss its merits and demerits. 9
9. Describe the concept of continuous and comprehensive evaluation. Why it is necessary ? 9

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 4 × 6
  - a) Explain the concept of evaluation in the teaching learning process with examples.
  - b) Write briefly instructional goals and objectives.
  - c) How can objective test items be constructed ?
  - d) How observation schedule is prepared ?
  - e) Explain portfolio is an alternative technique of assessment.
  - f) State importance of content analysis in assessment.
  - g) Why grading is superior to marking ?
  - h) What are the advantages of using computer in student's evaluation ?

2. Describe the structure and functions of Ear. 9
3. Explain the Gestalt laws of perception. 9
4. Explain about the similarities and differences in between classical and operant conditioning. 9
5. What is forgetting ? Discuss different causes of forgetting. 9
6. Discuss different properties and structure of language. 9
7. Discuss different stages of language development. 9
8. What is thinking ? Discuss different processes involved in thinking. 9
9. What is reasoning? Explain inductive and deductive reasoning. 9

V-302-0.5

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 6 × 4
  - a) Describe all about Sensory adaptation.
  - b) Elaborate about figure and ground relationship.
  - c) Explain about operant conditioning.
  - d) Discuss about episodic and semantic memory with examples.
  - e) Elaborate the nature of effective communication.
  - f) Discuss all about critical period controversy.
  - g) Explain different factors of influencing decision making.
  - h) Elaborate different steps in problem solving.

V-302

[Turn Over

2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following : 6 × 4
- a) Prove that  $\text{curl grad } \phi = 0$ .
  - b) State Gauss divergence theorem and Stoke's theorem.
  - c) Using Gauss law, find an expression for electric field due to a uniformly charged solid sphere.
  - d) Derive an expression for energy stored per unit volume in an electrostatic field.
  - e) Briefly discuss about various types of magnetic materials.
  - f) Discuss about the growth of current in LC circuit.

[ 2 ]

- g) Derive an expression for energy stored in magnetic field.
- h) Discuss about the displacement current and hence its significance with reference to Maxwell's equation.
2. a) Define gradient of a scalar function and discuss its significance. 4½
- b) Show that  $\vec{\nabla} \cdot \vec{\nabla} \times \vec{A} = 0$ , where  $\vec{A}$  is any vector function. 4½
3. Find the expression for electric field due to a very long straight uniformly charged wire. 9
4. Find the expression for potential due to uniformly charged spherical shell. 9
5. Using Biot-Savat's law calculate magnetic field due to an infinitely long straight wire carrying steady current. 9
6. Derive an expression for the amplitude and phase of the current in a series LCR circuit when an alternating emf is applied. 9

[ 3 ]

7. Derive wave equation for  $\vec{E}$  and  $\vec{B}$  in a homogeneous linear medium in which charge density is zero. 9
8. State the properties of electromagnetic wave and prove that electromagnetic wave travels with speed of  $\frac{1}{\sqrt{\epsilon_0 \mu_0}}$  in vacuum (symbols have their usual meanings). 9
9. a) Discuss about the Faraday's law of electromagnetic induction. 3
- b) Find the self-inductance of a toroidal coil with rectangular cross section (inner radius a, outer radius b, height h), that carries a total of N turns. 6

[ 4 ]

II-UG-Chem(GE-A)-II

8. Write notes on the following :  $3 \times 3$

- i) Reimer Tiemann reaction
- ii) Gattermann Koch reaction
- iii) Pinacol-Pinacolone rearrangement.

9. Write short notes on the following :  $3 \times 3$

- i) Aldol condensation
- ii) Clemensen reduction
- iii) Witting reaction.

V-304-0.7



2018

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Answer any *four* of the following :

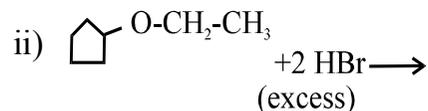
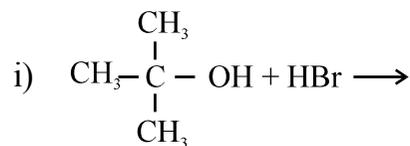
- a) State the third law of thermodynamics. How does this law help in the evaluation of absolute entropy of chemical compounds ? 6
- b) Explain free energy of mixing and spontaneity. 6
- c) Describe entropy changes in reversible and irreversible process. 6
- d) i) Derive Ostwald dilution law. 4  
ii) Calculate the  $P^H$  of 0.1M aqueous solution of a weak monobasic acid whose dissociation constant is  $2.5 \times 10^{-6}$  at  $30^\circ C$ . 2

V-304

[Turn Over

[ 2 ]

