

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme Under CBCSS

History

Core Course VI

HY 1541 – MAJOR TRENDS IN HISTORICAL THOUGHT AND WRITINGS

(2013, 2015-2017 Admission)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in **one** sentence or **two** each. Each carrying **1** mark.

1. Ballads
2. "The Histories"
3. Cyclic view of history
4. "Prison Note Books"
5. "The New Science"
6. Historicism
7. Lucien Febvre.
8. Rethinking History

9. Objectivity
10. Oral History.

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** of the following in one paragraph each. Each question carries **2** marks.

11. Quasi-historical writings.
12. Polybius of the Hellenistic period.
13. Explain the concept 'Universal History'.
14. Analyse the content of work 'City of Gold'.
15. Describe the contributions of Vico.
16. "The course of positive philosophy".
17. Rankaeian school of historiography.
18. Economic determinism.
19. Examine the theory of challenge and response.
20. Describe the content of "Historian's craft".
21. Explain the distinction between facts of the past and the facts of history.
22. How do you evaluate the total history project?

(8 × 2 = 16 Marks)

PART – C

Answer any **six** of the following in not more than **120** words. Each carrying **4** marks.

23. Assess the features of Greek historiography.
24. Analyse the weakness of medieval historiography.

25. Briefly analyse the views expressed by Ibn Khaldun in his work "Muqaddima".
26. Explain the contributions of ancient Chinese to the development of historiography.
27. Write a brief note on Cartesianism.
28. What are the limitations of narratives?
29. Write a note on Toyen bee's "Study of civilizations".
30. Bring out the contributions of Auguste Comte in the scientific understanding of history.
31. How did "The idea of progress" influence history?

PART – D

(6 × 4 = 24 Marks)

Answer **any two** of the following. Each question carries **15** marks.

32. Give an account of the contributions of Herodotus in the evolution of history as a discipline.
33. Discuss the new approaches introduced by the Annales school in historical writing.
34. Elucidate the challenges raised by post-modernism to the historical writing.
35. Critically assess the possibilities and limitations of historical materialism as tool of writing the history of society.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme Under CBCSS

History

Core Course VII

HY 1542 : COLONIALISM AND RESISTANCE MOVEMENTS IN INDIA

(2013, 2015–2017 Admission)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in **one** sentence or **two** each. Each carrying **1** mark.

1. Mercantilism
2. Tranquebar
3. Francois Martin
4. Dastak
5. *Rast Gofar*
6. Muslin
7. Leather Cockade
8. Mahesh Lal Datta

9. 'Dumb Brother'
10. General Service Enlistment Act

(10 × 1 = 10 Marks)

PART – B

Answer any **eight** of the following in **one** paragraph each. Each question carries **2** marks.

11. Oriental Despotism
12. White Man's Burden
13. Charter Act of 1833
14. Black Hole
15. Raghoba
16. Prardhana Samaj
17. Macaulay's Minute
18. Thomas Munroe
19. Female Infanticide
20. *Poligar*
21. *Ananda Math*
22. Tantia Tope

(8 × 2 = 16 Marks)

PART – C

Answer any **six** of the following in not more than **120** words each carrying **4** marks.

23. Imperialist Historiography on Indian Colonization.
24. Fourth Anglo-Mysore War
25. Features of Subsidiary Alliance
26. Main features of Woods Despatch
27. Young Bengal Movement
28. Ryotwari System
29. Vellore Mutiny
30. Nature of 1857 Revolt
31. Abolition of *Sati*

(6 × 4 = 24 Marks)

PART – D

Answer any **two** of the following essays. Each question carries **15** marks.

32. Briefly Describe the Anglo-Maratha Wars.
33. Critically examine the concept of Drain of Indian Wealth.
34. Assess the importance of the Revolts of Pazhassi Raja.
35. Describe the causes and consequences of 1857 Revolt.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A./B.Sc./B.Com. Degree Examination, February 2021

First Degree Programme Under CBCSS

Physical Education

Open Course

PE 1551 : HEALTH AND FITNESS EDUCATION

(2013, 2015 – 2017 Admn)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions. Each question carries **1** mark.

1. Define Health.
2. What is dislocation?
3. What do you understand by Malnutrition?
4. What is Oxygen Debt?
5. What is Scoliosis?
6. What are Fats?
7. Define Agility.
8. What is the meaning of Body Mass Index?

9. What are the sources of protein?

10. Define Sprains.

(10 × 1 = 10 Marks)

PART – B

Answer any **eight** questions. Each question carries **2** marks.

11. What do you mean by Food Adulteration?

12. Write down four objectives of Physical Education.

13. What is Balanced diet? Elucidate its elements.

14. Write down the Importance of cool down.

15. What is body composition?

16. What are anabolic steroids?

17. Define Hypo kinetic diseases.

18. What do you understand by first aid?

19. Define Heart rate and pulse rate.

20. What do you mean by drug abuse in sports?

21. What are the biological factors that affect health?

22. Who is eligible for Arjuna Award?

PART – C

(8 × 2 = 16 Marks)

Answer any **six** questions. Each question carries **4** marks.

23. What are the five dimensions of health?

24. Briefly write about the importance of Warm-up.

25. Write a note on wellness.
26. What are the advantages of aerobic exercises?
27. Comment on the role of Media in creating a Positive Sports Environment.
28. Briefly explain the significance of Personal hygiene.
29. What are the first aid measures for bleeding through nose and electric shock?
30. Explain the overuse of computer.
31. Explain the meaning and concept of correct posture.

(6 × 4 = 24 Marks)

PART – D

Answer any **two** questions. Each question carries **15** marks.

32. Discuss the coordinative abilities in detail.
33. Discuss the need and importance of recreation for healthy living.
34. Describe the effect of exercise on respiratory and circulatory system.
35. Briefly discuss the methods to increase women's participation in sports?

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, FEBRUARY 2021.

First Degree Programme under CBCSS

Economics

Core Course VI

EC 1541- MONEY AND MODERN BANKING

(2015 –2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – I

I. Answer all questions. Answer in one or two sentences

1. Repo rate

2. IFSC

3. Credit card

4. ECS

5. Demand draft

6. What do you mean by Crossing of a cheque?

7. Balance sheet of a bank

8. Inflation

9. Money multiplier
10. Define dishonouring of cheque.

(10 × 1 = 10 Marks)

SECTION – II

II. Answer any eight questions not exceeding one paragraph. Each question carries two marks.

11. Cash reserve system of RBI.
12. Non-banking financial institutions (NBFIs)
13. Internet banking
14. What are the difference between NEFT and RTGS?
15. Write a note on Demand Draft
16. Monetarist approach of demand for money
17. Define Velocity of money
18. High powered money
19. What are the difference between saving and current account of the bank?
20. What do you mean by Personal identification Number (PIN)
21. Fishers equation of exchange
22. Open market operations of central bank

(8 × 2 = 16 Marks)

SECTION – III

III. Answer any six of the following. Each answer should not exceed 120 words.

Each question carries 4 marks.

23. What are the major functions of the RBI?
24. Discuss the structure of Indian cooperative credit market?
25. Examine the evolution of modern currency system in India?
26. What are the different determinants of money supply in India?
27. What are the different negotiable instruments in commercial banks?
28. How did NPA become a serious issue in Indian banking sector, Discuss
29. Examine the different methods of online fund transfer of Banks?
30. What do you mean by credit creation of banks?
31. What all are the different monetary standards existed in India.

(6 × 4 = 24 Marks)

SECTION – IV

IV. Answer any two questions not exceeding 4 pages each. Each question carries 15 marks.

32. Critically examine the functions of Money?
33. Narrate the pros and cons of banking sector reforms in India since 1991.
34. What are the functions of commercial banks in India? How does banks help in the economic development of our country?
35. Critically assess the changes that took place in the Indian banking industry with the arrival of Information technology?

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme under CBCSS

Economics

Core Course VII

EC 1542 : MACRO ECONOMICS II

(2015-2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer **all** questions in one word to maximum of two sentences. Each question carries **1** mark.

1. Cross-sectional data.
2. Transitory income.
3. Demonstration effect.
4. Autonomous investment.
5. Stagflation.
6. Multiplier.
7. Liquidity trap.
8. Pigou effect.

9. Velocity of money.
10. Marginal efficiency of capital.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions not exceeding one paragraph. Each question carries **2 marks**.

11. Write a note on subjective factors influencing consumption.
12. State Keynes' Psychological Law of Consumption.
13. Explain briefly the Keynesian multiplier. Calculate the value of investment multiplier when MPS is equal to 20%.
14. What is Phillips Curve?
15. Fisher's equation of exchange.
16. Write a note on Cost push inflation.
17. What is meant by the monetary base?
18. Consumption puzzle.
19. Discuss briefly the phases of trade cycle.
20. Discuss the main objectives of monetary policy.
21. What is deflationary gap?
22. What are the constituents of money-supply in India?

(8 × 2 = 16 Marks)

SECTION – III

Answer **any six** questions not exceeding **120** words. Each question carries **4** marks.

23. Define acceleration principle. Explain its working.
24. Distinguish between short run and long run Phillips Curves.
25. Explain the Crowding out effect with the help of IS-LM Model.
26. What are the costs of inflation?
27. Explain the H theory of money supply.
28. Discuss the measures to control trade cycles.
29. What are the reasons for holding money in the Keynesian system?
30. How does Life Cycle Hypothesis solve consumption puzzle?
31. What are the determinants of Keynesian Investment function?

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions not exceeding **4** pages. Each question carries **15** marks.

32. Critically explain the Hicksian theory of trade cycle.
33. Derive IS and LM curves and explain the basic ISLM model.
34. Critically evaluate permanent income hypothesis.
35. Examine Friedman's restatement of the quantity theory of money.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme under CBCSS

Economics

Core Course VIII

EC 1543 : ECONOMICS OF GROWTH AND DEVELOPMENT

(2015-2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer **all** questions in **1** word to maximum of **2** sentences. Each question carries **1** mark.

1. Social dualism
2. Life Expectancy
3. Head Count Ratio
4. Invention
5. Disguised unemployment
6. Warranted growth rate
7. Malnutrition
8. DPA
9. Economic development
10. Social capital.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions not exceeding **1** paragraph. Each question carries **2** marks.

11. What is critical minimum effort thesis?
12. What is Economic development?
13. What are the essential components of human development?
14. Explain Gini Coefficient.
15. What are 'stimulants' according to Leibenstein?
16. What are the economic and non-economic factors of economic growth?
17. Define modern economic growth.
18. Point out the indicators of under development.
19. Briefly explain various assumptions in the Ricardian Theory of Development.
20. What are the features of vicious circle of poverty?
21. What are the major assumptions of Karl Marx's theory?
22. Point out the growth agents in Leibenstein's theory.

(8 × 2 = 16 Marks)

SECTION – III

Answer **any six** questions not exceeding **120** words. Each question carries **4** marks.

23. What do you mean by Big Push Theory?
24. Explain the Endogenous growth theory.
25. Explain Kuznet's inverted U hypothesis.

26. Explain Human Development Index.
27. Explain Technological dualism.
28. What are assumptions of Joan Robinson's Golden Age Model of Economic growth?
29. Distinguish between Economic growth and development.
30. Explain unbalanced theory of economic development.
31. Explain the growth rates of Harrods's model.

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions not exceeding **120** words. Each question carries **15** marks.

32. Write an essay on the neoclassical growth model of Solow?
33. Write an essay on Joan Robinson's Golden Age Model of Economic growth.
34. What are the main characteristics of an underdeveloped economy?
35. Explain diagrammatically the low level equilibrium trap.

(2 × 15 = 30 Marks)

Reg. No. :

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Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme under CBCSS

History

Core Course VI

HY 1541 : MAJOR TRENDS IN HISTORICAL THOUGHT AND WRITINGS

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in one sentence or two each. Each question carries **1** mark.

1. Logographers
2. Tariq
3. Muqaddima
4. Polibius
5. Historia
6. Base and Superstructure
7. Zeitgeist

8. Antonio Gramsci
9. Rationalism
10. Rethinking history.

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** of the following in one paragraph each. Each question carries **2 marks**.

11. Kitab-al-Ibar.
12. Explain the contributions of Tacitus to history.
13. What is Quasi history?
14. Explain Isnad.
15. Cyclical view of history.
16. Historical seminar.
17. Berlin Revolution.
18. Skepticism.
19. Rene Descartes.
20. Impact of Romanticism on historiography.
21. Positivism.
22. Features of Enlightenment historiography.
23. Local narratives.

- 24. Oral history.
- 25. Features of Structuralism.
- 26. Micro history.

(8 × 2 = 16 Marks)

PART – C

Answer **any six** of the following in not more than 120 words each. Each question carries **4** marks.

- 27. Assess the importance of Myth in the study of history.
- 28. Give an account on Su-Ma-Chien's ideas on history.
- 29. Differentiate between past and history.
- 30. Point out the views of St. Augustine explained in the City of God.
- 31. How far history is scientific in nature? Analyze the views of August Comte.
- 32. What is interdisciplinary approach? Explain.
- 33. Assess the contributions of Edward Gibbon to history.
- 34. Explain Hegel's idea on history.
- 35. What is Historiography?
- 36. What are the impact of the Renaissance on historiography?
- 37. Prepare a brief note on subaltern historiography.
- 38. Analyze the influence of Post modernism on history.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** of the following. Each question carries **15** marks :

39. Discuss the salient features of Greek Historical writings.
40. What are the peculiarities of medieval historical writings? Analyse the views of Ibn Khaldhun to substantiate your answer.
41. Examine the role of Marxian philosophy in the study of history.
42. Discuss the views of Vico on history.
43. Is objectivity possible in History? Substantiate.
44. Briefly describe the contributions of Annales historians to history.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme under CBCSS

History

Core Course VII

HY 1542 : COLONIALISM AND RESISTANCE MOVEMENTS IN INDIA

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

Directions : Answer can be written either in Malayalam or in English.

PART – A

Answer **all** questions is one word or one or two sentences. Each carrying **1** mark.

1. Evangelical historians.
2. 'propagandist history'
3. Merchant Adventurers
4. Black Hole incident
5. Bengal Gazette
6. Hyder Ali
7. Robert Clive

8. Mir Qasim
9. Deindustrialization
10. Veluthampi.

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** of the following in one paragraph each. Each question carries **2 marks**.

11. Dadabhai Naoroji
12. Marxist historiography
13. *The Subaltern Studies*
14. The French East India Company
15. Treaty of Sreerangapattanam
16. Pitt's India Act
17. Mahalwari Settlement
18. Doctrine of Lapse
19. Commercialization of agriculture
20. Orientalist-Anglicist debate
21. Brahma Samaj
22. Aligarh Movement
23. Resistance movement of the Poligars

24. Sanyasi Rebellion
25. Charter Act of 1833
26. Female infanticide.

(8 × 2 = 16 Marks)

PART – C

Answer **any six** of the following in not more than **120** words. Each question carries **4** marks.

27. Explain the features of the colonial historiography.
28. Discuss the nature of the early reform movements of India.
29. Explain the historical significance of the Battle of Buxar.
30. Briefly explain the Anglo-French rivalry.
31. Write a note on Anglo-Maratha relations.
32. Trace out the significance of the Charter Act of 1813 in the history of Indian education.
33. Write a note on the social reform activities of Sree Narayan Guru.
34. Explain the impact of British policy on Indian agriculture.
35. Why Pazhassi Raja revolted against the British?
36. Briefly describe the Santhal rebellion.
37. Why the revolt of 1857 was a failure?
38. Explain the social evils of Indian society during the British period.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** of the following. Each question carries **15** marks.

39. Explain nationalist historiography. How far it helped to inspire national feeling among the Indians?
40. Describe the growth of Indian press. Explain its impact on Indian national movement.
41. Explain the socio-religious reform movements of 19th century India. How far it contributed for the emancipation of the marginalized?
42. Write an essay on the growth of education in British India.
43. Explain the causes for the revolt of 1857.
44. Discuss the early resistance movements of South India against colonial rule.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme under CBCSS

History

Core Course IX

HY 1544 — HISTORY OF PRE-MODERN KERALA

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in **one** sentence or **two** each. **Each** question carries **1** mark.

1. Muniyara.
2. Umanar.
3. Ezhimala.
4. Tevaram.
5. Attaikkol.
6. Ur.
7. Joseph Rabban.
8. Karalar.

9. Patinettarakavikal.
10. Ananthapura Varnanam.

(10 × 1 = 10 Marks)

PART – B

Answer any **eight** of the following in **1** paragraph each. **Each** question carries **2** marks.

11. Travancore Archaeological series.
12. Tarisappalli Copper Plate.
13. Cheramanparambu.
14. Brahmaswam and Devaswam.
15. St. Thomas Tradition.
16. Silappatikaram.
17. What is Ariyittuvazhcha?
18. Explain Mamankam.
19. Sankaranarayana.
20. Who is a Devadasi?
21. Kolathiris.
22. Poonthanam.
23. Sanketam.
24. Mural painting.

25. Nalutali

26. Marumakkattayam.

(8 × 2 = 16 Marks)

PART – C

Answer any **six** of the following in not more than **120** words each. **Each** question carries **4** marks.

27. What are the major sources for the reconstruction of Pre-Modern Kerala history? Explain.
28. Give an account on the Life and culture of Early Tamil society.
29. Briefly describe the influence of Buddhism on Kerala with suitable examples.
30. Prepare a brief note on Sankaracharya.
31. What caused the expansion of agrarian society in pre-modern Kerala?
32. Examine the system of Knowledge in Pre-Modern Kerala.
33. Give an account on the Kaccams existed in the Perumal period.
34. What are the major contributions of Elamkulam P N Kunjan Pillai to Kerala History?
35. What were the causes for the decline of Perumals?
36. Describe the features of Jenmi system in Kerala.
37. Write a note on the Martial tradition of Medieval Kerala.
38. Prepare a short note on the Chinese contact on Kerala society.

(6 × 4 = 24 Marks)

PART – D

Answer any **two** of the following. **Each** question carries **15** marks.

39. Define Megaliths. Explain the major types found in Kerala and culture.
40. Briefly describe the Maritime contact of the Ancient Tamils.
41. Explain the Land relations under the Perumals of Kerala.
42. Give an account on trade and trade guilds of Early Medieval Kerala.
43. Point out the evolution of Swarupams and its structure.
44. Explain the peculiar geographical features of Kerala.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme under CBCSS

History

Core Course VIII

HY 1543 : HISTORY OF MODERN WORLD PART II

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

Directions : Answer can be written either in Malayalam or in English.

PART – A

Answer **all** questions in one word or one or two sentences. Each carrying **1** mark.

1. The Liberator.
2. Young Italy
3. Congress of Vienna
4. William I
5. Pan-German movement
6. *Weltpolitic*
7. Brestlitovsk

8. Treaty of Lausanne
9. *Mein Kampf*.
10. Pearl Harbour.

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** of the following in one paragraph each. Each question carries **2** marks.

11. Red Shirts
12. 'Bleeding Kansas'
13. 'Master Race' theory
14. Tripple Entente
15. The policy of 'blood and iron'
16. Fourteen Points
17. Paris Peace Conference
18. The Weimar Republic
19. Greater Serbia Scheme
20. Great Depression
21. Third Reich
22. Neville Chamberlain
23. Munich Pact
24. Phoney War

25. Yalata Conference
26. The Trusteeship Council.

(8 × 2 = 16 Marks)

PART – C

Answer **any six** of the following in not more than 120 words each. Each question carries **4** marks.

27. Explain the role of Abraham Lincoln in the Civil War of America.
28. Write a note on the foreign policy of Mussolini.
29. Explain the role of Mazzini in the unification of Italy.
30. Write a note on the Franco-Prussian War.
31. How imperialist rivalries led to the First World War?
32. Write a note on the different Covenant of the League of Nations.
33. Briefly explain the course of the First World War.
34. Explain the internal reforms of Mustafa Kamal Pasha.
35. Why the League of nations failed to achieve its aims?
36. How far the 'Big Powers' responsible for the Second World War?
37. Write a note on the War-time Conferences of 1939-45.
38. Explain Cold War. How Cold War led to race for armaments.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** of the following. Each question carries **15** marks.

39. Write an essay on the unification of Germany. What were the consequences of the 'blood and iron' policy of Bismarck in the future history of Europe?
40. Explain the rise and growth of Fascism in Italy.
41. Explain the causes and consequences of the Second World War.
42. Write an essay on various organs of the UNO.
43. Discuss in detail the causes for the American Civil War.
44. Critically examine the role of UNO in the post-War world.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme under CBCSS

History

Core Course IX

HY 1544 — HISTORY OF PRE-MODERN KERALA

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in **one** sentence or **two** each. **Each** question carries **1** mark.

1. Muniyara.
2. Umanar.
3. Ezhimala.
4. Tevaram.
5. Attaikkol.
6. Ur.
7. Joseph Rabban.
8. Karalar.

9. Patinettarakavikal.
10. Ananthapura Varnanam.

(10 × 1 = 10 Marks)

PART – B

Answer any **eight** of the following in **1** paragraph each. **Each** question carries **2** marks.

11. Travancore Archaeological series.
12. Tarisappalli Copper Plate.
13. Cheramanparambu.
14. Brahmaswam and Devaswam.
15. St. Thomas Tradition.
16. Silappatikaram.
17. What is Ariyittuvazhcha?
18. Explain Mamankam.
19. Sankaranarayana.
20. Who is a Devadasi?
21. Kolathiris.
22. Poonthanam.
23. Sanketam.
24. Mural painting.

25. Nalutali
26. Marumakkattayam.

(8 × 2 = 16 Marks)

PART – C

Answer any **six** of the following in not more than **120** words each. **Each** question carries **4** marks.

27. What are the major sources for the reconstruction of Pre-Modern Kerala history? Explain.
28. Give an account on the Life and culture of Early Tamil society.
29. Briefly describe the influence of Buddhism on Kerala with suitable examples.
30. Prepare a brief note on Sankaracharya.
31. What caused the expansion of agrarian society in pre-modern Kerala?
32. Examine the system of Knowledge in Pre-Modern Kerala.
33. Give an account on the Kaccams existed in the Perumal period.
34. What are the major contributions of Elamkulam P N Kunjan Pillai to Kerala History?
35. What were the causes for the decline of Perumals?
36. Describe the features of Jenmi system in Kerala.
37. Write a note on the Martial tradition of Medieval Kerala.
38. Prepare a short note on the Chinese contact on Kerala society.

(6 × 4 = 24 Marks)

PART – D

Answer any **two** of the following. **Each** question carries **15** marks.

39. Define Megaliths. Explain the major types found in Kerala and culture.
40. Briefly describe the Maritime contact of the Ancient Tamils.
41. Explain the Land relations under the Perumals of Kerala.
42. Give an account on trade and trade guilds of Early Medieval Kerala.
43. Point out the evolution of Swarupams and its structure.
44. Explain the peculiar geographical features of Kerala.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

First Degree Programme under CBCSS

History

Core Course X

HY 1545 – MAKING OF INDIAN NATION

(2018 Admission-Regular)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in one sentence or two each. Each question carries **1** mark.

1. Swadeshi Movement
2. Round Table Conferences
3. C S P
4. Forward Bloc
5. Mountbatten
6. R I N Mutiny
7. Hindu Mahasabha
8. Hindustan Socialist Republican Association

9. Hind Swaraj
10. Mohan Singh

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** of the following in one paragraph. Each question carries **2** marks.

11. Azad Hind Fouj
12. Jamia Milia Islamia
13. Peshawar Conspiracy Cases
14. Komagatamaru incident
15. Payyannur Salt Satyagraha
16. Simon Go Back
17. Annie Besant
18. Partition of Bengal
19. Udham Singh
20. Poorna Swaraj
21. Preethy Latha Vaddedar
22. All India Muslim League
23. Do or Die Campaign
24. Frontier Gandhi
25. Communist Party of India
26. Bardoli Satyagraha

(8 × 2 = 16 Marks)

PART – C

Answer **any six** of the following in not more than **120** words. Each question carries **4** marks.

27. Discuss the activities of Constituent Assembly.
28. Describe the Two- Nation theory and the Pakistan Movement.
29. Why did Cripps Mission fail?
30. Explain the significance of Lucknow Pact.
31. What were the major proposals of the Cabinet Mission?
32. How did the Revolutionary terrorists in Bombay presidency respond to the British rule?
33. Bring about the role of Chandrasekhar Azad in the National Movement.
34. Discuss about Gandhian Constructive Programmes.
35. How did India react with the INA trials?
36. Elaborate the role of Tilak in the National Movement.
37. Examine the life of Kalpana Dutta as a revolutionary.
38. Give an assessment of Gandhi and Ambedkar debate.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** of the following. Each question carries **15** marks.