- e) What are buffer solutions ? Discuss the buffer action of ammonium acetate solution. 2+4
- f) i) How benzene is prepared from benzene sulphonic acid ? 3  
 ii) Discuss the mechanism of sulphonation of benzene. 3
- g) i) Discuss the effects of substituents on orientation and reactivity of benzene ring. 4  
 ii) Why vinyl chloride is less reactive than alkyl halide ? 2
- h) Complete the reaction with mechanism. 3+3



2. What is Kirchhoff's equation ? Explain the effect of temperature and pressure on enthalpy of reaction. 9

[ 3 ]

3. Derive the relation between equilibrium constant  $K_p$ ,  $K_c$ ,  $K_x$  under what condition  $K_p = K_c = K_x$   $C_p, c, x$  stand for partial pressure. 9
4. Derive an expression for calculating the degree of hydrolysis and  $P^H$  of a salt of weak acid and strong base. 9
5. Explain the mechanism, Kinetics and stereochemistry of  $SN_1$  and  $SN_2$  reaction with examples.
6. a) Discuss the effect of substituents on the reactivity of aryl halides in nucleophilic substitution reaction. 5  
 b) Discuss Benzyne mechanism. 4
7. a) How can you prepare  $1^\circ, 2^\circ$  and  $3^\circ$  alcohol from  $\text{CH}_3 \text{MgBr}$  ? 6  
 b) Complete the reaction with mechanism. 3  
 $\text{CH}_3 \text{CH}_2 \text{OH} + \text{SOCl}_2 \xrightarrow{\text{Pyridine}}$

4. Describe about the different types of embryo sac. 9
5. Discuss mechanism and adaptations in self pollination. 9
6. Define polyembryony. Discuss its types and practical application. 9
7. Give an account on embryo-endosperm relationship. 9
8. Discuss about the double fertilization in angiosperms. 9
9. Describe the structure of anther and Pollen in Angiosperms. 9

V-305-0.6

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write notes on any *four* of the following : 6 × 4
- Structure of monocot root.
  - Apical meristem.
  - Bisporic embryo sac.
  - Dicot embryo
  - Triple fusion
  - Stomata in xerophytes.
  - Annual rings.
  - Structure of monocot seed.
2. Give an account on meristematic tissues. 9
3. Discuss the process of secondary growth in root. 9

V-305

[Turn Over

3. Describe the mechanism of muscle contraction. 9
4. Explain the mechanism of breathing. Describe how breathing reflex is regulated in man. 9
5. What is cardiac cycle ? Describe in details the different stages in man. 9
6. Describe the structure and functional anatomy of human kidney. 9
7. "Pituitary is the master of endocrine orchestra". Discuss. 9
8. What do you understand by menstrual cycle. Explain the various changes that occur during the cycle. 9

V-306-0.6

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

1. Write notes on any *four* of the following : 6 × 4
  - a) Salivary glands.
  - b) Absorption of fat.
  - c) Structure of neuron.
  - d) Ultra-filtration.
  - e) Neurosecretion.
  - f) Pregnancy.
  - g) Respiratory quotient (RQ).
  - h) Heart beat.
2. What are the different secretions in different parts of the alimentary canal of man. Discuss the nervous and hormonal regulation of these secretions in brief. 9

V-306

[Turn Over

8. State and prove the Eisenstein criterion.  $12\frac{1}{2}$
9. Prove that a finite integral domain is a field.  $12\frac{1}{2}$

**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1  
which is compulsory

V-307-0.5



1. Answer any
- four*
- of the following :
- $7\frac{1}{2} \times 4$

a) Check whether the following set of vectors is Linearly independent or linearly dependent.

b) Find the rank and nullity of the matrix

$$\begin{bmatrix} 1 & 3 & 2 \\ -1 & 7 & 2 \\ 1 & 0 & 1 \end{bmatrix}$$

c) Let  $A = \begin{bmatrix} 3 & 1 \\ 6 & 2 \end{bmatrix}$ , Find the eigen values and eigen vectors.d) Prove that if  $G$  is a finite group whose order is a prime number  $p$ , then  $G$  is a cyclic group.

[ 2 ]

e) If  $\phi$  is a homomorphism of  $R$  into  $R'$  with Kernel  $I(\phi)$ , then prove that, If  $a \in I(\phi)$  and  $r \in R$  then both  $ar$  and  $ra$  are in  $I(\phi)$ .

f) Without expanding, prove that

$$\begin{vmatrix} a & b & c \\ x & y & z \\ p & q & r \end{vmatrix} = \begin{vmatrix} y & b & q \\ x & a & p \\ z & c & r \end{vmatrix}$$

g) State and prove the division algorithm.

h) If  $V$  has a basis of  $n$  elements, then prove that every other basis for  $V$  also has  $n$  elements.