39. Evaluate the destiny of the Non Cooperation Movement.
40. Analyse the role of Subhash chandra Bose in Indian National Movement

41. Critically evaluate the Govt. of India Act 1935.
42. Trace out the growth of Communalism in India.
43. Discuss how Quit India Movement was different from other nation-wide Movements.
44. Analyse the challenges and responses of Indian National Congress till partition.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

History

Open Course

HY 1551.2- INTRODUCTION TO ARCHAEOLOGY

(2018 Admission Regular)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in one sentence or two each. Each question carries **1** mark.

1. Petrology
2. Sondage
3. Historical dating
4. Antiquarianism
5. Artifact
6. Pollen Analysis
7. Digital format

8. Seriation
9. Rehydroxylation
10. Edakkal Caves

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** of the following in one paragraph each. Each question carries **2 marks**.

11. Magnetometer
12. Trial trench
13. C14 dating method
14. Mehrgarh
15. Salvage Archaeology
16. Aerial Archaeology
17. Archaeological Survey of India
18. Adichanallur
19. Fluorine Dating
20. Archaeological Culture
21. Assemblage
22. Paleolithic tools
23. Discuss the Thermoluminescence
24. What is Typology in Archaeology

25. Examine the quadrant method of excavation
26. Discuss the principle of Stratigraphy

(8 × 2 = 16 Marks)

PART – C

Answer **any six** of the following in not more than **120** words each. Each question carries **4** marks.

27. What are the main functions of Archaeologists
28. Discuss the relation of Archaeology with History
29. What are the morphological aspects in Archaeology
30. What is the importance of stone during the Paleolithic Period
31. Give an account on the Aerial reconnaissance
32. How far archaeology is a source for the reconstruction of ancient history
33. Briefly describe the inter disciplinary nature of archaeology
34. Discuss marine Archaeology and its relevance in the study of submerged cities
35. Examine the salient features of Neolithic culture
36. Sketch the importance of Dendrochronology in Archaeology
37. Briefly analyze radio-Carbon dating method
38. Explain the importance of museum and how can we preserve it.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** of the following. Each question carries **15** marks.

39. Give an account of the history of archaeology in India
40. Discuss the important exploration methods in archaeology
41. Define Archaeology and examine its aims and objectives
42. What are the problems encountered in archaeological excavations
43. Analyze different kinds of Archaeology
44. Discuss the various process of identification of a site.

(2 × 15 = 30 Marks)

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First Degree Programme Under CBCSS

Economics

Core Course VI

EC 1541 – MONEY AND MODERN BANKING

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer in **one** or **two** sentences. Attempt **all** questions.

1. Demand Draft
2. Bank
3. Time Deposit
4. SWIFT
5. NPA
6. Liquidity
7. Debit Card
8. Overdraft

9. Bills of Exchange

10. Cash credit

(10 × 1 = 10 Marks)

SECTION – II

Answer any **eight** questions not exceeding one paragraph. Each question carries **2** marks.

11. How do you define commercial bank?
12. What is ATM?
13. What do you mean by monetary standards?
14. Briefly explain dishonouring of cheques.
15. High Powered Money.
16. Briefly explain the concept mobile banking.
17. What is credit policy?
18. What are the important primary functions of commercial banks?
19. What do you mean by financial intermediaries?
20. What do you mean by the concept money?
21. What is cash reserve ratio?
22. What is IFSC?
23. Briefly explain the concept money supply.
24. Distinguish between NEFT and RTGS.

25. Explain Drawer, Drawee and Payee.
26. Distinguish between repo and reverse repo.

(8 × 2 = 16 Marks)

SECTION – III

Answer any **six** questions not exceeding **120** words. Each question carries **four** marks.

27. Discuss about various forms of deposits and advances performed by commercial banks.
28. What is credit creation?
29. Give an account of the recent trends in Indian banking.
30. Discuss about the cooperative credit structure in India.
31. What is bank rate policy?
32. Discuss about Negotiable instruments.
33. Analyse the balance sheet of a commercial bank.
34. Explain open market operations.
35. What do you mean by money multiplier?
36. Discuss briefly about the financial sector reforms initiated in 1991.
37. What are the different functions of money?
38. Discuss Keynesian of Demand for Money.

(6 × 4 = 24 Marks)

SECTION – IV

Answer any **two** questions not exceeding four pages. Each question carries **fifteen** marks.

39. Discuss the impact NPA on Indian economy.
40. State the relevance of SARFAESI Act 2002.
41. Elucidate important functions of commercial bank.
42. Give an account of various determinants of money supply. *
43. What do you mean by monetary standards? Discuss about different types of monetary standards.
44. Discuss the important functions of RBI.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

Economics

Core Course VII

EC 1542 – MACRO ECONOMICS - II

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer in **one** or **two** sentences. Attempt **all** questions

1. LM curve
2. Fiat money
3. APC
4. Speculative motive
5. Liquidity trap
6. Hyper inflation
7. GDP deflator

8. Core inflation
9. Trade cycles
10. Equation of exchange

(10 × 1 = 10 Marks)

SECTION – II

Answer any **eight** questions not exceeding **one** paragraph. Each question carries 2 marks.

11. Explain the concept of deflationary gap
12. What is moral suasion?
13. If the value of MPS is 0.2, what is the rate of income multiplier?
14. Explain the concept of galloping inflation.
15. Distinguish between real and financial investment.
16. Explain savings function.
17. Explain the concept of cyclical unemployment.
18. What is inventory investment?
19. Explain the concept of transitory income.
20. Explain Keynesian investment function.
21. Given an economy consuming 100 Crores annually with MPC = 0.8, find out the equilibrium level of income for the economy.
22. What is cost push inflation?
23. What is Pigou effect?
24. What is induced investment?

25. Distinguish between fiscal and monetary policy.
26. Explain Keynes effect.

(8 × 2 = 16 Marks)

SECTION-III

Answer any **six** questions not exceeding **120** words. Each question carries **4** marks.

27. Explain determinants of consumption expenditure.
28. Business cycle fluctuations are essentially a growth phenomenon. Explain.
29. Explain trade cycle theory of Hayek.
30. Examine consumption puzzle.
31. How Friedman restated the quantity theory of money?
32. Distinguish between MEC and MEI.
33. Explain the different possibilities of dampeners on accelerator.
34. Explain real balance effect.
35. How saving paradox emerges?
36. Explain the relationship between inflation and unemployment.
37. Explain the significance of WPI and CPI in measuring inflation.
38. Explain the leakages in multiplier process.

(6 × 4 = 24 Marks)

SECTION-IV

Answer any **two** questions not exceeding **four** pages. Each question carries **15** marks.

39. Critically examine relative income hypothesis of consumption.
40. Examine the theory of long run Phillips curve.

41. Explain the working of quantitative credit control tools.
42. How quantity theory of money forms the base for classical macro economics?
43. Illustrate the simultaneous attainment of product and money market equilibrium under IS LM frame work.
44. Examine the significance of life cycle hypothesis in determining long run consumption behaviour.

(2 × 15 = 30 Marks)

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FIRST DEGREE PROGRAMME UNDER CBCSS

Economics

Core Course VIII

EC 1543 – ECONOMICS OF GROWTH AND DEVELOPMENT

(2018 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer in one or two sentences, Attempt all questions

1. Natural growth rate
2. North-South divide
3. Growth Agents
4. Poverty gap
5. Per Capita income
6. Happiness index
7. Backwash effect
8. Social dualism

P.T.O.

9. Laissez-faire
10. Capital output ratio.

(10 × 1 = 10 Marks)

SECTION – II

Answer any eight questions not exceeding one paragraph. Each question carries 2 marks.

11. Lorenz curve
12. Gender development index
13. Define Economic development
14. Distinguish between Poverty and Deprivation
15. What is financial dualism?
16. PQLI
17. Examine the importance of Stationary state in the Ricardian theory of development.
18. Write a short note on Obstacles of growth.
19. Explain the concept of Development gap.
20. Poverty has multi-dimensions- Substantiate.
21. Balanced growth strategy of development.
22. Backward linkage and forward linkage.
23. What are the main ideas of low level equilibrium trap theory?
24. Materialistic interpretation of history by Karl Marx.
25. Three Core values of development.
26. How Endogenous growth theories explain economic development?

(8 × 2 = 16 Marks)

SECTION – III

Answer any six questions not exceeding 120 words. Each question carries 4 marks.

27. Examine how inequality is measured using Gini-Coefficient.
28. How far Lewis theory differs from the theory of Fei–Ranis two sector model?
29. Describe Adam Smith as the first development Economist.
30. Discuss Hirschman's view on economic development.
31. How Ragnar Nurkse explains disguised unemployment as a source of capital formation in UDCs?
32. Bring out the relationship between economic development and inequality envisaged in the Kuznets theory?
33. Solow's model is long run growth model. Comment.
34. Examine the Stages of growth theory of Rostow as a Non-Communist manifesto.
35. Describe the views of Joan Robinson on economic growth.
36. Write a short note on Amartya Sen's Capability approach.
37. Describe the theory of Circular causation as a theory of Geographical dualism.
38. Economic development is a multidimensional concept. Discuss.

(6 × 4 = 24 Marks)

SECTION – IV

Answer any two questions, not exceeding four pages. Each question carries 15 marks.

39. List out the basic characteristics of LDCs.
40. Examine the Leibenstein's Critical Minimum Effort thesis as a path to sustained development of UDCs.

41. Elucidate the Big Push theory of development.
42. Discuss the different measures of Economic development.
43. How Dualistic theories explain the underdevelopment in the UDCs?
44. Critically examine the Harrod-Domar model of development.

(2 × 15 = 30 Marks)

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First Degree Programme Under CBCSS

Economics

Core Course IX

EC 1544: INDIAN ECONOMY

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer in one or two sentences. Attempt **all** questions.

1. Inclusive Development
2. Mixed Economy
3. GST
4. TRIPS
5. Demography
6. Food Security
7. Foreign Direct Investment
8. Usual status unemployment

9. Relative poverty

10. MRTP

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions not exceeding one paragraph. Each question carries **2 marks**

11. Write a short note on National Food Securities Act 2013.
12. Examine the need for Second Green Revolution in India.
13. State the relevance of Demographic Dividend.
14. What is meant by Land Reforms?
15. List out the major institutional sources of Agriculture finance in India.
16. Functions of NITI Aayog.
17. Examine the rationale for the existence of Public Sector Undertakings in Indian economy.
18. Describe the objectives of Pradhan Mantri MUDRA Yojana.
19. Write a short note on Agreement on Agriculture of WTO.
20. Discuss Amartya Sen's views on Poverty.
21. What are the major features of industrial Policy Resolution 1956?
22. Examine MGNREGS as a Poverty Alleviation Scheme.
23. Write a short note on the Economic Crisis of 1990.
24. List out the importance of infrastructure in economic development.

25. Cite the promotion measures adopted for the development of small scale industries in India.
26. What are the objectives of New Agriculture Policy 2000?

(8 × 2 = 16 Marks)

SECTION – III

Answer **any six** questions not exceeding 120 words, Each question carries **4** marks.

27. State the importance and objectives of MSMEs in India.
28. What are the main objectives of National Population Policy 2000?
29. Examine the role of WTO in Indian Agriculture.
30. Define Cropping pattern and what are the factors affecting cropping pattern?
31. Inclusive development is the need of the day. Substantiate the statement.
32. Write a short note on the positive impacts of urbanization.
33. Small scale industry plays an important role in alleviating rural poverty. State the reasons.
34. Examine New Industrial Policy of 1991 as a breakthrough in the industrial policies since independence.
35. Describe the issues of concern of the Post-Economic Reforms in India.
36. Banking sector witnessed tremendous changes after the economic reforms of 1990. Justify the statement.
37. Make a short note on the poverty estimate of Tendulkar committee.
38. Write a short note on the role and performance of Service sector in Indian Economy.

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions, not exceeding **4** pages. Each question carries **15** marks

39. Make a critical assessment of the objectives of planning in India and how far it is achieved in India.
40. Examine the positive and negative impacts of Green revolution on Indian agriculture.
41. Assess the problems of small scale and cottage industries and the measures to promote the small scale industries in India.
42. Make a critical evaluation of economic reforms and its impact on India.
43. Examine the demographic trends revealed in 2011 census with special emphasis on the demographic dividend.
44. Discuss the components of land reforms in India and also examine how far it is conducive for the agriculture development in India.

(2 × 15 = 30 Marks)

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Economics

Core Course X

EC 1545 – PUBLIC ECONOMICS

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer in one or two sentences. Attempt all questions.

1. Marginal Social Benefit.
2. Merit goods.
3. VAT.
4. Budget.
5. Public debt.
6. Fiscal federalism.
7. Non tax revenue.
8. Digressive taxation.
9. Special assessments.
10. Club goods.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions not exceeding **one** paragraph. Each question carries **2** marks.

11. What do you mean by consolidated fund of India?
12. Explain the concept of Laffer curve.
13. Examine the term taxable capacity.
14. Explain the concept of performance budgeting.
15. Examine the concept of tragedy of commons.
16. What are the salient features of GST?
17. What are the basic objectives of public debt?
18. What are the basic instruments of fiscal policy?
19. Explain deficit financing.
20. Explain the concept of public finance.
21. What is the concept of financial administration?
22. Examine the basic objective of fiscal policy.
23. Explain the basic revenue sources of local bodies.
24. Distinguish between impact and incidence of taxation.
25. Examine the concept of programme budgeting.
26. Distinguish between advalorem and specific duty.

(8 × 2 = 16 Marks)

SECTION – III

Answer **any six** questions not exceeding **120** words. Each question carries **4** marks.

27. Examine the similarities and dissimilarities between public finance and private finance.
28. What are the basic characteristics of public goods?
29. How externalities lead to market failure?
30. Examine Adam Smith's canons of taxation.
31. What are the basic categories of public expenditure?
32. Examine Gadgil-Mugharjee Formula of fiscal devolution.
33. Critically evaluate Peacock-Wiseman hypothesis.
34. Examine the reasons for the growth of public expenditure in India.
35. What are the basic classifications of public debt?
36. What are the different sources of public revenue?
37. Examine the economic effects of deficit financing.
38. Distinguish between proportional and progressive taxation.

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions not exceeding **4** pages. Each question carries **15** marks.

39. Examine the various methods of public debt redemption.
40. Critically evaluate the principle of maximum social advantage.

41. Examine the propositions of Musgrave's theory of incidence.
42. Evaluate the merits and demerits of direct and indirect taxes.
43. Critically evaluate Wagner's law of increasing state activities.
44. Examine the nature, scope and significance of public finance.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

Economics

Open Course

EC 1551 : HUMAN RESOURCE MANAGEMENT

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

(Short Answer Type)

Answer in **one or two** sentences attempt **all** questions.

1. Incentives
2. Collective bargaining
3. HRD
4. Work participation rate
5. Recruitment
6. On the Job training
7. HR Planning

8. Coordination
9. Organisational structure
10. Layoff

(10 × 1 = 10 Marks)

SECTION – II

(Short Answer)

Answer **any eight** questions not exceeding **one** paragraph. Each question carries **2** marks.

11. Explain the relevance of HRM.
12. Point out the important prerequisites of a good organisation structure?
13. Write a short note on the need for External recruitment.
14. What you meant by induction?
15. What is HR Gap?
16. Explain the concept of Human capital.
17. Bring out the emerging functions of HRM.
18. Explain the concepts of Selection and Placement.
19. What are the good qualities of a HR Manager?
20. Write a short note on Industrial Democracy.
21. Explain the concepts of Industrial relations and Industrial disputes.
22. What you meant by corporate excellence?
23. Distinguish between Promotion and Demotion.

24. Explain the need and benefits of Training.
25. What are the important advantages of Campus Recruitment?
26. What is Discharge or dismissal?

(8 × 2 = 16 Marks)

SECTION – III

(Short Essay)

Answer **any six** questions, not exceeding **120** words. Each question carries **4** marks.

27. Explain the various perspectives of HRM.
28. Briefly explain Traditional types of Organisation.
29. What are the important advantages of the Good industrial relationship?
30. Distinguish between Layoff and Retrenchment.
31. Write a short note on the Economic principle of 'labour theory of value'.
32. Explain the procedure of disciplinary action in a firm.
33. Explain the strategy of Worker's participation in HR management.
34. What are important steps involved in Selection process?
35. Explain the meaning and objectives of HR Planning.
36. Explain the concepts of Transfer, Layoffs and Compensation.
37. What are the causes for industrial disputes?
38. Briefly explain the role of HRM in Strategic Management.

(6 × 4 = 24 Marks)

SECTION – IV

(Long Essay)

Answer **any two** questions, not exceeding **four** pages. Each question carries **15** marks.

39. Explain the objectives and functions of Human Resource Management.
40. Define Training. What are the important methods of Training? Explain.
41. Describe the role of HRM in the current economic situation.
42. Explain the need and importance of HR planning at Macro level. What are the various factors influencing in HR planning?
43. Define Recruitment. What are the methods used for Recruitment process?
44. Explain the need for adaptive system for HRM.

(2 × 15 = 30 Marks)

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First Degree Programme Under CBCSS

Mathematics

Open Course

MM 1551.1 : OPERATIONS RESEARCH

(2013, 2015 – 2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the **first ten** questions are compulsory. They carry **1** mark.

1. In the LPP maximize $z=3x_1+2x_2$ subject to $x_1+x_2\leq 10$, $2x_1+5x_2\geq 10$, $x_1, x_2\geq 0$ convert the constraints into equalities.
2. What should be the value of $z_j - c_j$ for a basic feasible solution to become optimum for a maximization linear programming problem?
3. Define a feasible solution.
4. Define degenerate basis.
5. Name any one method to find an initial basic feasible solution for a transportation problem.
6. What is mean by non-standard Assignment problem?

7. Name the mathematician who developed the Hungarian method for solving an Assignment problem.
8. What does PERT stands for?
9. Define critical path.
10. Define earliest time.

SECTION – II

Answer **any eight** questions from among the questions 11 to 22. These questions carry **2** marks each.

11. Write the LPP in standard form Maximize $Z=3x_1+2x_2$ subject to $x_1+x_2\leq 10$, $2x_1+5x_2\geq 10$, $x_1, x_2\geq 0$.
12. Represent the following LPP given in standard form in matrix-vector notation.

$$\text{Maximize } z=2x_1+4x_2-3x_3+x_4$$

$$\text{Subject to } x_1+2x_2+x_3+5x_4=10$$

$$x_2-2x_3+x_4=7$$

$$x_1+7x_2+3x_3+x_4=2$$

$$x_1, x_2, x_3, x_4 \geq 0.$$

13. Define Slack and surplus variables in a LPP.
14. Write the steps involved in Vogel's Approximation method for finding an initial basic feasible solution of a transportation problem.
15. What is an assignment problem?

16. Obtain the optimal assignment of three jobs and three machines that will minimize to total cost for the following problem.

		Jobs		
		J ₁	J ₂	J ₃
Machines	M ₁	15	10	9
	M ₂	9	15	10
	M ₃	10	12	8

17. Find an initial basic feasible solution of the following transportation problem using northwest corner rule.

	D ₁	D ₂	D ₃	Supply
S ₁	0	2	1	6
S ₂	2	1	5	9
S ₃	2	4	3	5
Demand	5	5	10	

18. How can we solve an assignment problem of maximization type?
19. Write two applications of PERT and CPM.
20. Define Crashing cost.
21. Which are the three time estimates in PERT?
22. Define slack time.

SECTION – III

Answer **any six** questions from among the questions 23 to 31. These question carry 4 marks each.

23. Solve the following LP problem graphically

$$\text{Maximize } z = 6x_1 + 5x_2$$

$$\text{Subject to } 3x_1 + x_2 \leq 160$$

$$x_1 \leq 40$$

$$x_2 \leq 130$$

$$x_1, x_2 \geq 0.$$

24. Use simplex method to solve the following LPP.

$$\text{Maximize } z = 4x_1 + x_2 + 5x_3$$

$$\text{Subject to } x_1 + 2x_2 + x_3 \leq 430$$

$$3x_1 + 2x_3 \leq 460$$

$$x_1 + 4x_2 \leq 450$$

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

25. Obtain an initial basic feasible solution of the following transportation problem using north west corner rule.

	D ₁	D ₂	D ₃	D ₄	Supplies
S ₁	20	25	28	31	200
S ₂	32	28	32	41	180
S ₃	18	35	24	32	110
Demands	150	40	180	170	

26. Write the linear program formulation of a transportation problem.

27. Solve the following assignment problem.

	J ₁	J ₂	J ₃	J ₄
M ₁	10	9	7	8
M ₂	5	8	7	7
M ₃	5	4	6	5
M ₄	2	3	4	2

28. Solve the following assignment problem using Hungarian method.

	J ₁	J ₂	J ₃	J ₄	J ₅
M ₁	3	9	2	3	7
M ₂	6	1	5	6	6
M ₃	9	4	7	10	3
M ₄	2	5	4	2	1
M ₅	9	6	2	4	5

29. A publisher has a contract with an author to publish a text book. The activities associated with the production of text book are given below. Draw the network of the project.

Activity	Predecessor	Duration (weeks)
A: Manuscript proof reading by editor	—	3
B: Sample paper prepared type setter	—	2
C: Book cover design	—	4
D: Preparation of art work for book figures	—	3
E: Author's approval of edited manuscript and sample papers	A,B	2
F: Book type setting	E	2
G: Author checks type set pages	F	2
H: Author checks art work	D	1
I: Production of printing plates	G,H	2
J: Book production and binding	C,I	4

30. Find an initial solution of the following transportation problem using Vogel's approximation method.

	M ₁	M ₂	M ₃	M ₄	Supply
W ₁	2	2	2	1	3
W ₂	10	8	5	4	7
W ₃	7	6	6	8	5
Demand	4	3	4	4	

31. Three reservoirs with daily supplies of 15,20 and 25 million litres of fresh water respectively. On each day we must supply four cities A,B,C,D whose demands are 8, 10, 12 and 15 respectively.

The cost of pumping per million liters is given below:

		Cities			
		A	B	C	D
Reservoirs	1	2	3	4	5
	2	3	2	5	2
	3	4	1	2	3

Use the transportation algorithm to determine the cheapest pumping schedule.

SECTION – IV

Answer **any two** questions from among the questions 32 to 35. These questions carry **15 marks each**.

32. Consider the following LP problem

$$\text{Maximize } z = 2x_1 + 3x_2$$

$$\text{Subject to } x_1 + 3x_2 \leq 6$$

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

$$x_1, x_2 \geq 0.$$

(a) Express the problem in equations.

(b) Find an optimal solution using simplex method.

33. Solve the following LP problem graphically

$$\text{Maximize } z = 5x_1 + 4x_2$$

$$\text{Subject to } 6x_1 + 4x_2 \leq 24$$

$$x_1 + 2x_2 \leq 6$$

$$-x_1 + x_2 \leq 1$$

$$x_2 \leq 2$$

$$x_1, x_2 \geq 0.$$

34. Find an optimal solution of the following transportation problem.

	D ₁	D ₂	D ₃	D ₄	Supply
S ₁	10	2	20	11	15
S ₂	12	7	9	20	25
S ₃	4	14	16	18	10
Demand	5	15	15	15	50

35. A project consisting of nine jobs (A,B,C,D,...I) with the following precedence relation and time estimates.

Job	Predecessors	Optimistic time (a)	Most probable time (m)	Pessimistic time (b)
A	—	2	5	8
B	A	6	9	12
C	A	6	7	8
D	B,C	1	4	7
E	A	8	8	8
F	D,E	5	14	17
G	C	3	12	21
H	F,G	3	6	9
I	H	5	8	11

Find the average time and variance for each job.

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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme Under CBCSS

Chemistry

Core Course

CH 1541 : PHYSICAL CHEMISTRY I

(2013, 2015-16 Admn)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **a word or** sentences. **Each** question carries **1** mark.

1. Write down the Van der Waals equation for n moles of a gas.
2. Define critical constants.
3. Schottky defects are due to _____.
4. Total number of Bravais lattices is _____.
5. Define fluidity.
6. Give any one example of a liquid crystalline substance.
7. Define Internal energy.
8. Explain Joule-Thomson expansion.

9. Write Boltzmann-Planck entropy equation.
10. What is the point group of BF_3 molecule?

(10 × 1 = 10 Marks)

SECTION – B

Each question carries **2** marks (Short answer type) Answer any **eight** questions.

11. Distinguish between *rms* velocity and *average* velocity.
12. Define mean free path.
13. Explain surface tension of liquids with any one example.
14. Explain why the Osmotic pressure of colloidal solutions are usually low.
15. Define enthalpy of formation.
16. Define bond energy and bond dissociation energy.
17. Discuss partition function.
18. State Carnot's theorem.
19. Explain plane of symmetry of a molecule with one example.
20. Define the operation improper rotation.
21. State and explain the first law of thermodynamics.
22. Define enthalpy of neutralization.

(8 × 2 = 16 Marks)

SECTION – C

Each question carries **4** marks (Short essay type) Answer any **six** questions.

23. Calculate the mean free path of O_2 gas at 300K and 1 atm. Take collision diameter $\sigma = 500\text{\AA}$
24. Derive thermodynamically the relation between osmotic pressure and lowering of vapour pressure.
25. Derive an expression for work done in the reversible isothermal expansion of an ideal gas.
26. Derive Gibbs Duhem equation.
27. Discuss the structure of NaCl and KCl.
28. Briefly describe the determination of fugacity of a gas.
29. Explain symmetry elements and symmetry operations with an example.
30. Discuss how critical temperature and critical pressure are determined experimentally.
31. Explain point defects.

(6 × 4 = 24 Marks)

SECTION – D

Each question carries **15** marks (Essay type) Answer any **two** questions.

32. Derive Gibbs-Helmholtz equation and discuss its application.
33. Derive Bragg's law and discuss about rotating crystal method of XRD.

34. (a) Derive an expression for the relationship between pressure and volume in a reversible adiabatic expansion of an ideal gas.
- (b) 3 moles of an ideal gas expand isothermally and reversibly from a volume of 5 L to a volume of 15 L at 25° C. Calculate the maximum work done.
35. (a) Describe Berkley and Hartley's method for the determination of osmotic pressure.
- (b) Describe the determination of depression in freezing point by Beckmann and Rast method.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

Core Course

Chemistry

CH 1542 : INORGANIC CHEMISTRY III

(2013, 2015-2016 Admission)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions. Each question carries **one** mark.

1. Which is coloured, solution of TiCl_3 or TiCl_4 ? Justify your answer.
2. Which is stabler Cu^+ or Cu^{2+} ? why?
3. What is the hybridization and geometry of the complex $[\text{Pt}(\text{NH}_3)_4]^{2+}$?
4. What are carboranes? Give one examples.
5. How is silicon rubber prepared?
6. Give any one application of coordination compounds in qualitative analysis.
7. What are the important raw materials used for the preparation of glasses.
8. Give two examples of phosphorous based polymers.

9. What is Bohr effect?
10. What are LNCC? Give one example.

(10 × 1 = 10 Marks)

PART – B

Answer any **eight** questions. Each question carries **2** marks

11. Why do Zr and Hf display similar properties?
12. Tetrahedral complexes are high spin. Justify?
13. Find out the hybridisation, geometry and predict the magnetic property of the complex $[\text{Co F}_6]^{3+}$.
14. Explain why $[\text{Fe (H}_2\text{O)}_6]^{3+}$ ion is more paramagnetic than $[\text{Fe (CN)}_6]^{3-}$.
15. What are labile and inert complexes?
16. Give the geometry and the structure of the compound ClF_3 .
17. Draw the structures of XeF_2 and XeF_4 .
18. Give one method of preparation of Ni(CO)_4 .
19. What are pseudo halide ions? Give one example.
20. Calculate EAN of the central atom in the following.
 - (a) $\text{K}_4[\text{Fe(CN)}_6]$
 - (b) $[\text{Pt(NH}_3)_6]^{4+}$
21. Boron nitride resembles graphite. Comment on this statement.
22. Explain the function of Na-K pump in biological process.

(8 × 2 = 16 Marks)

PART – C

Answer any **six** questions. Each question carries **4** marks.

23. Explain the behavior of the oxidizing agent KMnO_4 in acidic, basic and neutral solution.
24. Briefly discuss the characteristics of d block elements.
25. What are high spin and low spin complexes? Explain with examples.
26. Illustrate stereo isomerism in coordination compounds using example.
27. Explain the diamagnetic property of ferrocene on the basis of valence bond theory.
28. Explain the role of hemoglobin and myoglobin in biological system.
29. Describe the bonding in metal-alkene complexes.
30. Write a short note on zeolites.
31. Discuss about silicon based polymers.

(6 × 4 = 24 Marks)

PART – D

Answer any **two** questions. Each question carries **15** marks.

32. Compare lanthanides and actinides based on
 - (a) Electronic Configuration
 - (b) Oxidation states
 - (c) Magnetic Properties
 - (d) Spectral properties

33. (a) Explain sigma bonding of octahedral complexes using Molecular Orbital Theory.
- (b) Draw Molecular orbital diagram for $[\text{Co}(\text{NH}_3)_6]^{3+}$ and predict its magnetic property.
34. Define organometallic compounds. Discuss its classification in detail with example for each class.
35. Discuss preparation, properties and bonding in Diborane.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

Mathematics

Core Course V

MM 1541 : REAL ANALYSIS — I

(2015 – 2017 Admission)

Time : 3 Hours

Max. Marks : 80

All the first 10 questions are compulsory. They carry 1 mark each.

1. If u and $b \neq 0$ are real numbers such that $u \cdot b = b$, then $u =$ _____.
2. Give a lower bound of $\{x \in \mathbb{R} : -3 \leq x \leq 1\}$.
3. Give an example of an unbounded interval.
4. State the infimum property of $\mathbb{R}$.
5. If X and Y are the sequences $X = (5n)$, and $Y = \left(\frac{1}{3n}\right)$, then the product sequence $\left(\frac{X}{Y}\right)$ is _____.
6. Give an example of a divergent sequence.

7. $\lim_{n \rightarrow \infty} \left(\frac{2n+1}{n+5} \right) = \underline{\hspace{2cm}},$

8. The set of cluster points of the set $A = [0, 1]$ is $\underline{\hspace{2cm}}.$

9. $\lim_{x \rightarrow c} x = \underline{\hspace{2cm}},$

10. $\lim_{x \rightarrow -3} \frac{1}{(x+3)^2} = \underline{\hspace{2cm}},$

Answer **any eight** questions from among the questions 11 to 22, these questions carry **2** marks each.

11. If $a \in \mathbb{R}$, then show that $(-a) \cdot (-a) = a^2$.

12. Prove that $1 > 0$.

13. Show that if a nonempty set S has finite number of elements, then $\sup S$ exists and belongs to the set S .

14. Describe Dedekind's form of completeness property.

15. Show that $\lim_{n \rightarrow \infty} \left(\frac{1}{n^2} \right) = 0$.

16. Prove that a Cauchy sequence of real numbers is bounded.

17. Prove that every contractive sequence is a Cauchy sequence.

18. Prove that $\sum_{n=0}^{\infty} ar^n$ converges if $|r| < 1$.

19. Show that the series $\frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \dots$ converges.

20. Prove that $\lim_{x \rightarrow 2} \frac{x^3 - 4}{x^2 + 1} = \frac{4}{5}$.

21. Prove that $\lim_{x \rightarrow 0} \sin(x)$ does not exist.
22. If p and q are polynomial function on $\mathbb{R}$ and if $q(c) \neq 0$, then prove that
- $$\lim_{x \rightarrow c} \frac{p(x)}{q(x)} = \frac{p(c)}{q(c)}.$$

Answer **any six** questions from the questions 23 to 31. These questions carry **4** marks each.

23. If $a \in \mathbb{R}$ is such that $0 \leq a < \varepsilon$ for every positive ε , then prove that $a = 0$.
24. If a and b are real numbers, prove that $\|a\| - \|b\| \leq \|a - b\|$.
25. If $x \in \mathbb{R}$ then show that there exists $n_x \in \mathbb{N}$ such that $x < n_x$.
26. If $I_n = [a_n, b_n], n \in \mathbb{N}$, is a nested sequence of closed and bounded intervals, then prove that there exists a number $\xi \in \mathbb{R}$ such that $\xi \in I_n$ for all $n \in \mathbb{N}$.
27. Prove that a sequence of real numbers can have at most one limit.
28. Prove that a bounded sequence of real numbers has a convergent subsequence.
29. If $X = (x_n)$ is a sequence of real numbers, then prove that there is a subsequence of X that is monotone.
30. Prove that a montone sequence of real numbers is properly divergent if and only if it is unbounded.
31. If $f : A \rightarrow \mathbb{R}$ and if c is a cluster point of A , then prove that f can have at most one limit at c .

Answer **any two** questions from among the questions 32 to 35. These questions carry **15** marks each.

32. (a) Determine the set of all real numbers x that satisfy $|x - 1| < 1$.
- (b) Let A and B be bounded nonempty subsets of the set of real numbers, and let $A + B = \{a + b : a \in A, b \in B\}$, prove that $\sup(A + B) = \sup A + \sup B$.

33. (a) Prove that a monotone sequence of real numbers is convergent if and only if it is bounded. Also, prove that if $Y = (y_n)$ is a bounded decreasing sequence, then $\lim(y_n) = \inf \{y_n : n \in \mathbb{N}\}$.
- (b) Examine the convergence of the sequence (e_n) , where $e_n = \left(1 + \frac{1}{n}\right)^n$ for $n \in \mathbb{N}$.
34. (a) Prove that a sequence of real numbers is convergent if and only if it is a Cauchy sequence.
- (b) Discuss the convergence of the series $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$ if converges, find the sum.
35. (a) Let $A \subseteq \mathbb{R}$ and $f : A \rightarrow \mathbb{R}$ and $g : A \rightarrow \mathbb{R}$ are two functions, and let $c \in \mathbb{R}$ be a cluster point of A . If $\lim_{x \rightarrow c} f = L$ and $\lim_{x \rightarrow c} g = M$ (L and M real numbers), then prove that $\lim_{x \rightarrow c} (f + g) = L + M$.
- (b) Show that $\lim_{x \rightarrow 0} \sin x = 0$.

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First Degree Programme Under CBCSS

Mathematics

Core Course V

MM 1542 : COMPLEX ANALYSIS – I

(2015 – 2017 Admissions)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the first ten questions are compulsory. They carry 1 mark each

1. Express $\frac{(3-i)(4+i)}{(2-i)}$ in the form $a+ib$.
2. Find the square roots of $2i$.
3. Show that $\operatorname{Re} z = \frac{z + \bar{z}}{2}$.
4. Represent geometrically $\{z / \operatorname{Re} z > 0\}$.
5. Find $|e^i|$.
6. State triangle inequality.
7. Express $1+i$ in polar form.

8. Define Cauchy sequence in a complex plane.
9. Write the Cauchy-Riemann equations.
10. Write the power series expansion of e^{2z} .

SECTION – II

Answer any **eight** from among the questions 11 to 22. They carry **2** marks each.

11. Find the sum of the complex numbers $4+i$ and $1-i$ geometrically.
12. Find the fourth roots of unity.
13. Prove that $\{z_n\}$ converges if and only if it is a Cauchy sequence.
14. Use Cauchy-Riemann equations to verify whether $x^2 - y^2 - 2xyi$ is analytic.
15. Does the series $\sum_{k=1}^{\infty} \frac{i^k}{k^2 + i}$ converge or diverge. Justify your answer.
16. Prove that an analytic function with constant modulus is a constant.
17. Evaluate $\int_C x^2 + iy^2 dz$ where $C: z(t) = t + it, 0 \leq t \leq 1$.
18. Evaluate $\int_C \frac{1}{z} dz$ where $C: z(t) = \sin t + i \cos t, 0 \leq t \leq 2\pi$.
19. Find the unique real solution of $x^3 + 6x = 20$ using cubic method.
20. Is the polynomial $x^3 - 3xy^2 - x + i(3x^2y - y^3 - y)$ analytic. Justify your answer.
21. Show that $x^2 + iV(x, y)$ is not analytic for any choice of the real polynomial $V(x, y)$.
22. Define a piecewise differentiable curve.

SECTION – III

Answer any **six** questions from among the questions 23 to 31. They carry 4 marks each.

23. Geometrically represent the following sets.

(a) $\left\{ z : \frac{-\pi}{3} < \arg z < \frac{\pi}{3} \right\}$

(b) $\{ z : |z+1| < 1 \}$

24. Prove that $|z_1 - z_2| \geq |z_1| - |z_2|$.

25. If $\sum_{n=0}^{\infty} C_n z^n$ is zero at all points of a non-zero sequence $\{z_n\}$ which converges to zero, then prove that the power series is identically zero.

26. Find the radius of convergence of $\sum_{n=1}^{\infty} \frac{z^n}{n^2}$.

27. If C_1 and C_2 are smoothly equivalent then prove that $\int_{C_1} f = \int_{C_2} f$.

28. Prove that $\int_C f(z) dz = F(z(b)) - F(z(a))$ where $f(z) = F'(z)$ and C is a smooth curve.

29. (a) Evaluate $\int_C (z+2i) dz$ where C is $z(t) = t + it^2$, $-1 \leq t \leq 1$.

(b) Also find the above integral along the straight line from $-1+i$ to $1+i$.

30. (a) Show that $f(z) = x^2 + iy^2$ is differentiable at all points on the line $y = x$.

(b) Prove that $e^{z_1+z_2} = e^{z_1} e^{z_2}$.

31. Show that e^z is an entire function by verifying Cauchy-Riemann equations.

SECTION – IV

Answer any **two** questions from among the questions 32 to 35. They carry 15 marks each.

32. (a) Prove that if $P_y = iP_x$, then the polynomial is analytic.
- (b) Hence deduce C.R. equations.
33. (a) Suppose $f(z) = \sum_{n=0}^{\infty} C_n z^n$ converges for $|z| < R$. Then prove that $f'(z)$ exists and equals $\sum_{n=0}^{\infty} n C_n z^{n-1}$ throughout $|z| < R$.
- (b) Prove that a power series is infinitely times differentiable in their domain of convergence.
34. (a) Show that the function $f(x, y) = \frac{xy(x+iy)}{x^2+y^2}$, $z \neq 0$ and $f(0) = 0$ satisfies C.R. equations at origin but it is not differentiable at origin.
- (b) Suppose $G(t)$ is a continuous complex value function of t . Then, prove that
- $$\int_a^b G(t) dt \leq \int_a^b |G(t)| dt.$$
35. State and prove Rectangle Theorem.
-

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First Degree Programme under CBCSS

Mathematics

Core Course VIII

MM 1545 : ABSTRACT ALGEBRA I

(2015-2017 Admission)

Time : 3 Hours

Max. Marks : 80

PART – A

All the first **ten** questions are compulsory. They carry **1** mark each.

1. Define a binary operation on the set of all $n \times n$ matrices with real entries.
2. Give an example of an isomorphism from $(\mathbb{R}, +)$ to $(\mathbb{R}^+, \cdot)$.
3. Why $\langle \mathbb{Q}, + \rangle$ and $\langle \mathbb{Z}, + \rangle$ are not isomorphic?
4. Check whether $\mathbb{Z}^+$ under addition is a group.
5. Give example of abelian and non-abelian groups of order 6.
6. Write the generators of $\mathbb{Z}_8$?
7. What are the subgroups of $\mathbb{Z}$?
8. Give an example of a finite group that is not cyclic.

9. Write the identity permutation in S_n as a product of transpositions.

10. Find all cosets of the subgroup $4\mathbb{Z}$ of $\mathbb{Z}$.

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** questions from this section. Each question carries **2** marks.

11. Prove that in a binary structure $\langle S, * \rangle$ if there is an identity element, it is unique.

12. Determine whether the diagonal $n \times n$ matrices with no zeros on the diagonal is a subgroup of $GL(n, \mathbb{R})$.

13. Prove that every cyclic group is abelian.

14. Describe the group of symmetries of a square.

15. Prove that every permutation σ of a finite set is a product of disjoint cycles.

16. Find the number of elements in the set. $\{\sigma \in S_5 / \sigma(2) = 5\}$.

17. Find the order of the permutation $(1\ 4\ 7)$.

18. Let G be a group and let $a \in G$. Prove that $\langle a^{-1} \rangle = \langle a \rangle$.

19. Prove that order of an element of a finite group divides the order of the group.

20. Give an example of a subgroup of a group G whose left cosets give a partition of G into just one cell.

21. Suppose that $|G| = pq$, where p and q are prime. Prove that every proper subgroup of G is cyclic.

22. Find the order of $(8, 4, 10)$ in the group $\mathbb{Z}_{12} \times \mathbb{Z}_{60} \times \mathbb{Z}_{24}$.

(8 × 2 = 16 Marks)

PART – C

Answer **any six** questions. Each question carries **4** marks.

23. Let G be a group and let $a \in G$. Prove that $H = \{a^n \mid n \in \mathbb{Z}\}$ is a subgroup of G and is the smallest subgroup of G that contains a .
24. Show that if H and K are subgroups of an abelian group G , then $\{hk \mid h \in H \text{ and } k \in K\}$ is a subgroup of G .
25. Find all subgroups of $\mathbb{Z}_{18}$ and give their subgroup diagram.
26. Show that S_n is non-abelian for $n \geq 3$.
27. Let σ be a permutation of a set A . For $a, b \in A$ define $a \sim b$ iff $b = \sigma^n(a)$ for some $n \in \mathbb{Z}$. Show that $\sim$ is an equivalence relation.
28. Let H be the subgroup $\langle \mu_1 \rangle = \{e, \mu_1\}$ of S_3 . Find the partition of S_3 into left cosets of H and the partition into right cosets of H .
29. Let H be a subgroup of a finite group G . Show that the order of H is a divisor of the order of G .
30. Let $\sigma = (1\ 2\ 5\ 4)(2\ 3)$ in S_5 . Find the index of $\langle \sigma \rangle$ in S_5 .
31. Show that no permutation can be expressed both as a product of even number of transpositions and as a product of an odd number of transpositions.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** questions from this part. Each question carries **15** marks.

32. Describe the Klein-4 group and $\mathbb{Z}_4$ and determine their structural differences. Also draw their subgroup diagrams.
33. Let G be a cyclic group with generator a . Prove that if the order of G is infinite, then G is isomorphic to $(\mathbb{Z}_n, +)$ and if G has finite order n , then G is isomorphic to $(\mathbb{Z}_n, +_n)$.

34. Prove that every group is isomorphic to a group of permutations.

35. Let $G_1, G_2, \dots, G_n$ be groups. For $(a_1, a_2, \dots, a_n)$ and $(b_1, b_2, \dots, b_n)$ in $\prod_{i=1}^n G_i$ define $(a_1, a_2, \dots, a_n)(b_1, b_2, \dots, b_n)$ to be the element $(a_1, b_1, a_2, b_2, \dots, a_n, b_n)$. Prove that $\prod_{i=1}^n G_i$ is a group.

(2 × 15 = 30 Marks)

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Physics

Core Course V

PY 1541 – METHODOLOGY IN PHYSICS AND RELATIVISTIC MECHANICS

(2015-17 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Very short answer type questions). Answer **all** questions **1** mark each.

1. Mention any two factors that motivate research.
2. What is meant by quantitative research?
3. When is a probability sample recommended in research?
4. What are the characteristics of a good research report?
5. What is the physical significance of the Hamiltonian?
6. Write down the Hamilton's equations of motion.
7. Distinguish between inertial mass and relativistic mass of a particle.

8. When is an equation said to be invariant under a transformation?
9. What is meant by co-variant quantity with respect to a transformation?
10. Distinguish between inertial and non-inertial frames of reference.

(10 × 1 = 10 Marks)

SECTION – B

Short answer type questions. Answer **any eight** questions of **2** marks each.

11. What is meant by Ex post facto research?
12. Distinguish between research methods and Research methodology.
13. In the context of Research design, explain Experimental and control groups.
14. Define confounded relationship in the context of Research design.
15. When is an equation said to be invariant under a transformation?
16. Assuming Lorentz-Fitzgerald contraction, calculate the apparent length of a meter scale moving at a speed of 2.5×10^8 m/s.
17. Calculate the length of a rod moving with 0.8 times the velocity of light (c), in the X-Y plane inclined at an angle of 60° with the X axis. Given the proper length of the rod is 1 m.
18. What is the life time of a burst of π^+ mesons travelling with a velocity of 0.7 times the velocity of light (c). The proper life time = 2.5×10^{-8} sec?
19. Two electrons in a stationary frame of reference move off with equal velocity 0.8 times the velocity of light (c) in opposite to the X axis. What is the velocity of one electron with respect to the other.
20. Find the energy equivalent to 1Kg of matter.

21. The length of a rocket is 100m on the ground. While on flight, its length as measured from the ground frame is 99m. What is the speed of the rocket?
22. Calculate the rest energy of an electron if the rest mass of the electron is 9.1×10^{-31} kg.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions of **4** marks each.

23. Explain how errors are estimated and reported.
24. How do errors propagate in different mathematical operations?
25. How can errors in a measurement be minimised?
26. Research is concerned with proper fact finding, analysis and evaluation. Give reasons supporting this statement.
27. Using the relativity theory, arrive at the expression for variation of mass with velocity.
28. Derive Einstein's mass energy equivalence. Give suitable examples to prove this equivalence.
29. Explain the concepts of Lorentz transformation.
30. What is a Harmonic oscillator? Deduce the Hamilton's equations for a Harmonic oscillator.
31. (a) From D'Alembert's principle deduce Hamilton's principle.
(b) From Hamilton's Principle deduce Lagrange's equations.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks.

32. What are the main features of paper writing in research? Why is paper publication important in research?
33. Compare the Newtonian, Lagrangean and Hamiltonian approach for a two dimensional harmonic oscillator. Which approach is more fruitful?
34. Distinguish between inertial and non-inertial frame of reference. Deduce the Galilean transformation equations.
35. What are the basic ideas of errors measurement? Discuss the various types of errors.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

Chemistry

Core Course V

CH 1541 – PHYSICAL CHEMISTRY – I

(2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. Glass is an example of _____ solid.
2. How many Bravais lattices does the cubic crystal system have?
3. Property of resistance to flow is called _____.
4. Boiling point of a liquid _____ with increase in external pressure.
5. For an exothermic reaction, the enthalpy change is _____.
6. Miller indices of a plane making intercepts of $2a$, $3b$ and $2c$ are _____.
7. A symmetry operation is the movement of a molecule that brings it into _____ configurations.
8. What is the order of a C_{2v} point group?

9. What name denotes the total number of collisions between the molecules of a gas per unit time per unit volume?
10. At a particular temperature, which has the highest value for a particular gas- average velocity, most probable velocity or RMS velocity?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks.

11. Identify the proper rotation axis of C_6H_6 molecule.
12. What is an inversion center?
13. What is a cyclic process?
14. 500 J of heat was supplied to a system at constant volume. It resulted in the increase of temperature of the system from 293 K to 298 K. What is the change in internal energy of the system?
15. Why does an increase in temperature decreases surface tension?
16. What is reverse osmosis?
17. What is meant by a real gas?
18. RMS velocity of O_2 at 298 K is 4.6×10^2 m/s. Calculate its average velocity?
19. What are F centers?
20. What are lattice planes?
21. State the law of constancy of interfacial angles.
22. What is enthalpy of combustion?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. **Each** question carries **4** marks.

23. Give the important postulates of kinetic theory.
24. Derive the Bragg equation.
25. Discuss the effect of temperature on distribution of molecular velocities in gases.
26. Explain the terms molality and mole fraction of a solution.
27. Discuss the crystal structure of NaCl.
28. Identify the symmetry elements present in BF_3 .
29. Derive the relationship between lowering of vapour pressure and molar mass of a solute.
30. Discuss the physical significance of free energy.
31. Write a note on liquid crystals.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks.

32. (a) How do you determine critical temperature and critical volume of a gas?
(b) Derive the relationship between Vander Waal's constants and critical constants.
33. (a) What is Joule Thomson effect?
(b) Derive the expression for Joule Thomson effect

34. Write an essay on imperfections or defects in crystals.
35. (a) Explain the different kinds of symmetry operations and symmetry elements with suitable examples.
- (b) What are group multiplication tables? Give the GMT of C_{2v}
(2 × 15 = 30 Marks)
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Name :

Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme under CBCSS

Chemistry

Core Course

CH 1542 : INORGANIC CHEMISTRY – III

(2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in a word/sentence. Each question carries **1** mark.