2. If  $U$  and  $W$  are two subspaces of a finite-dimensional vector space  $V$ , then prove that  $12\frac{1}{2}$   
 $\dim(U + W) = \dim U + \dim W - \dim (U \cap W)$ .

3. Let  $T : U \rightarrow V$  and  $S : V \rightarrow W$  be two linear maps. Then prove that  $12\frac{1}{2}$

- a) If  $ST$  is onto, then  $S$  is onto.
- b) If  $ST$  is nonsingular, then  $T$  is one-one and  $S$  is onto.

[ 3 ]

4. a) Find the inverse of the matrix  $6\frac{1}{2}$

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ -1 & 1 & 1 \end{bmatrix}$$

b) Prove that the columns of a square matrix  $A$  are L.I iff its rows are L.I (L.I denotes Linearly independent).  $6$

5. Let  $A = \begin{bmatrix} 1 & 0 & -1 \\ 2 & 3 & 4 \\ 1 & 2 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} -1 & 2 & 0 \\ 3 & 6 & 1 \\ 1 & 5 & 3 \end{bmatrix}$   $12\frac{1}{2}$

prove that  $\det(AB) = (\det A) (\det B)$

6. Prove that,  $HK$  is a subgroup of  $G$  if and only if  $HK = KH$ .  $12\frac{1}{2}$

7. If  $f(x), g(x)$  are two nonzero elements of  $F[x]$ , then  $\deg (f(x) g(x)) = \deg f(x) + \deg g(x)$ .  $12\frac{1}{2}$

9. Production figure of a textile industry are as follows :  $12\frac{1}{2}$

Year	2005	2006	2007	2008	2009	2010	2011
Production: (in '000 units)	12	10	14	11	13	15	16

From the above data

- i) Determine the straight line equation by change of the origin under the least square method.
- ii) Estimate the production for 2012 and 2014.

V-308-3



**2018**

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer any *four* of the following :  $7\frac{1}{2} \times 4$ 
  - a) Distinguish between Continues series and Discrete series.
  - b) What are the advantages of the median ?
  - c) Explain the three important properties of standard deviation.
  - d) The arithmetic mean and the standard deviation of a set of 9 items are 43 and 5 respectively. If an item of value 63 is added to the set. Find the mean and standard deviation of 10 items.
  - e) From the pack of playing cards, two cards are drawn at random. Find the probability that one is an Aces and the other is an Knave.

V-308

[Turn Over

[ 2 ]

- f) Explain the time reversal test.
- g) Distinguish between Laspeyres and Paasche's index.
- h) Outline the causes of seasonal variation.
2. What is meant by editing? Explain how will you edit primary and secondary data? 12½
3. From the following series, Find the class intervals if the actual mean is 25 and the assumed mean is 20. 12½
- |                   |    |    |    |   |    |    |    |
|-------------------|----|----|----|---|----|----|----|
| Step deviation d' | 3  | 2  | 1  | 0 | -1 | -2 | -3 |
| No of students F  | 15 | 20 | 10 | 7 | 13 | 3  | 2  |
4. Explain the concept of skewness. How is skewness different from Dispersion? 12½
5. A box contains 8 black and 4 white balls. If 5 balls are drawn at random, Find the probability that 3 of them are black and 2 white balls. 12½
6. Define correlation. Explain the various types of correlation. 12½

[ 3 ]

7. Obtain the equation of two lines of regression from the data given below 12½

X	6	2	10	4	8
Y	9	11	5	8	7

8. From the following price of a commodity. Compute the index number with 2008 as base and recast the indices thus obtained by shifting the base to 2012.

<i>Year</i>	<i>Price</i>
2008	50
2009	60
2010	62
2011	65
2012	75
2013	78
2014	82
2015	84
2016	88
2017	90

12½

4. Give an account of the summer season in India. 9
5. Highlight the factors influencing the uneven distribution of population in India. 9
6. Discuss wheat cultivation in India. 9
7. Give an account of the cotton textile industries in India. 9
8. Discuss the types and importance of roadways in India.. 9
9. Describe the climate of Odisha. 9

V-300-0.2

**2018**

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer *five* questions including Q.No.1 which is compulsory

1. Answer in brief any *four* of the following : 6×4
- Purvachal.
  - Karakoram range.
  - Chhotnagpur plateau.
  - Literacy in India.
  - Coal Production in India.
  - Modernisation of railways.
  - Localisation of Iron and Steel industries.
  - Odisha Coastal Plain.
2. Discuss the physiography of the Coastal Plains. 9
3. Describe the major rivers of the Peninsula. 9

V-300

[Turn Over