1. Zn(II), Cd(II) and Hg(II) ions are colourless. Why?
2. What is the most common oxidation state of lanthanides?
3. Sketch the d orbital splitting in square planar complex
4. What is liquation?
5. What is calcination in metallurgy?
6. Why are transition metals mostly used in construction materials?
7. Explain the structure of Zeise's salt?
8. What are cytochromes?

9. Which is the most common ore of iron?
10. What is lanthanide contraction?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions, each question carries **2** marks. (short answer questions)

11. Briefly explain the metallurgy of sodium.
12. Explain the laws of spectrophotometry.
13. The electronic spectra of the lanthanide complexes are sharper in comparison with that of the transition metal complexes. Why?
14. Discuss the structure of dibenzene chromium
15. Briefly explain Scanning Electron Microscopy (SEM).
16. What is the reason for the high spin nature of the tetrahedral complexes?
17. Write a note on the geometrical isomerism in coordination complexes.
18. State and explain 18 electron rule.
19. What are the factors affecting the stability of metal complexes?
20. What are ambidentate ligands? Explain with examples.
21. Calculate the CFSE of the complex $[\text{Co}(\text{NH}_3)_6]^{2+}$.
22. What is the function of cytochrome P450 in human body?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks. (short essay type)

23. Give a short note on Jahn Teller distortion and its consequence.
24. Write a note on the preparation, properties and uses of $K_2Cr_2O_7$.
25. Explain the magnetic properties and complexation behaviour of lanthanides.
26. Discuss the mechanism of oxygen transport in blood.
27. Differentiate between Atomic absorption spectroscopy and Flame emission spectroscopy.
28. Discuss the working of a sodium - potassium pump in biological system.
29. Explain the bonding in complexes using valence bond theory.
30. Briefly explain the biochemistry of magnesium and calcium.
31. Explain the purification of metals by zone refining.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks. (essay type)

32. (a) Explain the application of coordination complexes in qualitative and quantitative analysis. 8
- (b) Explain the factors affecting crystal field splitting. 7
33. (a) Write a note on AFM and TEM. 5
- (b) Mention the applications of organometallic compounds. 5
- (c) Explain the principle of TG with example. 5

34. (a) Write a note on the magnetic properties and colour of metal complexes. 5
- (b) Differentiate between haemoglobin and myoglobin in terms of their structure and function. 5
- (c) Explain the structure of iron carbonyls. 5
35. (a) Give a note on the ligand substitution reactions in metal complexes. 5
- (b) What are iron sulphur proteins? 5
- (c) Discuss the classification of organometallic compounds. 5
- (2 × 15 = 30 Marks)**

St. Xavier's College

Reg. No. :

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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme Under CBCSS

Chemistry

Core Course – VII

CH 1543 — ORGANIC CHEMISTRY – II

(2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Very short answer type questions)

Answer **all**. **Each** question carries **1** mark.

1. How does the basicity of primary, secondary and tertiary alkylamines vary?
2. Name the test that is used to identify primary amines.
3. How does methanal react with ammonia?
4. Compare the acidity of methanol, propan-2-ol and phenol
5. Give the method of preparation of coumarin.
6. What is the effect of shielding on delta value of an NMR signal?
7. Which stretching is responsible for the broad band at 3400 cm^{-1} in IR spectrum of aniline?

8. Name two green solvents.
9. Illustrate Williamson's synthesis with a suitable example.
10. What is an auxochrome?

(10 × 1 = 10 Marks)

SECTION – B

(Short answer questions)

Answer **any eight** questions. **Each** carries **2** marks.

11. Explain with equation how methyl magnesium bromide can be converted into tertiary butylalcohol.
12. How is primary, secondary and tertiary alcohols distinguished?
13. Explain the term λ_{max} in terms of UV-visible spectroscopy.
14. What is meant by finger print region in an IR spectrum of an organic molecule?
15. How can phenol be converted to parabromophenol?
16. Give one example for an ultrasonicated reaction that can be carried out in acid medium.
17. Illustrate Schotten Baumann reaction with a suitable example.
18. What is Kolbe Schmidt reaction?
19. What is meant by haloform test?
20. What is meant by base peak in mass spectroscopy?
21. What is meant by green synthesis?
22. What are the conditions for a molecule to be IR active?

(8 × 2 = 16 Marks)

SECTION – C

(Short essay questions)

Answer **any six** questions. **Each** question carries **4** marks.

23. Mention the differences between phenols and alcohols.
24. How is benzene sulphonic acid converted to p- nitro phenol?
25. How can aniline be converted to p-bromoaniline?
26. Sketch the ^1H NMR spectrum of ethanol.
27. Illustrate the following reactions with mechanism
 - (a) Reimer-Tiemann reaction
 - (b) Claisen condensation.
28. Discuss the method of separation of three kinds of amines.
29. How is aniline converted into Phenyl carbylamine? Give the mechanism.
30. Give the name and mechanism of the reaction that you would adopt for the conversion of normal butyl amine to 1-butene.
31. Illustrate, with an example each, two different nucleophilic addition reactions undergone by aldehydes and ketones.

(6 × 4 = 24 Marks)

SECTION – D

(Long essay questions)

Answer **any Two**. **Each** question carries **15** marks.

32. Discuss the principles of green chemistry. (15)
33. Discuss the mechanism of the following reactions.
 - (a) Cannizzaro reaction
 - (b) Fries rearrangement
 - (c) Benzidine rearrangement

(3 × 5 = 15 marks)

34. Discuss :

- (a) Zeisel's method of estimation of methoxy group.
- (b) Crown ethers. How are they named? Mention their applications.
- (c) The synthetic applications of benzenediazonium chloride.

(3 × 5 = 15 marks)

35. (a) Illustrate two microwave assisted reactions, one each in organic solvent and in water.
- (b) Define atom economy of a synthetic reaction. Explain its significance with a suitable example.
- (c) Explain the splitting of a signal into multiplets due to spin-spin coupling taking the example of NMR spectrum of ethyl chloride.

(3 × 5 = 15 marks)

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme Under CBCSS

Mathematics

Core Course V

MM 1541 : REAL ANALYSIS – I

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the **first 10** questions are compulsory. Each question carries **one** mark.

1. Define supremum of a set A with an example.
2. Let $B = \left\{ 1 - \frac{(-1)^n}{n} : n \in \mathbb{N} \right\}$. Find $\inf(B)$ and $\sup(B)$.
3. State Cantor's theorem.
4. Find $\lim \left(\frac{3n+1}{2n+5} \right)$.
5. Given an example of a divergent sequence (b_n) of real numbers for which sequence of absolute values $(|b_n|)$ is convergent.
6. Define monotone sequence with an example.

7. State Bolzano-Weierstrass theorem.
8. Give an example of an unbounded sequence with a convergent subsequence.
9. Give an example of a monotone sequence that is not Cauchy.
10. Define cluster point of a set.

(10 × 1 = 10 Marks)

SECTION – II

Answer any **eight** questions from this Section. Each question carries **2** marks.

11. Prove that two real numbers a and b are equal if and only if for every real number $\epsilon > 0$, it follows that $|a - b| < \epsilon$.
12. Prove that if a and b are any two real numbers then $||a| - |b|| \leq |a - b|$.
13. Let $y_1 = 1$, and for each $n \in \mathbb{N}$ define $y_{n+1} = \frac{3y_n + 4}{4}$. Show that the sequence $(y_1, y_2, y_3, \dots)$ is bounded above by 4.
14. Let $A \subseteq \mathbb{R}$ be bounded above, and let $c \in \mathbb{R}$. Show that $\sup(c + A) = c + \sup A$.
15. Prove that $\lim \left(\frac{1}{\sqrt{n}} \right) = 0$.
16. Show that every convergent sequence is bounded.
17. If $\lim a_n = a$ and $a_n \geq 0$ for all n then show that $a \geq 0$.
18. Let $x_n \geq 0$ for all $n \in \mathbb{N}$. If $(x_n) \rightarrow 0$, show that $(\sqrt{x_n}) \rightarrow 0$.
19. Show that subsequences of a convergent sequence converge to the same limit as the original sequence.
20. Prove that every convergent sequence is a Cauchy sequence.
21. State and prove comparison test for series.

22. Give an example to show that it is possible for both the series $\sum x_n$ and $\sum y_n$ to diverge but for $\sum x_n y_n$ to converge.
23. Prove that intersection of a finite collection of open sets is open.
24. Let $A \subseteq \mathbb{R}$. Prove that the closure $\bar{A}$ is the smallest closed set containing A .
25. Prove that the intersection of an arbitrary collection of closed sets is closed.
26. State Baire's theorem.

(8 × 2 = 16 Marks)

SECTION – III

Answer any **six** questions from this section. Each question carries **4** marks.

27. Prove that $\sqrt{6}$ is irrational.
28. Let $A \subseteq \mathbb{R}$ and $s \in \mathbb{R}$. Prove that $s = \sup(A)$ if and only if, for every choice of $\epsilon > 0$, there exists an element $a \in A$ satisfying $s - \epsilon < a$.
29. Let a and b be any two real numbers with $a < b$. Prove that there exists a rational number r satisfying $a < r < b$.
30. If $\lim a_n = a$ and $\lim b_n = b$ then show that $\lim(a_n/b_n) = a/b$, provided $b \neq 0$.
31. State and prove Squeeze theorem.
32. Show that a sequence of real numbers can have at most one limit.
33. Prove that the sequence defined by $x_1 = 3$ and $x_{n+1} = \frac{1}{4 - x_n}$ converges.
34. State and prove Cauchy Criterion for series.
35. Prove that every absolute convergent series is convergent.
36. Show that a set O is open if and only if its complement O^c is closed.

37. If $K_1 \supseteq K_2 \supseteq K_3 \supseteq K_4 \supseteq \dots$ is a nested sequence of nonempty compact sets, then prove that the intersection $\bigcap_{n=1}^{\infty} K_n$ is not empty.
38. Show that the Cantor set is a compact set.

(6 × 4 = 24 Marks)

SECTION – IV

Answer any **two** questions from this section. Each question carries **15** marks.

39. (a) State and prove nested interval property. 7
- (b) Prove that there exists a real number $\alpha \in \mathbb{R}$ satisfying $\alpha^2 = 2$. 8
40. (a) Prove that the set of real numbers $\mathbb{R}$ is uncountable. 8
- (b) State and prove Monotone Convergence theorem. 7
41. (a) Show that the Harmonic series $\sum_{n=1}^{\infty} \frac{1}{n}$ diverges. 7
- (b) State and prove Cauchy condensation test. 8
42. (a) Let $x_1 = 2$ and $x_{n+1} = \frac{1}{2} \left(x_n + \frac{2}{x_n} \right)$. Prove that the sequence (x_n) converges and find its limit. 7
- (b) If $\sum_{n=1}^{\infty} a_n$ converges absolutely, then prove that any rearrangement of this series converges to the same limit. 8
43. State and prove Heine-Borel Theorem.
44. Prove that nonempty perfect set is uncountable.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme Under CBCSS

Mathematics

Core Course VI

MM 1542 COMPLEX ANALYSIS I

(2018 Admission-Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the first ten questions are compulsory. They carry 1 mark each.

1. Write $1 + \sqrt{3}i$ in polar form.
2. Which of the points $i, 2 - i$, and -3 is farthest from the origin?
3. Compute $(1 + i)^{24}$.
4. Define analyticity of a complex-valued function on an open set.
5. Let $f(z) = e^z - (1 + z + z^2/2 + z^3/6)$. Find $f^{(3)}(0)$.
6. Express $\cos(1 - i)$ in the form $a + bi$.
7. Evaluate $\text{Log}(\sqrt{3} + i)$

8. Define a contour.
9. Compute $\int_{\Gamma} \bar{z} dz$ where Γ is the circle $|z| = 2$ traversed once counterclockwise.
10. If $P(z)$ is a polynomial and Γ is any closed contour, explain why $\int_{\Gamma} P(z) dz = 0$.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions from among the questions **11 to 26**. These questions carry **2** marks each.

11. Find the most general harmonic polynomial of the form $ax^2 + bxy + cy^2$.
12. Prove that the function $f(z) = e^z$ is entire and find its derivative.
13. Prove that the function $g(z) = \bar{z}$ is continuous on the whole plane.
14. Show that the function $\text{Arg } z$ is discontinuous at each point on the non-positive real axis.
15. Find all values of $(1-i)^{3/2}$.
16. Find all the poles and their multiplicities for $R(z) = \frac{(3z + 3i)(z^2 - 4)}{(z - 2)(z^2 + 1)^2}$.
17. A polynomial $p(z)$ of degree 4 has zeros at the points 1, $3i$ and $-3i$ of respective multiplicities 2, 1 and 1. If $p(1) = 80$, find $p(z)$.
18. Show that if the rational function $R(z)$ has a pole of order m at z_0 , then its derivative $R'(z)$ has a pole of order $m + 1$ at z_0 .
19. Show that the function $f(z) = (x^2 + y) + i(y^2 - x)$ is not analytic at any point.
20. Evaluate $\int_{\Gamma} (3z^2 - 5z + i) dz$ along the line segment from $z = i$ to $z = 1$.

21. Prove that $\sin z = 0$ if and only if $z = k\pi$ where k is an integer.
22. Prove that the function e^z is one-to-one on any open disk of radius π .
23. True or false: If f is analytic at each point of a closed contour, then $\int_{\Gamma} f(z) dz = 0$.
24. Show that if C is a positively oriented circle and z_0 lies outside C , then
$$\int_C \frac{dz}{z - z_0} = 0.$$
25. Compute $\int_{\Gamma} \frac{1}{z - z_0} dz$ where Γ is the circle $|z - z_0| = r$ traversed twice in the counterclockwise direction starting from the point $z_0 + r$.
26. When do you say that the loop Γ_0 is continuously deformable to the loop Γ_1 in the domain D ?

(8 × 2 = 16 Marks)

SECTION - III

Answer any **six** questions, from among the questions **27** to **38**. These questions carry **4** marks each.

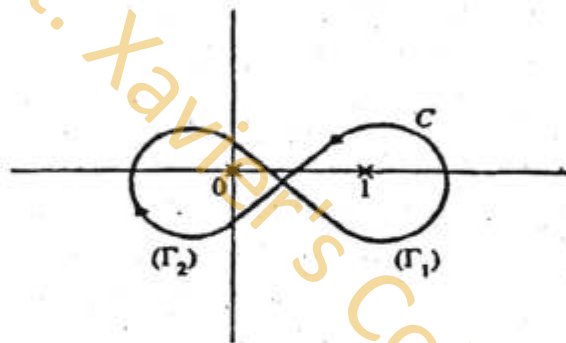
27. Compute the integral $\int_0^{2\pi} \cos^4 \theta \, d\theta$.

28. Let $f(z)$ be defined by
$$f(z) = \begin{cases} \frac{2z}{z+1} & \text{if } z \neq 0 \\ 1 & \text{if } z = 0 \end{cases}$$

At which points does $f(z)$ have a finite limit, and at which points is it continuous? Which of the discontinuities of $f(z)$ are removable?

29. Show that $h(z) = x^3 + 3xy^2 - 3x + i(y^3 + 3x^2y - 3y)$ is differentiable on the coordinate axes but is nowhere analytic.

30. Determine a branch of $f(z) = \log(z^3 - 2)$ that is analytic at $z = 0$, and find $f(0)$ and $f'(0)$.
31. Prove that there exists no function $F(z)$ analytic in the annulus $D: 1 < |z| < 2$ such that $F'(z) = 1/z$ for all z in D .
32. Prove that any branch of $\log z$ is analytic in its domain and has derivative $1/z$.
33. Find the maximum value of $|z^2 + 3z - 1|$ in the disk $|z| \leq 1$.
34. Compute $\int_C \frac{2z+1}{z(z-1)^2} dz$ along the figure-eight contour C sketched below:



35. Find an upper bound for $\left| \int_{\Gamma} \frac{e^z}{z^2 + 1} dz \right|$ where Γ is the circle $|z| = 2$ traversed once in the counterclockwise direction.
36. Evaluate $\int_{\Gamma} \frac{e^{iz}}{(z^2 + 1)^2} dz$ where Γ is the circle $|z| = 3$ traversed once counterclockwise.
37. If f is analytic in the annulus $1 \leq |z| \leq 2$ and $|f(z)| \leq 3$ on $|z| = 1$ and $|f(z)| \leq 12$ on $|z| = 2$, prove that $|f(z)| \leq 3|z|^2$ for $1 \leq |z| \leq 2$.
38. Write the polynomial, $p(z) = z^5 + 3z + 4$ in the Taylor form, centered at $z = 2$.

SECTION – IV

Answer **any two** questions from among the questions **39** to **44**. These questions carry **15** marks each.

39. (a) Let
$$f(z) = \begin{cases} \frac{x^{4/3}y^{5/3} + ix^{5/3}y^{4/3}}{x^2 + y^2} & \text{if } z \neq 0 \\ 0 & \text{if } z = 0 \end{cases}$$

Show that the Cauchy-Riemann equations hold at $z = 0$ but that f is not differentiable at this point.

(b) Suppose that $f(z)$ is analytic and nonzero in a domain D . Prove that $\ln|f(z)|$ is harmonic in D .

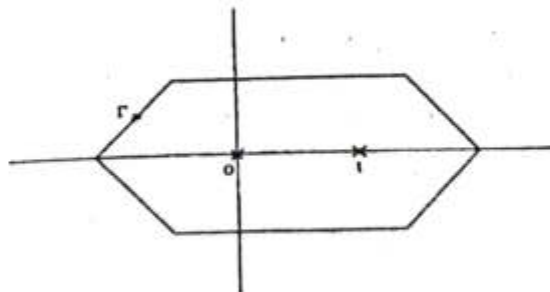
40. (a) Show that the equation $e^z = 1$ holds if and only if $z = 2k\pi i$, where k is an integer. Also show that the equation $e^{z_1} = e^{z_2}$ holds if and only if $z_1 = z_2 + 2k\pi i$, where k is an integer.

(b) Define a branch of $(z^2 - 1)^{1/2}$ that is analytic in the exterior of the unit circle, $|z| > 1$.

41. (a) State and prove Cauchy's Integral Formula.

(b) Show that every nonconstant polynomial with complex coefficients has at least one zero.

42. (a) Compute $\int_{\Gamma} \frac{3z-2}{z^2-z} dz$ where Γ is the simple closed contour indicated in the following figure



- (b) Suppose that f is analytic inside and on the unit circle $|z| = 1$. Prove that if $|f(z)| \leq M$ for $|z| = 1$, then $|f(0)| \leq M$ and $|f'(0)| \leq M$. What estimate can you give for $|f^{(n)}(0)|$?

43. (a) Compute the integral $\int_{C_r} (z - z_0)^n dz$, with n an integer and C_r the circle $|z - z_0| = r$ traversed once in the counterclockwise direction.

- (b) Show that the function $\text{Log } z$ is analytic in the domain D^* consisting of all points of the complex plane except those lying on the nonpositive real axis.

Also show that $\frac{d}{dz} \text{Log } z = \frac{1}{z}$ for all $z \in D^*$.

44. Let g be continuous on the contour Γ and for each z not on Γ , set $G(z) = \int_{\Gamma} \frac{g(\zeta)}{\zeta - z} dz$. Show that the function G is analytic at each point not on Γ , and its derivative is given by $G'(z) = \int_{\Gamma} \frac{g(\zeta)}{(\zeta - z)^2} dz$.

(2 × 15 = 30 Marks)

(Pages : 6)

K – 3291

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme under CBCSS

Mathematics

Core Course VII

MM 1543 — ABSTRACT ALGEBRA – GROUP THEORY

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the first **10** questions are compulsory. They carry **1** mark each.

1. Describe the set of symmetries of an equilateral triangle.
2. What is the inverse of 13 in $U(14)$?
3. Determine all elements of finite order in R^* , the group of non zero real numbers under multiplication.
4. What is the order of the following permutation $(124)(35)$?
5. Prove that S_n is non-Abelian for all $n \geq 3$.
6. Why the set of odd permutations in S_n is not a subgroup?

7. Show that a group of prime order is cyclic.
8. If a group G has a unique subgroup H of some finite order, show that H is normal in G .
9. Define Group Homomorphism.
10. Suppose that ϕ is a homomorphism from Z_{30} to Z_{30} and $\ker \phi = \{0, 10, 20\}$. If $\phi(23) = 9$, determine all elements that map to 9.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions from among the questions 11 to 26. These questions carry **2** marks each.

11. Let a, b and c be elements of a group. Solve the equation $axb = c$ for x . Solve $a^{-1}xa = c$ for x .
12. Suppose that H is a non empty subset of a group G that is closed under the group operation and has the property that if a is not in H then a^{-1} is not in H . Is H a subgroup?
13. Prove that a group with two elements of order 2 that commute must have a subgroup of order 4.
14. Suppose that H is a proper subgroup of Z under addition and that H contains 12, 30, and 54. What are the possibilities for H ?
15. For $n > 1$ prove that A_n has order $n!/2$.

16. Find $\text{Aut}(Z)$.
17. Show that Z has infinitely many subgroups isomorphic to Z .
18. Prove or disprove that $U(20)$ and $U(24)$ are isomorphic.
19. If G is a finite group and H is a subgroup of G , then show that $|H|$ divides $|G|$.
20. State and prove Fermats Little Theorem.
21. Show that a subgroup H of G is normal in G if and only if $xHx^{-1} \in H$ for all x in G .
22. Let ϕ be an isomorphism from a group G onto a group $\bar{G}$. Prove that if H is a normal subgroup of G , then $\phi(H)$ is a normal subgroup of $\bar{G}$.
23. If ϕ is a homomorphism from Z_{30} onto a group of order 5, determine the kernel of ϕ .
24. Suppose that ϕ is a homomorphism from $U(40)$ to $U(40)$ and that $\ker \phi = \{1, 9, 17, 33\}$. If $\phi(11) = 11$, find all elements of $U(40)$ that map to 11.
25. Show that every normal subgroup of a group G is the kernel of a homo-morphism of G .
26. Determine all homomorphisms from Z_n to itself.

(8 × 2 = 16 Marks)

SECTION – III

Answer **any six** questions from among the questions 27 to 38. These questions carry 4 marks each.

27. Prove that the dihedral group of order 6 does not have a subgroup of order 4.
28. If d is a positive divisor of n , show that the number of elements of order d in a cyclic group of order n is $\phi(d)$.

29. Suppose that a cyclic group G has exactly three subgroups: G itself, $\{e\}$, and a subgroup of order 7. What is $|G|$? What can you say if 7 is replaced with p where p is a prime?
30. Prove that Q^+ , the group of positive rational numbers under multiplication, is isomorphic to a proper subgroup.
31. Suppose that $\phi: Z_{20} \rightarrow Z_{20}$ is an automorphism and $\phi(5) = 5$. What are the possibilities for $\phi(x)$?
32. Show that the order of a permutation of a finite set written in disjoint cycle form is the least common multiple of the lengths of the cycles.
33. For two finite subgroups H and K of a group, show that $|HK| = |H||K|/|H \cap K|$.
34. State and prove the Orbit-Stabilizer Theorem.
35. Show that Q , the group of rational numbers under addition, has no proper subgroup of finite index.
36. Suppose that there is a homomorphism from a finite group G onto Z_{10} . Prove that G has normal subgroups of indexes 2 and 5.
37. State and prove the First Isomorphism Theorem.
38. Suppose that ϕ is a homomorphism from Z_{36} to a group of order 24.
- (a) Determine the possible homomorphic images.
- (b) For each image in part a, determine the corresponding kernel of ϕ .

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions from among the questions 39 to 44. These questions carry **15 marks** each.

39. Prove that the center of a group G is a subgroup of G and determine the centers of the dihedral groups.
40. (a) Prove that an infinite group must have an infinite number of subgroups.
- (b) Suppose that a and b are group elements that commute and have orders m and n . If $\langle a \rangle \cap \langle b \rangle = \{e\}$, prove that the group contains an element whose order is the least common multiple of m and n . Show that this need not be true if a and b do not commute.
41. (a) Show that every group is isomorphic to a group of permutations.
- (b) Determine $\text{Inn}(D_4)$.
42. Compute $\text{Aut}(Z_{10})$ and show that it is isomorphic to $U(10)$.
43. Let G be a group of order $2p$, where p is a prime greater than 2. Then show that G is isomorphic to Z_{2p} or D_p .
44. Let f be a homomorphism from a group G to a group $\bar{G}$ and let H be a subgroup of G . Prove the following :
- (a) $\phi(H) = \{\phi(h) \mid h \in H\}$ is a subgroup of $\bar{G}$
- (b) If H is cyclic, then $\phi(H)$ is cyclic.
- (c) If H is Abelian, then $\phi(H)$ is Abelian.
- (d) If H is normal in G , then $\phi(H)$ is normal in $\phi(G)$.
- (e) If $|\ker \phi| = n$, then ϕ is an n -to-1 mapping from G onto $\phi(G)$.

- (f) If $|H| = n$, then $|\phi(H)|$ divides n .
- (g) If $\bar{K}$ is a subgroup of $\bar{G}$, then $f^{-1}(\bar{K}) = \{k \in G \mid \phi(k) \in \bar{K}\}$ is a subgroup of G .
- (h) If $\bar{K}$ is a normal subgroup of $\bar{G}$, then $f^{-1}(\bar{K}) = \{k \in G \mid \phi(k) \in \bar{K}\}$ is a normal subgroup of G .
- (i) If ϕ is onto and $\ker \phi = \{e\}$, then ϕ is an isomorphism from G to $\bar{G}$.

(2 × 15 = 30 Marks)

St. Xavier's College

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme Under CBCSS

Mathematics

Core Course VIII

MM 1544 : DIFFERENTIAL EQUATIONS

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer **all** the questions.

1. The order of the differential equation $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = e^x$ is
2. Form the differential equation having for it general solution $y = ax$ where a and b any constant.
3. The equation $\frac{dy}{dx} + py = Q$ is called
4. Define exact equation.
5. Define particular solution of a differential equation.
6. Integrating factor of the equation $\frac{dy}{dx} - y \cot x = 2x \sin x$ is

7. A differential equation $Mdx + Ndy = 0$ is exact if
8. Form the differential equation that represents all Parabolas each of which has a latus rectum $4a$ and whose axes are parallel to the x -axis.
9. Find out the Wronskain of e^x and e^{-x} .
10. Define a singular solution of a differential equation.

(10 × 1 = 10 Marks)

SECTION – II

Answer any **eight** questions.

11. Verify that the following are the solution of the corresponding differential equation.

$$y = mx + c : \frac{d^2y}{dx^2} = 0.$$

12. Form the differential equation by eliminating α and β from $(x - \alpha)^2 + (y - \beta)^2 = r^2$.
13. Find out the general solution of $x dx + y dy = 0$.
14. Solve $y dx - x dy + 3x^2 y^2 e^{x^3} dx = 0$.
15. Solve $y' = (y/x) + \tan(y/x)$.
16. Solve $\frac{dy}{dx} + y \cos x = 1/2 \sin x$.
17. Solve $(x+1)\frac{dy}{dx} + 1 = 2e^{-y}$.
18. Solve $P^2 + \left(x + y - \frac{2y}{x}\right)P + xy + \frac{y^2}{x^2} - y - \frac{y^2}{x} = 0$.
19. Solve $y = 2Px + y^2 P^3$.
20. Define Wronskain.

21. Define variation of Parameter in second order ODE.
22. Solve $y'' + y = \sec x$ by variation of parameters.
23. Solve $(D^2 + DD' - 2D'^2)z = 0$.
24. Solve $(D^4 - D'^4)z = 0$.
25. Find the orthogonal trajectories of the family of curves given by $r = a \sin \theta$.
26. Write the general solution of $(y - Px)(P - 1) = P$.

(8 × 2 = 16 Marks)

SECTION – III

Answer any **six** questions.

27. Solve $\frac{dy}{dx} = \frac{6x - 4y + 3}{3x - 2y + 1}$.
28. Solve $x dx + y dy - \left(\frac{x dy - y dx}{x^2 + y^2} \right) = 0$.
29. Verify whether $e^y dx + (xe^y + 2y) dy = 0$ is exact if so solve.
30. Solve $(1 + y^2) dx + (x - \tan^{-1} y) dy = 0$.
31. Given that $y = x$ is a particular solution of the differential equation $x^2 y'' - 2x(1 + x)y' + 2(1 + x)y = x^3$. Find its general solution.
32. Solve $P\sqrt{x} + q\sqrt{y} = \sqrt{z}$.
33. Solve $(D^2 - 4)y = e^{2x} + e^{-4x}$.
34. Find the Particular integral of $(D^2 - 4D + 3)y = e^x \cos 2x$.

35. Apply the method of variation of Parameter to solve $y'' + 3y' + 2y = x^2$.
36. By the method of variation of Parameter solve $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 9y = e^{2x}$.
37. Find the general solution of $zp + x = 0$.
38. Find the equation of the system of orthogonal trajectories of the Parabola $r = \frac{2a}{1 + \cos \theta}$ where a is the parameter.

(6 × 4 = 24 Marks)

SECTION – IV

Answer any **two** questions.

39. Solve $\frac{dy}{dx} = \frac{y^3 + 3x^2y}{x^3 + 2xy^2}$.
40. Solve $(2xy^4e^y + 2xy^3 + y)dx + (x^2y^4e^y - x^2y^2 - 3x)dy = 0$.
41. Solve $(1 + y^2)dx + (x - \tan^{-1}y)dy = 0$.
42. (a) Solve $(D^2 - 4D + 4)y = 3x^2e^{2x} \sin 2x$.
(b) Solve $(D^2 - 6D + 13)y = 2^x$.
43. Find the orthogonal trajectories of the family of curves $\frac{x^2}{a^2} + \frac{y^2}{b^2 + c} = 1$ where C is the parameter.
44. (a) By the method of variation of parameter solve $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 9y = \frac{e^{3x}}{x^2}$.
(b) Find the general solution of $P + 3q = 5z + \tan(y - 3x)$.

(2 × 15 = 30 Marks)

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First Degree Programme Under CBCSS

Mathematics

Open Course

MM 1551.1 — OPERATIONS RESEARCH

(2018 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the **first 10** questions are **compulsory**. They carry **1** mark **each**.

1. The linear function which is to be maximized or minimized is called _____.
2. The values of the decision variable in an LPP which satisfy the constraints are called _____ solution.
3. In an LPP a constraint of the type $\leq$ can be converted into equation by introducing _____ variable to the left side of the constraints.
4. A set of all feasible solution of LPP is _____.
5. A feasible solution to the transportation problem is called a basic feasible solution if the number of allocation is equal to _____.
6. Vogels approximation method is also called _____.
7. Modified distribution method is also called _____ method.

8. The solution for the assignment problem is possible only when the matrix is a _____.
9. Critical path method (CPM) developed in the year _____
10. Optimistic time is the _____ timing PERT calculation.
- (10 × 1 = 10 Marks)**

SECTION – II

Answer **any eight** questions from among the questions **11 to 26**. These questions carry **2 mark each**.

11. A person requires 10,12,14 units of chemical ABC respectively for his garden. A liquid product contains 5, 2 and 1 units of A, B and C respectively per jar. A dry product contains 1,2 and 4 units of A, B, C per carton. If the liquid product sells for Rs. 3 per jar and the dry product sells for Rs. 2 per carton how many of each should be purchased to minimize the cost and meet the requirements.
12. Define Slack variable.
13. Write the following LPP model in the standard form
- Maximize $Z = x_1 + x_2$ S.t
- $-x_1 + 2x_2 \leq -3$
- $4x_1 - 3x_2 \leq -6$
- $x_1, x_2 \geq 0.$
14. What is the Reformulated form of LPP.
15. Write the Algorithm of Assignment problem.
16. Is traveling salesman problem similar to assignment problem?
17. Define Big-M-method.
18. Define North West Corner Rule.

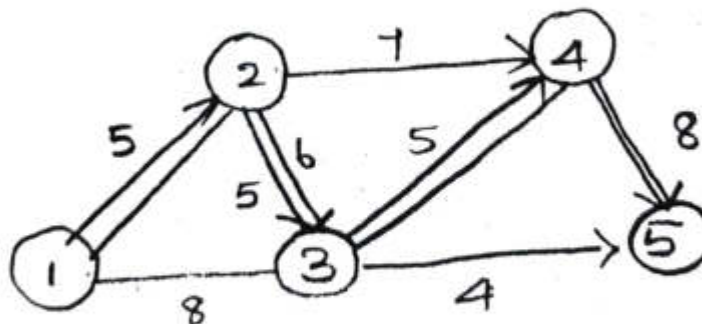
19. Solve the transportation problem and find the initial basic feasible solution.

	A	B	C	a_i
F_1	10	9	8	8
F_2	10	7	10	7
F_3	11	9	7	9
F_4	12	14	9	
b_j	10	10	8	

20. Solve the following assignment problem.

	1	2	3	4	5
A	20	15	25	25	29
B	13	19	30	13	19
C	20	17	14	12	15
D	14	20	20	16	24
E	14	16	19	11	22

21. What are the two Property's of assignment problem?
22. What are the two steps for solving a maximization problem.
23. Define critical path method. What are the two types of CPM.
24. Find the path and duration from the below figure.



25. Is any relation between optimistic time estimate and Pessimistic time estimate? Explain.

26. The following data are the characteristics of a project.

Activity	Immediate predecessors	Duration in days
A	—	2
B	A	3
C	A	4
D	B, C	6
E	—	2
F	E	8

Draw the network diagram.

(8 × 2 = 16 Marks)

SECTION – III

Answer any six questions from among the questions 27 to 38. These questions carry 4 marks.

27. An animal feed company must produce 200 kgs of a minimum consisting of ingredient X_1 and X_2 daily. X_1 cost Rs. 3 per Kgs and X_2 Rs. 8 per Kg. Not more than 80 kgs of X_1 can be used and at least 60 kgs of X_2 must be used. Find how much of each ingredient should be used if the company wants to minimize the cost.
28. Let us assume that you have inherited Rs.1,00,000 from your father-in-law that can be invested in a combination of only two stock portfolios with the maximum allowed in either portfolio set at Rs. 75,000. the first portfolio has an average rate of return of 10% Where as the second has 20%. In terms of risk of factors associated with these portfolios, the first has a risk rating of 4 and the seconds has 9. Since you wish to maximize your return, you will not accept an average rate of return below 12% or a risk factor above it. Hence you then face an important question. How much should you invest in each portfolio? Formulate this as a linear programming problem and solve by graphical method.
29. Solve the following LPP by simplex method

$$\text{Max } Z = 2x_1 + 5x_2$$

Subject to :

$$x_1 + 2x_2 \leq 8$$

$$x_1 \leq 4$$

$$0 \leq x_2 \leq 3, x_1 \text{ is unrestricted.}$$

30. Solve the following transportation problem :

	D ₁	D ₂	D ₃	D ₄	
O ₁	1	2	3	4	6
O ₂	4	5	2	0	8
O ₃	0	2	2	1	10
	4	6	8	6	24

31. Explain graphical method and its types.

32. Using North west corner rule find an initial basic feasible solution for the following transportation problem :

	W ₁	W ₂	W ₃	a _i
F ₁	2	7	4	5
F ₂	3	3	1	8
F ₃	5	4	7	7
F ₄	1	6	2	14
b _j	2	9	18	34
				29

33. Determine the optimum solution to the following T.P.

	Waterhouse	W ₁	W ₂	W ₃	Capacity
Factory					
F ₁		8	8	15	120
F ₂		15	10	17	180
F ₃		3	9	10	80
Requirement		150	80	50	280

34. Prove that the optimal solution to an assignment problem remains the same if a constant is added (or) subtracted to any row or column of the cost matrix.

35. Determine the optimum sequence for the following sequencing problem in which 5 jobs are done in 2 machines M_1 and M_2 in the order M_1, M_2 . Processing times are given in hours in the following table.

	M_1	M_2
J_1	10	4
J_2	2	12
J_3	18	14
J_4	6	16
J_5	20	6

36. A project has the following characteristics

Activity	Duration	Predecessors
A	6	None
B	8	A
C	4	B
D	9	B
E	2	C
F	7	D

Construct and compute the network T_e and T_L for each and critical path and project duration.

37. Explain Simplex method.
 38. Solve the following LPP using Simplex method

$$\text{Max } Z = 45x_1 + 80x_2$$

Subject to :

$$5x_1 + 20x_2 \leq 400$$

$$10x_1 + 15x_2 \leq 450$$

$$x_1, x_2 \geq 0.$$

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions **each** question carry **15** marks.

39. Solve the following LPP graphically.

$$\text{Maximize } Z = 20x_1 + 30x_2$$

$$\text{Subject to } 3x_1 + 3x_2 \leq 36 \text{ — (1)}$$

$$5x_1 + 2x_2 \leq 50 \text{ — (2)}$$

$$2x_1 + 6x_2 \leq 60 \text{ — (3)}$$

$$x_1, x_2 \geq 0$$

40. Use simplex method to solve the LPP.

$$\text{Maximize } z = 30x_1 + 20x_2$$

$$\text{Subject to } 10x_1 + 8x_2 \leq 800$$

$$x_1 \leq 60$$

$$x_2 \leq 75$$

$$x_1, x_2 \geq 0$$

41. Use simplex method to solve the following LPP.

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

$$\text{Subject to } x_1 + 2x_2 \leq 10$$

$$x_1 + x_2 \leq 6$$

$$x_1 - x_2 \leq 2$$

$$x_1 - 2x_2 \leq 1$$

$$x_1, x_2 \geq 0$$

42. Using North-West Corner Rule find the initial basic feasible solution for the transportation problem and then solve.

	D_1	D_2	D_3	D_4	a_i
S_1	3	1	7	4	300
S_2	2	6	5	9	400
S_3	8	3	3	2	500
b_j	250	350	400	200	1200

43. A company has 4 machines on which to do 3 jobs. Each job can be assigned to one and only machine. The cost of each machine is given in the following table. What are the job assignments, which will minimize the cost?

	A	B	C	D
X	18	24	28	32
Y	8	13	17	19
Z	10	15	19	22

44. The following indicates the details of a project the duration are in days. A refers optimistic time m refers most likely time a and b refers Pessimistic time estimate.

Activity	1-2	1-3	1-4	2-4	2-5	3-4	4-5
a	2	3	4	8	6	2	2
m	4	4	5	9	8	3	5
b	5	6	6	11	12	4	7

- Draw the network.
- Find the critical path.
- Determine the mean and SD of the project completion time.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

Physics

Core Course V

PY 1541 : QUANTUM MECHANICS

(2018 Admission Regular)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** the questions. Answer should not exceed two sentences. Each question carries **1** mark :

1. Give the Planck's distribution law.
2. What is meant by dual nature of matter?
3. Mention the properties of the wave function.
4. What is meant by normalised wave function?
5. Write down the Schrodinger's time independent wave equation in three dimensions and explain the symbols.
6. What is meant by zero point energy?
7. What is a wave packet?

8. Define a Hermitian operator.
9. What is a linear operator?
10. What do you mean by Phase velocity?

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** questions. Answer should not exceed one small paragraph. Each question carries **2** marks :

11. What is Compton wavelength? Discuss the importance of Compton effect.
12. Derive the energy time uncertainty relation.
13. Brief the give the physical interpretation of the wave function.
14. Write note on black body radiation. Give examples.
15. Explain the discrepancy of Rutherford hydrogen atom and the Bohr model explanation.
16. Mention any four uses of electron diffraction.
17. Give the evidence for finite width of the spectral lines.
18. Write note on the orthogonality of eigen functions.
19. Explain the orthogonality and normalization condition of wave functions.
20. Write note on probability density.
21. Discuss about the linear vector space.
22. Define the Hamiltonian operator.
23. Discuss the purpose of Davisson–Germer experiment.

24. What do you understand by box normalization?
25. Write the normalized wave function for particle in a infinite square potential well and draw diagram showing its amplitude wave and probability density.
26. Write down the Schrodinger's wave equation in momentum representation and explain the terms.

(8 × 2 = 16 Marks)

PART – C

Answer **any six** questions. Each question carries **4** marks :

27. An X-ray beam of wavelength 5 pm is Compton scattered from a target. Determine the minimum and maximum wavelength of the scattered x-rays.
28. Using the uncertainty principle, estimate the ground state energy of the harmonic oscillator.
29. Calculate the permitted energy levels of an electron in a box 1 Å wide.
30. The energy required to remove an electron from sodium is 2.5 eV. Does sodium exhibit photoelectric effect from a radiation having wavelength 300 nm.
31. X-rays of wavelength 2 Å are scattered from a carbon block. The scattered photons are observed at right angles to the direction of the incident beam. Determine
- (a) the wavelength of the scattered photon
 - (b) the recoil energy of the electron.
32. The photoelectric threshold for a certain metal is 200 nm. Estimate the maximum energy of the electrons emitted by a radiation of wavelength 40 nm.
33. Calculate the de-Broglie wavelength associated with an electron of energy 5 eV.

34. Calculate the expectation value $\langle p_x \rangle$ of the momentum of a particle trapped in a one dimensional box.
35. Derive the time independent form of Schrodinger equation.
36. Show that eigen functions of a hermitian operator that belong to distinct eigen values are orthogonal.
37. An electron in a one dimensional infinite potential well, defined by $V(x)=0$ for $-a < x < a$ and $V(x)$ is infinite, otherwise, goes from $n=4$ to the $n=2$ level. The frequency of the emitted photon is 3.43×10^{14} Hz. Find the width of the box.
38. Normalize the wave function $\psi(x) = Ae^{-ax^2}$ between over the domain $-\infty \leq x \leq \infty$, where A and a are constants.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** questions. Each question carries **15** marks :

39. Discuss the important conclusions on photoelectric effect. Give Einstein's explanations of the different effects.
40. Discuss quantum mechanically the problem of a particle in a finite square potential well. Draw diagram showing the amplitude wave and probability density for the same.
41. Explain the postulates of quantum mechanics.
42. Explain the properties of Hermitian operator.
43. Discuss the inadequacy of classical mechanics and explain the discrepancy of Rutherford hydrogen atom and the Bohr's model explanation.
44. Derive the Schrodinger's time dependent equation for a free particle.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

Physics

Core Course VI

**PY 1542 : STATISTICAL MECHANICS, RESEARCH METHODOLOGY AND
DISASTER MANAGEMENT**

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Answer all the questions. Each carries 1 mark)

1. What are microstates?
2. Define Fermi free energy.
3. What are bosons?
4. What do you mean by research methods?
5. Write two criteria of good research.
6. What are different types of systematic errors?
7. How to determine the accuracy of the measurement?
8. What are natural disasters?

9. Write the importance of pre-disaster activity.
10. Give the number of significant figures in 0.00802.

(10 × 1 = 10 Marks)

SECTION – B

(Answer **any eight** questions. Each carries **2** marks)

11. Differentiate precision and accuracy.
12. Write the guidelines for rounding off the numerical values of various quantities.
13. Give the number of significant figures in following numbers.
 - (a) 234.5 m
 - (b) 400.005
 - (c) 0.00687
 - (d) 50 m
14. Briefly describe the research methodology.
15. What are the steps in disaster management?
16. Describe the objective of research.
17. What are the main characteristics of good research?
18. Write the layout of main text of thesis.
19. What are the graphical representation of error?
20. Explain μ space and Γ space.
21. Give the impact of global climate change.

22. Explain the design of preliminary section of thesis writing.
23. Explain microcanonical ensemble.
24. Give any four rules for determining significant figures.
25. Explain Gibb's paradox.
26. Define standard deviation. Write its formula.

(8 × 2 = 16 Marks)

SECTION – C

(Answer **any six** questions. Each carries **4** marks)

27. Explain various steps in research.
28. Calculate the Fermi energy of sodium assuming that the metal has one free electron per atom. Given $h = 6.625 \times 10^{-34}$ Js; mass of electron 9×10^{-31} kg; density of sodium = 970 kg/m^3 ; Avogadro's number = 6.02×10^{26} and atomic weight of sodium = 22.99.
29. Write a note on indistinguishability of identical particles.
30. The length of a rod measured in an experiment is recorded as 2.51 m, 2.56 m, 2.49 m, 2.58 m, 2.48 m, 2.55 m respectively. Find the mean length, absolute error, mean absolute error.
31. A student measures period of pendulum 5 times and the results are 2.9, 2.5, 2.7, 2.4 and 2.5 second. Find (a) Arithmetic Mean (b) Standard Deviation.
32. What all are the different types of research?
33. The length, breadth and thickness of a rectangular sheet of metal are 4.234 m, 1.005 m, and 2.01 cm respectively. Give the area and volume of the sheet to correct significant figures.
34. Write a note on recent major disaster and their relief efforts.

35. Give accounts personal hygiene and control of communicable disease.
36. The length l , breadth b and thickness t of a block of wood were measured with the help of a measuring scale. The results with permissible errors are $l = 15.12 \pm 0.01$ cm, $t = 5.28 \pm 0.01$ cm, $b = 10.15 \pm 0.01$ cm. Calculate the percentage error in volume upto proper significant figures.
37. Compare three types of ensembles.
38. Explain the different ways of data collection.

(6 × 4 = 24 Marks)

SECTION – D

(Answer **any two** questions. Each carries **15** marks)

39. Derive Fermi-Dirac distribution function.
40. Describe the importance of literature survey and criteria for good research.
41. Explain random and systematic errors with suitable examples. Write the importance of estimating errors.
42. What are earth quakes and their effects? Explain disaster preventions, mitigation and advancement in research area of earthquakes.
43. Explain disaster reduction activity along with achievements and challenges.
44. Derive the Maxwell-Boltzmann distribution law.

(2 × 15 = 30 Marks)

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First Degree Programme Under CBCSS

Physics

Core Course VII

PY 1543 — ELECTRONICS

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Very Short Answer type questions. (Answer all **10** questions of **1** mark each).

1. State Kirchhoff's voltage law.
2. What is the value of PIV of a centre tap full wave rectifier?
3. What is mean by intrinsic semiconductors?
4. Define distortion of power amplifier.
5. Discuss the phase reversal of CE configuration of a transistor.
6. What is regulated power supply?
7. What is meant by feedback in Amplifiers?

8. Explain conductive modulation in UJT.
9. What are the limitations of AM modulation?
10. Define input offset current of an op-amp.

(10 × 1 = 10 Marks)

SECTION – B

Short answer type questions. (Answer **any eight** questions of **2 marks each**).

11. State and explain maximum power transfer theorem.
12. Draw and explain the forward and reverse bias VI characteristics of PN junction diode.
13. What are the advantages and disadvantages of RC phase shift oscillator?
14. Why we prefer NPN transistor over PNP transistor for commercial purpose?
15. Explain the function of a shunt capacitor in a filter circuit.
16. Explain the role of PN junction diode in AM modulation.
17. Write a short note on push pull amplifier.
18. What are the advantages of FET compared to BJT?
19. What are the difference between photodiode and solar cell?
20. Explain the enhancement mode working of DE-MOSFET.
21. Explain the transfer characteristic of JFET.

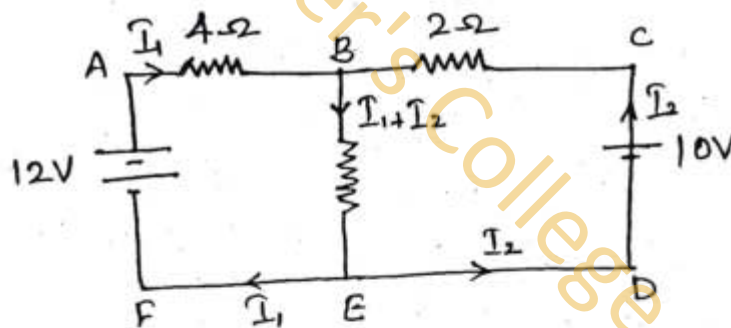
22. Draw the pin diagram of IC741 (Op-amp).
23. What is meant by tunnel effect?
24. How to form depletion region?
25. How to test a diode using multi meter?
26. Draw and explain the circuit diagram of theft alarm using SCR.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. **Each** question carries **4** marks.

27. Using Kirchhoff's law, calculate the branch current in the network given below.



28. A silicon diode dissipates 3W for a forward current of 2A. Calculate the forward voltage drop across the diode and its bulk resistance.
29. A silicon diode passes a current of 100 mA at 1V. Find its bulk resistance. What would be its ac resistance for direct current of
 - (a) 0.1 mA and
 - (b) 25 mA.

30. A half wave rectifier supplies a power of a $1\text{ K}\Omega$ load. The input supply voltage is $200\text{ V}_{\text{rms}}$. Neglect the forward resistance of the diode, calculate
- (a) V_{dc}
 - (b) I_{dc}
 - (c) ripple voltage (*rms value*)
31. A transistor has $\alpha = 0.98$, $I_B = 100\mu\text{A}$ and $I_{\text{CO}} = 6\mu\text{A}$. Calculate I_C and I_E .
32. In a negative feedback amplifier, $A = 100$, $\beta = 0.04$ and $V_i = 50\text{mV}$. Find
- (a) gain with feedback
 - (b) output voltage
 - (c) feedback factor
 - (d) feedback voltage.
33. The windshield wiper motor of an automobile is controlled by a UJT with $\eta = 0.6$. The capacitor has available of $50\mu\text{F}$ and the charging resistor is a series combination of $50\text{ k}\Omega$ resistors and a $500\text{ k}\Omega$ potentiometer. Determine the maximum and minimum number of blade strokes per minute possible with this arrangement.
34. A tuned collector oscillator has a fixed inductance of $100\mu\text{H}$ and has to be tuneable over the frequency band of 500 kHz to 1500 kHz . Find the range of variable capacitor to be used.

35. The total power content of an AM wave is 2.64 kW at a modulation factor of 80%. Determine the power content of
- (a) carrier
 - (b) each side band.
36. A certain diode has a reverse saturation current of $5 \mu A$ at $25^\circ C$ for a reverse voltage of 20 V. Calculate its reverse resistance.
37. A CE connected transistor has $\beta = 100$ and $I_B = 50 \mu A$. Compute the values of α , I_C and I_E .
38. A certain X-cut quartz crystal resonates at 450 kHz. It has an equivalent inductance of 4.2 H and an equivalent capacitance of 0.0297 pF. If its equivalent resistance is 60Ω calculate its Q-factor.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks.

39. With help of neat circuit diagram, explain the construction and working of full wave centre tap rectifier. Also explain how to regulate the output voltage of full wave rectifier using Zener diode.
40. What do you mean by ac and dc load line of a transistor circuit? Draw dc load line over output characteristics of transistor and explain the need of proper selection of operating point of the circuit.
41. Explain the principle and working of superheterodyne receiver with a neat block diagram.
42. What are the characteristic of an ideal op-amp? With the help of neat diagram, explain the working of non-inverting amplifier.

43. With the help neat circuit diagram, explain the principle and working of a single stage CE amplifier and also derive its parameters.
44. With the help neat diagram, explain different types of modulation and compare its merits and demerits.

(2 × 15 = 30 Marks)

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First Degree Programme under CBCSS

Physics

Core Course VIII

PY 1544: ATOMIC AND MOLECULAR PHYSICS

(2018 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in one or two sentences. Each question carries **1** mark.

1. What is j-j coupling?
2. What do you mean by critical potential of an atom?
3. What is the selection rule for J and S in optical spectra?
4. What is scattering?
5. What is Frank Condon principle?
6. Give an example for microwave inactive molecule.
7. What is the condition for a molecule which is both I R active and Raman active?
8. What is the lowest rotational energy gap in rotational Raman spectrum?
9. Write the full form of NMR and ESR
10. What is NMR imaging?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions not exceeding a paragraph. Each question carries **2 marks**.

11. What are the limitations of Sommerfeld atom model?
12. State Pauli's exclusion principle.
13. Name the spectral series of hydrogen atom.
14. What is Anomalous Zeeman effect?
15. Explain Larmor's theorem.
16. What is Stark effect?
17. Write down any two applications of x-ray spectrum.
18. Mention properties of x-rays.
19. What is chemical shift?
20. Explain dissociation energy.
21. Write down two differences between Raman spectra and IR spectra.
22. Factors affecting intensity of molecular spectra. Any two.
23. What are the different types of energies possessed by a molecule?
24. Explain the principle of mutual exclusion in vibrational spectroscopy.
25. Explain Mossbauer spectroscopy.
26. Mention any two applications of ESR spectroscopy.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks.

27. A hydrogen atom is placed in a magnetic field of 3T. Calculate the energy difference between $m_l = -1$ and $m_l = +1$ components in the 2p state.
28. Find the values of L and S of the ground state of nitrogen.
29. Draw the energy level diagram of sodium D lines and explain the fine structure.
30. Explain Paschen-Bach effect.
31. What is x-ray? Give its important applications.
32. Explain measurement of X-ray wavelengths by ruled gratings.
33. Explain the quantum theory of Raman effect.
34. Calculate the vibrational energy levels of an HCL molecule, assuming the force constant to be 516Nm^{-1} .
35. HCL molecule has a rotational constant B value of 1059.3m^{-1} and a centrifugal distortion constant D of $5.3 \times 10^{-2}\text{m}^{-1}$. Estimate the vibrational frequency.
36. The spacing between the vibrational levels of CO molecule is $8.45 \times 10^{-2}\text{eV}$ of energy. Calculate the frequency of the molecule.
37. Explain the principle of NMR spectroscopy.
38. An unpaired electron gives ESR resonance at 35 GHz when the magnetic field is 1.3T. Calculate electron g-factor.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** questions. Each question carries **15** marks.

39. What are the postulates of Bohr atom model? Explain Vector atom model and quantum numbers corresponding to each atom.
40. (a) Explain spectral terms and notations with examples.
(b) Explain the quantum theory of Zeeman effect.

41. What are Xrays? How are they produced? Explain their energy level diagrams and applications.
42. Discuss the rotational spectra of diatomic molecules and explain their selection rules.
43. Explain the working and principle of IR spectrometer with suitable diagram.
44. What is the principle behind NMR spectroscopy? Explain the working of a NMR spectrometer and mention its uses.

(2 × 15 = 30 Marks)

St. Xavier's College

Reg. No. :

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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme under CBCSS

Physics

Open Course

PY 1551.2 : ASTRONOMY AND ASTROPHYSICS

(2018 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Very short answer. Answer **all** questions. (Each carries **1** mark)

1. Define celestial sphere.
2. What is meant by apparent magnitude of a star?
3. Compare the brightness of first and sixth magnitude stars.
4. Which planets are called terrestrial planets?
5. Define asteroids in solar system.
6. What is Sun's corona?
7. By which process does the sun produce its energy?

8. Define luminosity of a star.
9. What is meant by a constellation?
10. Name the galaxy in which we live?

(10 × 1 = 10 Marks)

SECTION – B

Short answer. Answer **any eight** questions. (Each carries 2 marks)

11. What is the elemental composition of sun?
12. What are sun spots?
13. Write down the contribution of Tycho Brahe in observational astronomy.
14. What is a solar wind?
15. Why do stars have different colors in the night sky?
16. Why do we have seasons on earth?
17. How did Galileo's series of observation of Venus prove Copernican theory of solar system?
18. Name important moon missions.
19. Why does Saturn have a ring system?
20. Compare the atmosphere of Venus and Mars to that of earth?
21. What is meant by equinox and solstice?
22. Write a short note on size and surface temperature of sun?
23. State and explain Kepler's first law of planetary motion.

24. Write down first four celestial objects with highest apparent magnitude.
25. Write a short note on moons of Mercury, Venus and Mars.
26. What are dwarf planets?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. (Each question carries **4** marks)

27. Explain Ptolemaic model of solar system.
28. What is meant by precession of earth axis and how does it affect celestial coordinate system?
29. Write a brief note on Special theory of relativity and General theory of relativity.
30. Distinguish between asteroid belt and Kuiper belt.
31. Explain Hertzsprung Russell diagram of stars.
32. What are the different types of galaxies according to their shape?
33. Explain solar eclipse with diagram.
34. Explain different spectral types of stars.
35. What are the different inner and outer layers of sun?
36. Write down the definition of a planet as per International Astronomical Union?
37. Comment on composition of earth atmosphere and role of carbon dioxide in earth atmosphere.
38. Explain how tides are formed.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. (Each question carries **15** marks)

39. Explain celestial coordinate system with declination and right ascension.
40. Explain formation of solar system using Nebula hypothesis.
41. Explain the evolution of a sun like star in detail.
42. Explain different type of objects in solar system.
43. Briefly explain the history of astronomy from ptolemaic model to general theory of relativity.
44. Discuss supernova, neutron stars and black holes.

(2 × 15 = 30 Marks)

Reg. No. :

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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme Under CBCSS

Chemistry

Core Course

CH 1541 : PHYSICAL CHEMISTRY – I

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. One word type. Each question carries **1** mark.

1. What will happen to the most probable velocity of a gas when the temperature is increased?
2. Which gas has the lowest critical temperature?
3. What is the SI unit of vander Waal's?
4. How many numbers of crystal systems exist in nature?
5. How many numbers of atoms in the unit cell of face centred cubic lattice?
6. What is the SI unit of coefficient of viscosity?
7. Liquids with high intermolecular forces have high viscosity. Explain.

8. What will happen to vapour pressure of solution when a non-volatile solute is dissolved in a solvent?
9. When 5KJ of work is done on the system and 1KJ is given out by the system what will be ΔU ?
10. What is the point group of boat form of cyclohexane?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Short answer type. Each question carries **2** marks.

11. Define root mean square velocity of a gas.
12. What is meant by the Boyle Temperature of a gas?
13. At what temperature will the RMS velocity of O_2 gas be equal to that of H_2 molecule at $27^\circ C$
14. Under what conditions does a real gas approach ideal behaviour?
15. What is the Joule-Thomson coefficient for an ideal gas?
16. What do you mean by smectic liquid crystal?
17. What do you mean by abnormal molecular mass?
18. Explain why the addition of a non-volatile solute increases the boiling point of a liquid?
19. Show that $C_p - C_v = R$ for one mole of an ideal gas.
20. Define efficiency of heat engine.
21. How is entropy of fusion of a substance related to enthalpy of fusion?
22. List out the symmetry elements of the C_{2v} point group.
23. Write down the expression for interplanar spacing (d_{hkl}) of a cubic unit cell.

24. What is molal elevation constant?
25. Define entropy.
26. What are colligative properties?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Short essay type. Each question carries **4** marks.

27. Explain the structure of NaCl.
28. Derive Bragg's equation.
29. Acetic acid associates to form double molecules. 1.65 g of acetic acid when dissolved in 100g of benzene raised the boiling point by 0.36°C. Calculate Van't Hoff's factor and degree of association of acetic acid in benzene.
30. Explain the molecular mass determination by Beckmann's method.
31. Explain the entropy criteria for reversible and irreversible process.
32. Derive the relation : $dG = VdP - SdT$.
33. Derive the Gibbs - Duhem equation.
34. Explain fugacity and its determination by graphical method.
35. Define the term Gibb's free energy? What is its physical significance?
36. Explain the Swam theory of liquid crystal.
37. Explain the non-stoichiometric defects in crystals.
38. What are critical constants of a gas? How would you determine them?

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Long essay type, Each question carries **15** marks.

39. Derive the expression connecting the Joule-Thomson coefficient and inversion temperature with van der Waals constants.
40. (a) State and illustrate the Hess's law of constant heat summation.
(b) Explain two applications of Hess's law.
(c) The standard enthalpy of reaction for the hydrogenation of ethylene (C_2H_4) to ethane (C_2H_6) is -136.8 KJ/moles. The standard enthalpy of formation of ethane is -84.4 kJ/moles. Calculate the standard enthalpy of formation of ethylene?
41. (a) Explain the different types of point defects in crystals.
(b) Explain the powder method for crystal structure determination?
42. (a) Discuss the different classes of liquid crystals with suitable examples.
(b) Explain the different characterization techniques of liquid crystals.
43. (a) Derive the Gibbs Helmholtz relation and its significance.
(b) Construct the group multiplication table for C_{2v} point group.
44. (a) Explain the different types of colligative properties exhibited by dilute solutions.
(b) Discuss the method of determination of molecular mass by Rast's method.

(2 × 15 = 30 Marks)

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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme Under CBCSS

Chemistry

Core Course

CH 1542 : INORGANIC CHEMISTRY – III

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries **1** mark (Answer in a word/sentence)

1. Write the formula of sodium tetrafluoridosilicate (IV).
2. Name the energy carriers in photosynthesis.
3. Give an example of heteroleptic metal carbonyl.
4. Among the 3d transition elements which metal has highest number of unpaired electrons in the ground state?
5. Name the most basic hydroxide among lanthanide hydroxides.
6. _____ process is used for the purification of nickel.
7. Where do we obtain the magnified image of the specimen in TEM?
8. Crude titanium is purified by _____ method.

9. What is the coordination number and oxidation state of central metal ion in $K_3[Fe(Ox)_3]$.
10. Give an example of hexahapto ligand.

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. Each question carries **2** marks. (short answer questions)

11. Distinguish between ore and mineral with examples.
12. Write the IUPAC names of
- (a) $[Co(NH_3)_5Cl]Cl_2$
 - (b) $K_2[Pt(SCN)_6]$
13. What is EAN rule? Check whether $(Ag(CN)_2)^-$ is obeying EAN rule or not. (At. No. of Ag -47)
14. Transitional metal ions form a number of nonstoichiometric compounds. Give reasons.
15. Why do actinides form complexes more readily than lanthanides?
16. Give two uses of potassium dichromate in the lab.
17. What is meant by coordination isomerism? Explain with example.
18. Differentiate between mononuclear and polynuclear metal carbonyls with examples.
19. What are bulk and trace metal ions? Give examples.
20. Explain how IR spectroscopy is helpful in finding the structure of metal carbonyls.
21. What is the principle of AFM?

22. Mention the differences between haemoglobin and myoglobin.
23. Mention the differences between SEM and TEM.
24. Explain why crystal field splitting in tetrahedral field is less than splitting in octahedral field.
25. Differentiate between calcination and roasting.
26. What is meant by aluminothermy?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. Each question carries **4** marks. (Short essay questions)

27. What is meant by hydrometallurgy? Explain with an example.
28. Discuss any four general characteristics of transition metals in detail.
29. Briefly discuss the biochemical processes in which Fe is involved.
30. Describe the bonding in metal carbonyls.
31. Write a note on spectrochemical series.
32. Explain the crystal field splitting in an octahedral field.
33. Briefly discuss applications of organometallic compounds.
34. Discuss instrumentation involved in TG.
35. Briefly compare the similarities between lanthanides and actinides.
36. What is meant by chelate effect? Why it is called as an entropy effect?
37. Explain froth flotation process.
38. Distinguish between labile and inert complexes with examples.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. Each question carries **15** marks. (essay questions)

39. Write an account of the MOT of octahedral complexes taking $[\text{Co}(\text{NH}_3)_6]^{3+}$ as example.
40. What is lanthanide contraction? Discuss the causes and consequences.
41. Discuss the principle and instrumentation of colorimetry.
42. Discuss the bonding involved in Zeise's salt and its structure.
43. Briefly explain the steps involved in photosynthesis.
44. Discuss the extraction of iron from haematite.

(2 × 15 = 30 Marks)

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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme under CBCSS

Chemistry

Core Course VII

CH 1543 – ORGANIC CHEMISTRY – II

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Very short answer type question.

Answer **all** questions. **Each** question carries **1** mark.

1. Give the IUPAC name of the given compound.



2. What is Bayer -Villiger oxidation?
3. $A + C_2H_5MgBr \longrightarrow B \xrightarrow{H_2O/H^+} 2\text{-Methylbutan-2-ol}$. Identify A.
4. What happens when formaldehyde is treated with ammonia?
5. Name the strongest halogenated acetic acid.

6. Give the name of the product formed when ethanamine is heated with chloroform and alcoholic potash.
7. In what type of reactions the percentage atom economy is 100?
8. Mention any two advantages of a microwave assisted reaction when compared to its thermal reaction with same concentrations.
9. Mention the general nature of electronic spectrum of a species in solution.
10. How many signals will be obtained for the protons of TMS in its NMR spectrum?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks.

11. How is benzamide converted into aniline?
12. Arrange ortho, para and meta chloro anilines in the increasing order of basicities
13. Define bathochromic effect.
14. Mention the conditions for a molecule to be IR active.
15. Sketch the schematic PMR spectrum of toluene.
16. How many PMR peaks will be obtained for C_2H_5Br ?
17. Explain green synthesis. Illustrate with one example.
18. What kind of feed stock should be used for green synthesis?
19. How is phenol converted into benzene?
20. How is coumarine prepared from salicylaldehyde?
21. With the help of equations, explain haloform test.
22. How does ethanal react with $NaHSO_3$? Give the equation.

23. Distinguish acetophenone and benzophenone chemically.
24. What happens when cinnamic acid is treated with dry soda lime?
25. How is tosyl chloride prepared?
26. What is Nef's reaction?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. **Each** question carries **4** marks.

27. How do the following reagents react with alcohols given against them?

(a) Jones's reagent 

(b) Collins reagent 

28. Explain what happens when primary and secondary alcohols react with alkaline KMnO_4 .
29. Explain Lucas test to distinguish primary secondary and tertiary alcohols.
30. Explain Knoevenagel reaction with mechanism.
31. Explain the reactions of methyl magnesium bromide with the following compounds. What happens when the product is subsequently hydrolysed in acid medium?
(a) Propanal (b) Benzaldehyde
32. Explain how oxalic acid is commercially prepared. Explain the action of the following on oxalic acid.
(a) Con. Sulphuric acid (b) Heat
33. How is saccharin synthesized? Give equations.
34. Explain Hoffmann's bromamide reaction.

35. Draw the schematic PMR spectrum of ultrapure ethanol and explain.
36. Explain microwave synthesis. Give two examples one in aqueous medium and one in organic solvent.
37. How will you convert (a) butanoic acid into butane (b) aniline to para bromoaniline?
38. How can the isomers of C_2H_6O be differentiated using NMR spectroscopy?

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks.

39. Discuss the mechanisms of the following reactions.
(a) Perkin (b) Beckmann rearrangement (c) Claisen rearrangement.
40. (a) Explain the splitting of PMR signals into multiplets due to the spin-spin coupling, taking chloroethane as an example.
(b) Explain crown ethers and its importance.
(c) Explain how is a $-O-CH_3$ group estimated? **5+5+5**
41. What is green chemistry? Explain the need for green chemistry. Mention the goals of it. Discuss the limitations of green chemistry.
42. (a) How does phenol react with (i) CO_2 (ii) $CHCl_3$ and $NaOH$ (iii) Br_2 in CCl_4 (iv) $NaNO_2$ and H_2SO_4
(b) Explain (i) MPV reduction. (ii) Wolf Kishner reduction. **8+7**
43. Write notes on
(a) Ascent and descent series in aliphatic carboxylic acid
(b) Auxochrome chromophore concept.
44. Discuss various aspects related to the basic strengths of three kinds of aliphatic amines and ammonia.

(2 × 15 = 30 Marks)

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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme under CBCSS

Chemistry

Open Course I

CH 1551.1 : ESSENTIALS OF CHEMISTRY

(2018 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. Give the electronic configuration of chromium (Cr) (Atomic Number 24).
2. Who discovered electrons?
3. Who proposed modern periodic table?
4. Which isotope of carbon is used for radio carbon dating?
5. What is the monomer of natural rubber?
6. Name one inorganic polymer.
7. All enzymes are _____
8. Name one example of antipyretic drug.

9. What is the unit of radioactivity?
10. Name one cortical hormone.

(10 × 1 = 10 Marks)

SECTION – B (short answer type)

Answer any **eight** questions. **Each** question carries **2** marks.

11. What are disadvantages of hard water?
12. What is gun cotton?
13. What are the different classes of dyes?
14. What is the role of enzymes in the living systems?
15. What is vulcanisation of rubber?
16. What is group displacement law?
17. Define ionization potential.
18. What is Pauli's exclusion principle?
19. What are the monomers of Nylon 66 polymer?
20. What is hybridization?
21. What are the different quantum numbers of an electron in an atom?
22. What are factors affecting the purity of water?
23. Define electronegativity.
24. What is green house effect?
25. What is Bakelite?
26. What is the chemical formula of natural rubber?

(8 × 2 = 16 Marks)

SECTION – C (short essay)

Answer any **six** questions. **Each** question carries **4** marks.

27. Write a method for the removal of hardness of water.
28. What is Bohr's theory of atoms?
29. Write a short note on explosives?
30. Explain the cleaning action of soap.
31. Differentiate between DNA and RNA.
32. What are different classes of enzymes? Explain the mechanism of action of enzymes.
33. Briefly explain the rock dating experiment.
34. Write down the structure and application of polyethylene and polystyrene.
35. Explain green house effect and acid rain.
36. Write a short note on ozone layer depletion.
37. Distinguish between addition and condensation polymerization.
38. What are the disadvantages of hard water? How it can be removed?

(6 × 4 = 24 Marks)

SECTION – D (Long Essay)

Answer any **two** questions. **Each** question carries **15** marks.

39. Explain the different principles involved in the electronic configuration of atoms.
40. Explain nuclear fission and fusion with suitable examples.
41. Explain the different sources of water pollution.

42. Explain the nature and types of different radiations as a result of natural radioactivity?
43. (a) Explain the different aspects of rock dating and radio carbon dating.
(b) Explain the different classes of detergents.
44. (a) Explain the different aspects of air pollution due to particulate matter.
(b) Explain the different classification of polymers.

(2 × 15 = 30 Marks)

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Fifth Semester B.Com. Degree Examination, February 2021

First Degree Programme under CBCSS

(Open Course I)

**CO 1551.3/CC 1551.3/CX 1551.3/TT 1551.3 –
CAPITAL MARKET OPERATIONS**

(2015-2017 Admission)

**(Common for Commerce / Commerce with Computer Application /
Commerce and Tax Procedure and Practice / Commerce and Tourism and
Travel Management)**

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** word or to a maximum of **two** sentences each. Each question carries **1** mark.

1. What are the various types of financial markets?
2. What is Secondary market?
3. What is Beta?
4. What do mean by Zero Coupon Bond?
5. What are G-Secs.?
6. What is a Bond?
7. Who is a broker?
8. What is Arbitration?
9. What is Stock exchange?
10. What is Rolling Settlement?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in not exceeding one paragraph each. Each question carries **2** marks.

11. What is an Auction?
12. What is meant by Call Option?
13. What is Short Selling?
14. What is a Depository?
15. What are stock indices?
16. What is NSE?
17. What is a Trading Account?
18. What is a stock index?
19. What are derivatives?
20. What is a Dematerialisation?
21. What is online trading?
22. What is an option contract?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in about **120** words each. Each question carries **4** marks.

23. Explain bond and debenture.
24. What are the charges that can be levied on the investor by a stock broker?

25. What is Margin Trading Facility?
26. Discuss the functions of Stock Exchange.
27. What are Sensex and Nifty?
28. What are the functions of a stock index?
29. How is a demat account opened?
30. Explain the Advantages of online trading
31. What are the problems of forward markets?

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions in not exceeding 4 pages each. Each question carries **15** marks.

32. Discuss the securities traded in the secondary market.
33. Explain the process of buying and selling of securities.
34. Explain the main types of derivatives contracts.
35. Distinguish between speculation and investment.

(2 × 15 = 30 Marks)

Reg. No. :

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Fifth Semester B.Com. Degree Examination, February 2021

First Degree Programme Under CBCSS

Core Course : CO 1541/CC 1541

FUNDAMENTALS OF INCOME TAX

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries **one** mark.

1. What is meant by direct tax?
2. What is the rate of depreciation for plant and machinery?
3. Write any two disallowed expenses while computing Income from Business.
4. What is capital gain?
5. Define annual value.
6. What is CCA?
7. Who is an assessee?
8. What is section 80C?
9. What do you mean by intra-head set-off?
10. What is STT?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks.

11. What do you mean by sub-letting?
12. Define LTCCG.
13. Define MRV.
14. What do you mean by annual accretion?
15. What do you mean by commutation of pension?
16. Why income from other source is called residuary heads of income?
17. What is meant by clubbing of income?
18. What do you mean by profit in lieu of salary?
19. What is unabsorbed depreciation?
20. Explain deduction u/s 80 DD.
21. What do you mean by fringe benefits?
22. What is total income?
23. What is LTC?
24. What is meant by transferred balance?
25. Distinguish between AOP and BOI.
26. Sivakumar an Indian citizen leaves India to the USA for a job on 21.9.2019. What will be his residential status for the assessment year 2020-21 if he has never left India earlier?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. Each question carries **4** marks.

27. What do you mean by accelerated assessment? State the situations where accelerated assessment is done?
28. Explain the tax treatment of Gifts.
29. Write a note on Bond washing transactions.
30. What are the situations where clubbing is done?
31. Compute Income from House property of Mr. Felix for the financial year 2019-2020.

Municipal valuation Rs. 1,50,000

Fair rental Value Rs. 1,80,000

Standard rent Rs. 1,60,000

Actual rent receivable Rs. 20,000 p.m

Municipal taxes 4%, half of which is paid by Mr. Felix and the other half paid by the tenant. Unrealized rent admissible Rs. 25,000.

Interest on loan taken for the repairing of the property Rs. 40,000

32. Compute Income from other sources of Mr. Lalit for the year 2019-2020.

	Rs.
Director's fees	2,000
Income from agricultural land in Pakistan	5,000
Ground rent received	10,000

	Rs.
Interest on Post office Savings Bank account	2,000
Interest on deposit with IFCL	500
Dividend from a foreign company	700
Rent from sub-letting a house	26,250
Rent payable by Mr. Lalit for the sub-let house	12,000
Other expenses incurred on this sub-let house	1,000
Winning from horse race	12,300
Interest on securities	4,000

33. Mr. X is a person with severe disability. He had the following particulars of his income for the previous year 2019-20.

Income from salary	5, 80,000
Interest on savings bank account	4,000
Dividend from a co-operative society	3,000
Dividend from Indian company	2,000

Compute his total income.

34. Mr. Divakar purchased a plot of urban land in 1990 at a cost of Rs. 1,00,000. He constructed a house therein spending Rs. 12,00,000. Immediately, he spent Rs. 3,00,000 to modify the house. In March 2001, he constructed two additional rooms to the building at a cost of Rs. 4,00,000. In April 2009, he again spent Rs. 8,00,000 to remodel the house. Finally, he sold the house in April 2019 for Rs. 90,00,000. Fair market value of the house on 1.4.2001 was Rs. 30,00,000. (CII 2001-02=100, 2009-10 = 148, 2019-20=289).

Find out taxable capital gains for the year 2019-2020.

35. Compute taxable House Rent Allowance of Mr. Nagaraj for the year 2019-2020.
- Basic salary Rs. 60,000 p.m
 Dearness Allowance Rs. 10,000 p.m
 House Rent Allowance received Rs. 8,000 p.m
 Actual rent paid for the accommodation Rs. 12,000 p.m.
36. Explain income from House property exempt from tax.
37. Mr. Suresh retired on 1st August 2019 and received Rs. 1,76,000 as leave encashment. He had a total service of 23 years. The company provides 50 days leave for every year of completed service. During service he had utilized 8 months leave salary. He was receiving Rs. 10,000 as basic salary and Rs. 5,000 as DA (50% forming part of salary) before the date of retirement. Calculate taxable leave salary.
38. What are the deductions from Gross salary u/s 16.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. Each question carries **15** marks.

39. Mr. Ram Varma prepared the following P & L a/c of his business. Compute his income from Business.

To salaries	63,000	By Gross profit	86,200
To Rent	1,000	By Gift received from friends	2,000
To household expenses	10,000	Income tax refund	1,000
To income tax	1,000		
To audit fees	800		
To life insurance premium	6,000		
To Bad-debts reserve	1,000		
To Net profit	6,400		
	<u>89,200</u>		<u>89,200</u>

- (a) Depreciation allowable Rs. 3,200
- (b) Half of the rent is for his residential house.

40. Mr. Mathews, an employee of Sony Ltd. is working in Theni branch of the company. During the year 2019-20, he received Rs. 6,92,000 as basic salary, Rs. 9,000 as Entertainment Allowance, Rs. 4,000 as bonus, Rs. 5,000 as commission, Rs. 8,000 as City Compensatory Allowance, and Rs. 6,000 as arrears of bonus and commission for the financial year 2018-19. The company paid electricity bill of Rs. 4,000 on behalf of Mr. Mathews.

In addition to the above, the employer has provided a rent-free unfurnished flat (lease rent paid by the employer Rs. 69,000) and free use of a small car for private and official purposes (expenditure of the employer Rs. 7,000)

Compute Income from Salary for the year 2019-2020.

41. Explain the Residential status of an Individual.
42. Briefly explain Capital Gains exempt from tax.
43. Mr. Ghosh owns two houses. The following are the details :

	House I (self-occupied)	House II (let-out)
Municipal Value	37,500	70,000
Monthly rent	—	6,000
Municipal tax	6,000	10,000
Interest on loan taken for construction	30,000	4,000
Fire Insurance premium	6,000	—

Compute Income from House Property.

44. Explain the tax treatment of Rent-Free Accommodation.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.Com. Degree Examination, February 2021

First Degree Programme Under CBCSS

Core Course : CO 1542/CC 1542/CX 1542/HM 1542/TT 1542

COST ACCOUNTING

(2018 Admn – Regular)

**(Common for Commerce/Commerce with Computer
Application/Commerce and Tax Procedure and Practice/Commerce and
Hotel management and Catering/Commerce and Tourism and Travel
management)**

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Answer **all** questions. Each question carries **1** mark).

1. What are factory overheads?
2. What is ABC analysis?
3. What is perpetual inventory system?
4. What is process costing?
5. Define cost centre.
6. What is machine hour rate?
7. What is batch costing?

8. What is piece wage system?
9. What is stock velocity?
10. Define costing.

(10 × 1 = 10 Marks)

SECTION – B

(Answer **any eight** questions. Each question carries **2** marks)

11. What is job costing?
12. What are semi-variable costs? Give an example
13. What is opportunity cost?
14. State the importance of cost classification.
15. What are overheads?
16. What is absorption of overheads?
17. What are the objectives of material control?
18. What is bin card?
19. Define cost unit.
20. What is danger level?
21. Who are casual workers?
22. What is under absorption?
23. What is Job card?
24. What is works cost?
25. What is JTT inventory technique?
26. How power expenses are apportioned?

(8 × 2 = 16 Marks)

SECTION – C

(Answer **any six** questions. Each question carries **4** marks)

27. What are the functions of a store keeper?
28. Distinguish between bin card and stores ledger.
29. What are the bases of apportionment of overheads?
30. Differentiate absorption from apportionment.
31. Explain the steps in purchase procedure.
32. Distinguish between cost accounting and financial accounting.
33. Calculate re-order level and maximum level from the following data
Time lag for procurement of materials: Maximum 6 months, Minimum -4 months
Maximum usage - 75 units
Minimum usage 25 units
Re-order quantity - 300 units
34. Calculate machine hour rate from the following
Cost of machine - Rs. 19,200
Estimated Scrap value - Rs 1,200
Average repair and maintenance charges per month – Rs. 150
Standing charges allocated to machine per month Rs. 50
Effective working life of machine 10000 hours
Running time per month -166 hours
Power used by machine: 5 units per hour @ 19 paise per Unit

35. Calculate total earnings and effective rate of earnings per hour under Rowan Plan from the following.

The standard time - 10 hours, Actual hours taken - 8 hours, Wage rate per hour - Rs. 5.

36. Calculate EOQ from the following data

Annual usage- 5000 units

Cost of material per unit - Rs. 20

Cost of placing an order - Rs. 50

Annual carrying cost of per unit- 10% of inventory value

37. The standard time for a job is 10 hours. Actual hours taken are 8. Wage rate per hour is Rs. 5. Calculate earnings and effective rate of earnings per hour under Halsey plan.

38. From the following transactions, calculate the closing balance of materials in units and value by using LIFO method.

Opening balance 100 units @ Rs. 10 per unit

Issued 60 units

Received 120 units @ 10.10 per unit

Issued 50 units (stock verification reveals a loss of 2 units)

Received back from order 20 units (originally issued @ Rs. 9.90 per unit)

Issued 80 units

Received 44 units @ Rs. 10.20 per unit

Issued 66 units

(6 × 4 = 24 Marks)

SECTION – D

(Answer **any two** questions. Each question carries **15** marks)

39. Explain the advantages of cost accounting.
40. Discuss the important techniques of material control.
41. Explain the classification of overheads.
42. The cost accounts of a firm reveals the following details:

Raw material consumed	20,000
Direct wages	18,000
Total machine hours	3,000
Machine hour rate	Rs. 2
Office overhead	10% of works cost
Selling overhead	Rs. 2.50 per unit
Units produced	5,000
Units sold	4,600 @ 30 each

Prepare a cost sheet from the above data showing cost per unit and profit for the period

43. X Ltd has three production departments A, B and C and two service departments D and E. The overhead expenses incurred during the year 2019 are as follows:

Rent	10,800
Depreciation of Building	54,000
Depreciation of other assets	42,000
Insurance of building	9,600
Insurance of plant	8,400
Rates and taxes	3,000
Lighting	12,800
Power	16,500
Stores overhead	5,400
Subsidy to canteen	15,600

Apportion the costs to departments after taking into account the following further data:

Items	A	B	C	D	E
Area (Sq Ft)	3000	4000	4000	2000	2000
Number of Employees	80	110	60	30	20
Value of assets other than building	150000	190000	180000	100000	80000
Number of light points	15	10	7	5	3
Horse power of machines	400	300	200	200	—
Value of material consumed	90000	80000	60000	—	40000

44. Prepare a Stores Ledger account for the following transactions on the basis of FIFO method

Jan 1	Opening balance 10 units @ Rs. 30
Jan 10	Purchased 10 units @33
Jan 12	Issued 10 units
Jan 31	10 units
Closing balance	
Feb 3	Purchased 10 units @36
Feb 12	Issued 10 units
Feb 28	Purchased 10 units @40

Sales during the two months amounted to Rs. 1,050.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.Com. Degree Examination, February 2021

First Degree Programme under CBCSS

Stream 1 : Finance

Elective Course III : CO 1561.1

FINANCIAL SERVICES IN INDIA

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** the questions. Each question carries **1** mark

1. Define Financial Services.
2. What are Derivatives?
3. What is CAGR?
4. Who is a 'Lead Manager' in IPO?
5. Comment on the concept, 'Listing of Securities'.
6. What are Commercial Papers?
7. What is Portfolio Management?
8. Who are 'Angel Investors'?

9. Define Credit Rating.
10. Name any two foreign Credit Rating Agencies.

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** questions. Each question carries **2** marks.

11. Compare IPO and FPO.
12. Give a brief outline on 'Systematic Investment Plan'.
13. Cite any two differences between 'Rights Issue' and 'Public Issue'.
14. What is the need for taking Health Insurance?
15. What is 'Sensex' and 'Nifty'?
16. Who are 'Sponsors' and 'Trustees' in Mutual Funds?
17. State the need for Portfolio Revision.
18. Specify the players in Indian Money Market.
19. What do the following expressions signify in Credit Rating?
(a) AAA (b) BB
20. Distinguish between a Broker and a Depository Participant.
21. State any two differences between Hire Purchase and Instalment system.
22. What is Infrastructure Financing?
23. What is Corporate Counselling?

24. Who is an Underwriter?
25. Give the meaning for 'Credit Worthiness'.
26. What is meant by 'Financial Inclusion'?

(8 × 2 = 16 Marks)

PART – C

Answer **any six** questions. Each question carries **4** marks.

27. Briefly explain the functions of Financial Markets.
28. Compare Operating Lease and Financial Lease.
29. Enumerate the stages in Venture Capital Financing.
30. Summarise the functions of a Factor.
31. How advantageous is Credit Rating towards Investors in stock market?
32. Outline the important functions of Merchant Bankers briefly.
33. Give the distinctions between Factoring and Forfeiting.
34. "Financial Innovations are indispensable due to various reasons". Justify.
35. "SEBI is the regulator of Indian Capital Market". Analyse this statement.
36. Summarise the different Money Market Instruments based on their features.
37. Who are major players in Primary Market? Explain.
38. "In spite of suitable legislative measures, the Indian Financial system remains weak". Why?

(6 × 4 = 24 Marks)

PART – D

Answer **any two** questions. Each question carries **15** marks.

39. Trace out the contributions of Financial Services in Indian Financial System.
40. Elucidate in detail the objectives, roles and functions of CRISIL towards credit rating in India.
41. "Small drops of water make big ocean". Keeping this principle in mind, describe the problems and potentials in Mutual Fund Investments.
42. What is Lease Financing? State its nature. What opportunities do Leasing provide to both Lessor and Lessee?
43. Evaluate the different methods of raising funds in the Primary Market with merits and demerits.
44. Classify the different Fund-based and Non-Fund based financial services in India.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

First Semester B.Com. Degree Examination, February 2021

First Degree programme under CBCSS

Open Course I : CO 1551.3/CC 1551.3/CX 1551.3/TT 1551.3

CAPITAL MARKET OPERATIONS

(2018 Admission Regular)

**(Common for Commerce/Commerce with Computer Application/
Commerce and Tax Procedure and Practice/
Commerce and Tourism and Travel Management)**

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** or **two** sentence each. **Each** question carries **1** mark.

1. What is primary market?
2. What is IPO?
3. What is Stock Exchange?
4. Who is a Bear?
5. What is BSE Sensex?
6. What is futures contract?
7. What is Limit Price Order?

P.T.O.

8. What is Market Price Order?
9. What is dematerialisation?
10. What is preference share?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in not exceeding **one** paragraph each. **Each** question carries **2** marks.

11. What is book building?
12. What is Speculation?
13. What is listing of securities?
14. What is stock market index?
15. What is a forward contract?
16. What is put option?
17. What is rematerialisation?
18. What is right share?
19. What is convertible preference share?
20. What is secured debenture?
21. State two features of bonds.
22. What are the general risks associated with derivative instruments?
23. Distinguish between participating and non-participating preference shares.
24. What is depository?

25. Who is an aggressive investor?
26. Name two leading stock exchanges in India.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in not exceeding **120** words. **Each** question carries **4** marks.

27. What are the characteristics of capital market?
28. Discuss the Importance of capital Market.
29. State the advantages of public issue.
30. Explain the disadvantages of book-building.
31. Discuss the merits of private placement.
32. Who are the players in the primary market?
33. Explain the objectives of listing.
34. Explain the importance of stock market indices.
35. Explain the features of forward contract.
36. Explain the advantages of equity shares.
37. What are the advantages of preference shares?
38. What are the different types of investors?

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions in not exceeding **four** pages each. **Each** question carries **15** marks.

39. Explain the functions and benefits of capital market.
40. What is Over the Counter Exchange of India? Explain its features, objectives and advantages.
41. What is dematerialisation? Explain its process and benefits.
42. Discuss briefly the various methods of raising capital from the primary market with advantages and disadvantages of each.
43. Discuss the procedure for buying and selling of securities in stock exchange.
44. What do you mean by listing of securities? Explain its objectives, advantages and disadvantages.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Group 2 (a)

Malayalam and Mass Communication

Vocational Course – VIII

MX 1572 : INTRODUCTION TO TELEVISION PRODUCTION

(2015-2017 Admission)

Time : 3 Hours

Max. Marks : 80

I. Write answer in 1 word or Maximum 2 sentences to the following :

1. AVCHD
2. Frame rate
3. Full frame
4. Kelvin
5. Memory card
6. PAL
7. Mise en scene
8. Diegetic sound
9. Voice Over
10. FPS.

(10 × 1 = 10 Marks)

II. Write short answers to **eight** questions. Each in about **60** words :

11. What is meant by pre production?
12. How do you write a television script?
13. What is meant by production crew?
14. Explain mutli camera set up.
15. Describe extreme long shot.
16. Explain the rule of thirds composition.
17. Elaborate the Dutch angle.
18. What is Artificial light?
19. Explain colour temperature.
20. Elaborate 180 degree rule.
21. Explain the importance of steadicam.
22. Explain the importance of omni directional mics.

(8 × 2 = 16 Marks)

III. Give short essay type answer to any **six** question :

23. What are important characteristics of the television medium?
24. Delineate the important stages in the pre production of a talk show.
25. Explain Television studio orientation.
26. Explain the process of documentaries production.
27. What are the basic TV Shots?

28. What are the major land marks in the history of Indian television?
29. What are the different stages of television ad production?
30. What are the types of lights and lighting equipment?
31. What do you mean by editing? What are the do's and don'ts of editing a commercial?

(6 × 4 = 24 Marks)

IV. Write long Essays on any **two** questions :

32. Explain the audio consoles and audio control devices.
33. What is storyboard ? What is the importance of a storyboard in production, of a television commercial?
34. Elaborate different types of lighting and the importance of studio control room.
35. Delineate different types of camera used in a television production.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

Career Related First Degree Programme Under CBCSS

Group 2 (a) – Malayalam and Mass Communication

Open Course

MX 1551.1 – FILM APPRECIATION

(2015 -2017 Admission)

Time : 3 Hours

Max. Marks : 80

Answer **all** the **ten** questions, each one in one or two sentences.

1. Auteur.
2. Rack focus.
3. Rough cut.
4. Daguerreotypes.
5. Tilting.
6. Cutaways.
7. Nanook of the North.
8. Key Light.
9. High-angle shot.
10. Script.

(10 × 1 = 10 Marks)

Write short notes, each not exceeding 60 words, on **any eight** of the following.

11. Early actualities.
12. Battleship Potemkin.
13. Film certification.
14. Montage Theory.
15. Shooting schedule.
16. German Expressionism.
17. Visual effects.
18. Oblique shot.
19. Point-of-view shot.
20. Tracking.
21. Frames per second.
22. Dhundiraj Govind Phalke.

(8 × 2 = 16 Marks)

Write short essays, each not exceeding 120 words, on **any six** of the following.

23. Differentiate between Formalism and Realism in cinema.
24. Explain the role of an art director in a movie.
25. Explain the sound editing process.
26. Discuss the principles of scripting for short films.
27. Trace the evolution of cinema in India.

28. Explain any four shot sizes used in films.
29. What is an establishing shot? Explain its importance in a movie.
30. Discuss French New Wave.
31. What is an art cinema?

(6 × 4 = 24 Marks)

Write long essays, each not exceeding 500 words, on **any two** of the following.

32. Explain the Post-production stage of movie-making.
33. Films reflect society-Discuss.
34. The most important phase of production is preproduction - Elaborate.
35. Critically analyze the 'star value' associated with Malayalam cinema today.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Malayalam and Mass Communications

Core Course VII

MX 1541 : നാടോടിവിജ്ഞാനീയം

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക.
1. ഫോക്ലോറിന്റെ പിതാക്കൾ എന്ന നിലയിൽ സ്മരിക്കപ്പെടുന്ന ജർമ്മൻ പണ്ഡിതന്മാരുടെ പേരെഴുതുക.
 2. ഫോക് സൊസൈറ്റിയുടെ (ഇംഗ്ലണ്ട്) സ്ഥാപകനും ആദ്യ പ്രസിഡന്റുമായിരുന്ന വ്യക്തിയാര്?
 3. രേഖപ്പെടുത്താത്ത മാനസിക വസ്തുക്കളാണ് ഫോക്ലോർ എന്ന് അഭിപ്രായപ്പെട്ടതാര്?
 4. പുരാവൃത്തങ്ങളുടെ ഉൽപ്പത്തിയെക്കുറിച്ച് അന്വേഷണം നടത്തിയ പണ്ഡിതന്മാര്?
 5. മോഡേൺ മിത്തോളജി എന്ന ഗ്രന്ഥം ആരുടേതാണ്?
 6. കേരളത്തിലെ പ്രസിദ്ധമായ നാഗാരാധനാകേന്ദ്രം ഏത്?
 7. ഏതെങ്കിലും ഒരു ആയോധന സൂത്രത്തിന്റെ പേരെഴുതുക.

8. ആഖ്യാന സ്വഭാവമുള്ള പാട്ടുകൾക്കു പറയുന്ന പേരെന്ത്?
9. നാടോടിക്കഥയുടെ തിരശ്ചീന ഘടന കണ്ടെത്തിയ പണ്ഡിതനാര്?
10. ഫോക്ലോർ സൊസൈറ്റി ഓഫ് ഇൻഡ്യൻ ലാംഗ്വേജസിന്റെ ചുരുക്കെഴുത്തു രൂപമേത്?

(10 × 1 = 10 Marks)

II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ ഏതെങ്കിലും എട്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

11. ഫോക് എന്ന പദം കൊണ്ടു വിവക്ഷിക്കുന്നതെന്താണ്?
12. ഗ്രാമീണജനതയുടെ നിത്യജീവിതത്തിന്റെ ആത്മാവുകളെത്താൻ നാടോടിവിജ്ഞാനീയത്തിലേയ്ക്കു തിരിയണം എന്നു പറയാൻ കാരണമെന്ത്?
13. സാമൂഹിക സംസ്കാരം - എന്ന പ്രയോഗം ലക്ഷ്യം വയ്ക്കുന്നതെന്താണ്?
14. വ്യാപനസിദ്ധാന്തം (ഡിഫ്യൂഷൻ തിയറി) എന്നാലെന്ത്?
15. ഫിന്നിഷ് പദ്ധതിയിലൂടെ വിശദീകരിക്കുന്നതെന്താണ്?
16. കോതാമൂരിയാട്ടം - കുറിപ്പെഴുതുക.
17. നാടോടിനാടകങ്ങൾ - വിവരണക്കുറിപ്പു തയ്യാറാക്കുക.
18. ഫോക് എപ്പിക് എന്നാലെന്ത്?
19. ബാധപ്പാട്ടുകളുടെ സവിശേഷതയെന്ത്?
20. ഫോക് മിത്തോളജി - എന്നാലെന്ത്?
21. കടങ്കഥകൾ - കുറിപ്പെഴുതുക.

22. നാടൻ നിരൂക്തം - വിശദീകരിക്കുക.
23. നാടൻ വൈദ്യം - വിശദീകരണക്കുറിപ്പ് തയ്യാറാക്കുക.
24. ഇക്കോ ടൈപ്പ് എന്നാലെന്ത്?
25. ഫോക്ലോർ ജനുസ് - വിശദീകരിക്കുക.
26. ഫോക്ലോറിസം - ലക്ഷ്യം വയ്ക്കുന്നതെന്താണ്?

(8 × 2 = 16 Marks)

- III. ഓരോന്നിനും ഒന്നരപ്പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും ആറു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.
27. നാടോടിവിജ്ഞാനീയത്തെ സംസ്കാരത്തിന്റെ കണ്ണാടിയിലായി ദർശിക്കുവാനുള്ള കാരണം എന്താണ്?
28. വൈവിധ്യത്തിനുവേണ്ടിയുള്ള ആധുനിക മനസ്സിന്റെ ഒരു വിനോദപ്രവർത്തനമായിട്ടും ഫോക്ലോറിസത്തെ വിശേഷിപ്പിക്കാം - ഈ അഭിപ്രായം വിശകലനം ചെയ്യുക.
29. മനുഷ്യരെക്കുറിച്ചുള്ള താരതമ്യപഠനമെന്ന നിലയിൽ നാടോടിവിജ്ഞാനീയത്തിന് മറ്റു വിഷയങ്ങളുമായി അടുപ്പമുണ്ട് - ഈ അഭിപ്രായം വിലയിരുത്തുക.
30. പാരമ്പര്യമനോവിജ്ഞാനീയത്തിന് ഫോക്ലോറുമായി കൂടുതൽ അടുപ്പമുണ്ടെന്നു പറയാൻ കാരണമെന്ത്?
31. നാടൻ കഥാഗാനങ്ങളെ എങ്ങനെയെല്ലാം വിഭജിക്കാം? - വിശദീകരിക്കുക.
32. സമൂഹത്തിന്റെ ജീവിതരീതിയും സാമൂഹികവിധികളും മനസ്സിലാക്കുവാൻ നാടൻകഥകൾ സഹായിക്കുമെന്നു പറയാൻ കാരണമെന്ത്?
33. പുരാവൃത്തങ്ങളുടെ ധർമ്മമെന്താണ്? - വിശദീകരിക്കുക.
34. എം.വി. വിഷ്ണു നമ്പൂതിരി ഐതിഹ്യങ്ങളെ വർഗ്ഗീകരിക്കുന്നത് എങ്ങനെ? - വിശദീകരിക്കുക.
35. പഴഞ്ചൊല്ലുകളുടെ സവിശേഷതകൾ എന്തെല്ലാം?
36. ഫോക്ലോറും ഫോക്ലോറിസവും തമ്മിലുള്ള വ്യത്യാസം വിശദമാക്കുക.
37. ഫോക് ഹിസ്റ്ററി - വിശദീകരണക്കുറിപ്പ് തയ്യാറാക്കുക.
38. മെറ്റാഫോക്ലോർ - എന്നാലെന്ത്?

(6 × 4 = 24 Marks)

IV. മൂന്നു പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

39. സാമാന്യ ജനസമൂഹത്തിന്റെ സംസ്കാരസമ്പത്താണ് ഫോക്ലോർ. അതിനാൽ ഫോക്ലോർപഠനം ജനസംസ്കാരത്തിന്റെ സമഗ്രവും സമ്പൂർണ്ണവുമായ അന്വേഷണമാകുന്നു - വിശകലനം ചെയ്യുക.
40. ഭാഷയുടെയും സാഹിത്യത്തിന്റെയും പഠനമണ്ഡലങ്ങളുമായി നാടോടിവിജ്ഞാനീയത്തിനുള്ള അടുപ്പം അനിഷേധ്യമാണ് - വിശദീകരിക്കുക.
41. ജനസംസ്കാരപഠനത്തിൽ ജനങ്ങളുടെ വ്യവഹാര ഭാഷാപ്രയോഗങ്ങളെ സംബന്ധിച്ചുള്ള അന്വേഷണത്തിന് എത്രമാത്രം പ്രസക്തിയുണ്ടെന്ന് പരിശോധിക്കുക.
42. നാടോടിവിജ്ഞാനീയരംഗത്ത് ഉത്സവാഘോഷാദികളെക്കുറിച്ചുള്ള പഠനം അനുപേക്ഷണീയമാണെന്നു പറയാൻ കാരണമെന്ത്?
43. നാടോടി നാടകങ്ങളുടെ സാമൂഹിക വിമർശന സ്വഭാവത്തെക്കുറിച്ചു വിവരിക്കുക.
44. കളികൾക്ക് സാമൂഹിക ജീവിതത്തിൽ നിരവധി ധർമ്മങ്ങൾ നിറവേറ്റാനുണ്ട് - വിശകലനം ചെയ്യുക.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Malayalam and Mass Communication

Core Course

MX 1542 : കേരളസംസ്കാരം ഭാഗം - 2

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക.
1. 'കേരളം മലയാളികളുടെ മാതൃഭൂമി' ആരുടെ കൃതിയാണ്?
2. 'ദൈവദശകം' എഴുതിയതാര്?
3. കേരളത്തിലെ പ്രാചീനമായ സംസ്കൃതനാടകാഭിനയരീതി ഏത്?
4. മലബാറിലെ പ്രസിദ്ധമായ മുസ്ലീം രാജകുടുംബമേത്?
5. കുളച്ചുരി യുദ്ധം നടന്ന വർഷം ഏത്?
6. അദ്വൈതസിദ്ധാന്തത്തിന്റെ ഉപജ്ഞാതാവ് ആര്?
7. പ്രതൃക്ഷരക്ഷാദൈവസഭയുടെ സ്ഥാപകൻ.

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Malayalam and Mass Communication

Core Course

MX 1542 : കേരളസംസ്കാരം ഭാഗം - 2

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക.
1. 'കേരളം മലയാളികളുടെ മാതൃഭൂമി' ആരുടെ കൃതിയാണ്?
2. 'ദൈവദശകം' എഴുതിയതാര്?
3. കേരളത്തിലെ പ്രാചീനമായ സംസ്കൃതനാടകാഭിനയരീതി ഏത്?
4. മലബാറിലെ പ്രസിദ്ധമായ മൃസ്തീം രാജകുടുംബമേത്?
5. കുളച്ചൽ യുദ്ധം നടന്ന വർഷം ഏത്?
6. അദ്വൈതസിദ്ധാന്തത്തിന്റെ ഉപജ്ഞാതാവ് ആര്?
7. പ്രത്യക്ഷരക്ഷാദൈവസഭയുടെ സ്ഥാപകൻ.

8. തുഹ്ഫത്തുർ മുജാഹിദ്ദീൻ ആരുടെ കൃതിയാണ് ?
9. 'സുപ്പദിദാനം' നടത്തിയ രാജാവ്.
10. ദക്ഷിണഭോജൻ എന്നറിയപ്പെട്ട തിരുവിതാംകൂർ രാജാവ്.

(10 × 1 = 10 Marks)

- II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ ഏതെങ്കിലും എട്ടു ചോദ്യങ്ങൾക്ക് ഉത്തരമെഴുതുക.
11. വൈക്കം സത്യാഗ്രഹത്തിന്റെ പ്രസക്തി വിലയിരുത്തുക.
12. കേരളത്തിലെ ആദ്യകാല തുറമുഖങ്ങൾ ഏതെല്ലാം?
13. കുന്നൻകുരിശു പ്രതിജ്ഞയ്ക്കുള്ള കാരണമെന്ത്?
14. മൂഴിക്കുളം കച്ചത്തിന്റെ പ്രാധാന്യമെന്ത്?
15. കരിവല്ലൂർ സമരത്തിനുള്ള കാരണങ്ങൾ വിശദമാക്കുക.
16. ആദ്യ കമ്മ്യൂണിസ്റ്റ് മന്ത്രിസഭ അവതരിപ്പിച്ച വിദ്യാഭ്യാസ ബില്ലിന്റെ ഉള്ളടക്കം എന്ത്?
17. സിവിൽ നിയമലഘനം - കുറിപ്പെഴുതുക.
18. സ്വാതിതിരുനാളിന്റെ സംഗീതലോകത്തെക്കുറിച്ച് കുറിപ്പു തയ്യാറാക്കുക.
19. 'ഇന്റർനെറ്റ്' - കുറിപ്പു തയ്യാറാക്കുക.
20. ബ്ലോഗ് എന്നാലെന്ത് ?
21. 'ചാവറയച്ചൻ' നൽകിയ സാംസ്കാരിക സംഭാവനകൾ എന്തെല്ലാം ?
22. 'യോഗക്ഷേമസഭ' എന്നാലെന്ത് ?

23. 'രേവതിപട്ടത്താനം' എന്തെന്ന് വിശദമാക്കുക.
24. 'കൂത്ത്' എന്നാലെന്ത്? പ്രത്യേകതകൾ അവതരിപ്പിക്കുക.
25. കിളിപ്പാട്ട് പ്രസ്ഥാനം എന്നാലെന്ത്?
26. 'പഴശ്ശിരാജ'യെക്കുറിച്ച് കുറിപ്പ് തയ്യാറാക്കുക.

(8 × 2 = 16 Marks)

- III. ഓരോന്നിനും ഒന്നരപ്പുറത്തിൽ കവിയാതെ ആറു ചോദ്യങ്ങൾക്ക് ഉത്തരമെഴുതുക.
27. അറബി മലയാളത്തിന്റെ പ്രത്യേകതകൾ വിവരിക്കുക.
28. ജൈനമതത്തിന്റെ സവിശേഷതകളും സംഭാവനകളും വിവരിക്കുക.
29. കേരളത്തിലെ കാർഷികസംസ്കൃതിയെക്കുറിച്ച് ചുരുക്കി വിവരിക്കുക.
30. 'ഹോർത്തൂസ് മലബാറിക്കെസി'ന്റെ പ്രാധാന്യമെന്ത്?
31. മണ്ണാപ്പേടിയും പുലപ്പേടിയും എന്തെന്ന് വിശദമാക്കുക.
32. ആറ്റിങ്ങൽകലാപം എന്നാലെന്ത്?
33. കേരളസാഹിത്യചരിത്രത്തിൽ എഴുത്തച്ഛനുള്ള പ്രാധാന്യമെന്ത്?
34. മരുമക്കത്തായം എന്നാലെന്ത്?
35. കൂടിയാട്ടത്തിന്റെ പ്രത്യേകതകൾ വിവരിക്കുക.
36. കേരളീയസമൂഹത്തിൽ നിലനിന്നിരുന്ന ജാതിബന്ധങ്ങളെ വൈദേശികാധിനിവേശം എങ്ങനെയാണ് സ്വാധീനിച്ചത്?
37. മിഷണറിഗദ്യത്തെക്കുറിച്ച് വിവരിക്കുക.
38. 'അയ്യങ്കാളിയുടെ ദീർഘവീക്ഷണവും നിശ്ചയദാർഢ്യവും സാധുജനപരിപാലനസംഘത്തെ കേരളചരിത്രത്തിലെ നാഴികക്കല്ലാക്കി മാറ്റി' - ഈ പ്രസ്താവന ചർച്ച ചെയ്യുക.

(6 × 4 = 24 Marks)

IV. മൂന്നു പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ടു ചോദ്യങ്ങൾക്ക് ഉത്തരമെഴുതുക.

39. കേരളത്തിൽ അരങ്ങേറിയ ദേശീയ സമരങ്ങളെ പരിചയപ്പെടുത്തി കീറ്റ് ഇൻഡ്യാ പ്രക്ഷോഭത്തിന്റെ പ്രസക്തി വിലയിരുത്തുക.
40. ബുദ്ധജൈനമതങ്ങൾ കേരളത്തിന് നൽകിയ സംഭാവനകൾ എന്തെല്ലാം?
41. സമൂഹത്തിന്റെ കാഴ്ചപ്പാടുകൾ രൂപീകരിക്കുന്നതിൽ നവമാധ്യമങ്ങൾക്കുള്ള സ്ഥാനം പരിശോധിക്കുക.
42. ഭക്തിപ്രസ്ഥാനത്തിന്റെ പ്രാധാന്യവും സവിശേഷതയും വിവരിക്കുക.
43. കേരളത്തിലെ ഗ്രന്ഥശാലാസംഘം നൽകിയ സംഭാവനകൾ വിലയിരുത്തുക.
44. കേരളീയ നവോത്ഥാനത്തിന് ആക്കംകൂട്ടിയ സമുദായ പരിഷ്ക്കരണശ്രമങ്ങളെക്കുറിച്ച് വിവരിക്കുക.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Malayalam and Mass Communication

Core Course

MX 1543 : ഭാഷാശാസ്ത്രം, ഭാഷാചരിത്രം

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക.
1. ഏതെങ്കിലും ഒരു കാലഘട്ടത്തിലെ ഭാഷയെ വസ്തുനിഷ്ഠമായി അപഗ്രഥിക്കുന്ന പഠനമേത്?
2. കേരളത്തിൽ ആദ്യകാലത്ത് ഉപയോഗിച്ചിരുന്ന ലിപിവ്യവസ്ഥ ഏത്?
3. ലാംഗ്-പരോൾ സങ്കല്പനത്തിന്റെ കർത്താവാരാണ്?
4. ഉച്ചാരണ ശബ്ദങ്ങളെപ്പറ്റിയുള്ള പഠനശാഖ ഏത്?
5. 'ദ്രാവിഡ ഭാഷകളുടെ തുലനാത്മക വ്യാകരണം' - ആരുടെ കൃതി?
6. സാർത്ഥകമായ ഏറ്റവും വലിയ സ്വന്ത സമൂഹമേത്?
7. ആധുനിക ഭാഷാശാസ്ത്രത്തിന്റെ പിതാമഹൻ എന്നറിയപ്പെടുന്നതാരാണ്?
8. ഭാഷ-ഭാഷണം എന്നിവയെ സൂചിപ്പിക്കാൻ സൊസ്യൽ ഉപയോഗിക്കുന്ന പദങ്ങൾ ഏവ?

9. ഭാഷണത്തിലെ ഏറ്റവും ചെറിയ ഘടകം ഏത്?

10. മലയാളം ഏത് കക്ഷ്യയിൽപ്പെടുന്നു ?

(10 × 1 = 10 Marks)

II. അർപ്പണത്തിൽ കവിയാതെ എട്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

11. ചിഹ്നം എന്നാലെന്ത്? അവയ്ക്ക് വാക്യരചനയിലുള്ള പ്രാധാന്യമെന്ത്?

12. മലയാളമെന്ന ഭാഷാസംജ്ഞ രൂപപ്പെട്ടുവന്നതെങ്ങനെ ?

13. മണിപ്രവാള ഭാഷയുടെ സവിശേഷതകൾ എന്തെല്ലാം ?

14. സ്വതന്ത്രഭാഷാവാദത്തിന്റെ പ്രധാന യുക്തികൾ എന്തെല്ലാം ?

15. വാമൊഴി വരമൊഴി ഭേദം ഭാഷാപഠനത്തിൽ പ്രസക്തമാകുന്നതെങ്ങനെ ?

16. രൂപപരിണാമം എന്താണ് ?

17. ഉപസ്ഥാനം എന്നാലെന്ത് ?

18. ലാങ്-പരോൾ എന്നിവ എന്തെന്ന് വ്യക്തമാക്കുക.

19. മാനകഭാഷയുടെ പ്രത്യേകതകൾ എന്തെല്ലാം ?

20. സങ്കേതനം, വിസങ്കേതനം എന്നിവ എന്തെന്ന് വ്യക്തമാക്കുക.

21. അപഗ്രഥിതകക്ഷ്യ എന്തെന്ന് വ്യക്തമാക്കുക.

22. ഭാഷാകൗടലീയം - കുറിപ്പെഴുതുക.

23. സങ്കരഭാഷ എന്നാലെന്ത്? വിശദമാക്കുക.

24. വർണ്ണം-അക്ഷരം-ലിപി എന്നിവയുടെ വ്യത്യാസമെഴുതുക.

25. രൂപിമം എത്രവിധം? വിശദീകരിക്കുക.

26. പാട്ടിന്റെ ലക്ഷണമെഴുതി വിശദീകരിക്കുക.

(8 × 2 = 16 Marks)

III. ഒന്നരപ്പുറത്തിൽ കവിയാതെ ആറു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

27. ഭാഷോല്പത്തിസിദ്ധാന്തങ്ങൾ പരിചയപ്പെടുത്തുക.

28. സാമൂഹിക ചുറ്റുപാടുകൾ അർത്ഥപരിവർത്തനത്തിന് കാരണമാകുന്നതെങ്ങനെയെന്ന് ഉദാഹരണസഹിതം വ്യക്തമാക്കുക.

29. സ്വനവിജ്ഞാനത്തിലെ മൂന്ന് ഉൾപ്പിരിവുകൾ ഏവ? വിശദമാക്കുക.

30. മലയാള ഭാഷയുടെ വളർച്ചയിൽ പത്രഭാഷ ചെലുത്തിയ സാധിനം വിശദമാക്കുക.

31. മിഷണറിഗദ്യത്തിന്റെ ഭാഷാപരമായ സവിശേഷതകൾ എന്തെല്ലാം? വിശദമാക്കുക.

32. താരതമ്യാത്മകം, വിവരണാത്മകം, ചരിത്രാത്മകം എന്നീ ഭാഷാപ്രഗമനരീതികളെ പരിചയപ്പെടുത്തുക.

33. രചനാന്തരണപ്രജനകവ്യാകരണം എന്തെന്ന് വിശദീകരിക്കുക.

34. സൈബർ മലയാളം - കൂറിപ്പെഴുതുക.

35. വാക്യവിഭാഗങ്ങളെക്കുറിച്ച് വിശദീകരിക്കുക.

36. ഹരിതഭാഷാശാസ്ത്രം - വിശദമാക്കുക.

37. മനോഭാഷാവിജ്ഞാനീയത്തെപ്പറ്റി ലഘുവിവരണം തയ്യാറാക്കുക.

38. സ്വനിമവിജ്ഞാനം എന്ന പഠനമേഖലയുടെ പ്രാധാന്യമെന്തെന്ന് വിശദമാക്കുക.

(6 × 4 = 24 Marks)

IV. മൂന്നു പുറത്തിൽ കവിയാതെ രണ്ടു ചോദ്യത്തിനുത്തരമെഴുതുക.

39. ഭാഷാഭേദ ഭൂപടം തയ്യാറാക്കുക.

40. മലയാളഭാഷയിലെ അനുഭാഷാ സ്വാധീനത്തെപ്പറ്റി ഉപന്യസിക്കുക.

41. അർത്ഥപരിവർത്തന നിയമങ്ങൾ ഉദാഹരണസഹിതം വിശദമാക്കുക.

42. മലയാളത്തിലെ പ്രധാനപ്പെട്ട ഭാഷാശാസ്ത്രകൃതികളെ പരിചയപ്പെടുത്തുക.

43. ആശയവിനിമയത്തിൽ മനുഷ്യഭാഷയ്ക്കുള്ള സവിശേഷതകളെപ്പറ്റി ഉപന്യസിക്കുക.

44. രൂപിമം എന്ന സങ്കല്പത്തിന് ഭാഷാശാസ്ത്രത്തിലുള്ള സ്ഥാനമെന്ത്? രൂപിമങ്ങളെ തരംതിരിക്കുന്നതിന്റെ അടിസ്ഥാനമെന്ത്? സോദാഹരണം വിവരിക്കുക.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.A. Degree Examination, February 2021

Career Related First Degree Programme Under CBCSS

Group 2(a)

Malayalam and mass communication

Vocational Course VII

MX 1571 : RADIO PROGRAMME PRODUCTION

(2018 Admission-Regular)

Time : 3 Hours

Max. Marks : 80

I. Answer the following in one or two sentence.

1. Yuva vani.
2. Vayalum Veedum
3. Pod casting.
4. Marconi.
5. Voice of America.
6. ISBS.

P.T.O.

7. Club FM.
8. Satellite Radio.
9. Ham radio.
10. Radio Neythal.

(10 × 1 = 10 Marks)

II. Answer/Explain **any eight** each in 60 words.

11. Analyze the characteristics of Radio.
12. Role of radio programme producer.
13. How do you plan a radio documentary?
14. Farm development programmes in Radio.
15. Role of radio announcer.
16. What are qualities of a radio script writer?
17. Vazhivilakku
18. Music programmes in Radio
19. Types of radio stations
20. Major community radios in Kerala
21. Radio talk
22. Radio feature
23. Jingles
24. Short wave

25. Sound effects in radio

26. Radio host.

(8 × 2 = 16 Marks)

III. Answer **any six** questions, each in about **120** words.

27. Explain the scope of radio in this digital era .

28. Explain in detail the recording softwares used for Radio program production.

29. What are the major roles of a Radio Broadcaster?

30. Discuss the fundamentals of writing news for radio.

31. What are the basic qualities of radio language? Explain in detail

32. Elucidate the significance of community radio

33. What do you mean by the 7Ps in radio production?

34. Explain the various programmes aired through radio.

35. Explain the important characteristics of writing for radio

36. Explain the organizational structure of a radio station.

37. "Application of digital technology in radio broadcasting is a boom." Explain.

38. Examine the major characteristics of radio plays.

(6 × 4 = 24 Marks)

IV. Write long essays on **any two** of the following.

39. Describe the important principles of writing for radio, with examples.

40. Is radio an effective medium for achieving the developmental goals of the state?

41. Explain the characteristics and functions of radio as a medium of mass communication.
42. What are the new trends in radio broadcasting? Discuss the future of radio.
43. Write on the scope of radio in the 21st Century and the challenges faced by present day broadcasters.
44. Comment on the importance of privatization and its impact on FM stations in India.

(2 × 15 = 30 Marks)

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Career Related First Degree Programme under CBCSS

Group 2(a)

Malayalam and Mass communication Vocational Course VIII

MX 1572 : INTRODUCTION TO TELEVISION PRODUCTION

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

I. Answer **all** questions. Explain the following each in a maximum of **30** words.

1. Fill lights
2. Sequence
3. Nose Room
4. Rule of thirds
5. Framing
6. Rushes
7. Docudrama
8. Colour temperature
9. White level
10. Lyp sync.

(10 × 1 = 10 Marks)

P.T.O.

II. Write short notes, each not exceeding **60** words, on **any eight** of the following.

11. How will you explain the term 'treatment'?
12. What is a 'floor plan'?
13. What is the role of floor managers in a television studio?
14. What is 'split page scripting'?
15. What is the need of doing 'White balance' while shooting videos?
16. What is the importance of 'coloring' in video production?
17. Why do video makers resort to '180 degree rule', while covering football matches for television?
18. Explain the term 'adlib'.
19. List the identifying features of the genre 'sitcoms'?
20. Television is said to be a medium of close up shots- Explain.
21. How will you explain 'leadlines'?
22. What do you mean by the term 'cut-ins and cut-aways', while making video features?
23. What is high key lighting?
24. How will you explain head room?
25. What are the advantages of non-linear editing?
26. What are the responsibilities of a television producer?

(8 × 2 = 16 Marks)

- III. Write short essays, not exceeding **120** words, on any **six** of the following.
27. What are the most popular program genres in Indian television?
 28. What were the potentials and limitations of television?
 29. What are the popular transition devices used in video making?
 30. List and explain different camera angles, used while producing videos.
 31. Explain how videos can be used as a propaganda tool.
 32. List the important principles of video editing.
 33. What is negative space in composition? What is its purpose?
 34. Why is creative use of lights important in video making?
 35. What are the duties of a television producer?
 36. How will you explain the recent popularity of musical shows in television?
 37. Television documentaries are made on editing tables- Do you confirm to this view?
 38. Explain three point lighting with each of the light sources.

(6 × 4 = 24 Marks)

IV. Write long essays on any **two** of the following.

39. Elaborate on the important milestones in the history of development of television as a popular medium.
40. How will you explain 'composition'? Also list the various composition techniques used in videos with illustrations.
41. What are the important activities that happen during the post-production of a television program production?

42. What are the important types of shots used in television? Explain with illustrations.
43. List and explain various types of studio lighting instruments and their specific advantages.
44. Give an overview of the various types of microphones used for video production. What are the advantages of each type of microphones?

(2 × 15 = 30 Marks)

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Fifth Semester B.A./B.Sc./B.Com. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Group 2(a)

Malayalam and Mass Communication

Open Course

MX 1551.1 FILM APPRECIATION

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

I. Answer **all** questions. Explain the following each in a maximum of **30** words.

1. News Reel
2. Sequence
3. Head Room
4. Parallel editing
5. Rule of thirds
6. Fade out
7. Clap board
8. Log sheet
9. Art house cinema
10. Nanook of the North.

(10 × 1 = 10 Marks)

- II. Write short notes, each not exceeding **60** words, on **any eight** of the following.
11. How will you explain the term 'mis-en-scene'?
 12. What is 'Persistence of vision'?
 13. What is sound design?
 14. List the identifying features of various kinds of video transitions.
 15. Explain 'Chroma Keying'.
 16. What are the advantages of using a storyboard?
 17. What do you mean by the term 'Match cut', while making films?
 18. Explain the term 'Feature Films'.
 19. List the identifying features of the genre 'fantasy films'.
 20. What were the specialities of 'split- page scripting'?
 21. How will you explain 'montage'?
 22. What do you mean by the term 'treatment', while making films?
 23. What is non linear editing? List its advantages.
 24. Without good lighting, the best camera in the world can't capture a perfect picture. Explain.
 25. What is the purpose of doing film appreciation?
 26. How will you differentiate a documentary from a feature film?

(8 × 2 = 16 Marks)

- III. Write short essays, not exceeding **120** words, on **any six** of the following :
27. What are the most popular genres of Indian cinema?
 28. Explain your views about the recent trends of distributing movies through OTT platforms.
 29. How will you differentiate between diegetic and non-diegetic sounds?

30. List and explain different camera angles.
31. Explain how movies can be used as a propaganda tool.
32. List the principles of movie editing.
33. What is visual composition?
34. Why is creative use of sound important to film making?
35. Cinematic lighting utilizes lighting tricks like bouncing light, diffusing light, and adjusting color temperatures-Explain each of these techniques.
36. How will you explain Indian middle cinema?
37. Documentaries are made on editing tables - Do you confirm to this view?
38. What is the importance of the film 'Birth of a Nation' in developing the grammar of cinema?

(6 × 4 = 24 Marks)

IV. Write long essays on **any two** of the following :

39. Elaborate on the activities that happen during the pre-production stages of a film.
40. Film and its innovation sometimes have to catch up to the developments in society but sometimes it leads the society and culture too – Explain.
41. Write an appreciation of a popular film that you have recently watched.
42. Give an overview of different types of camera shots used in films.
43. List and explain different types of popular camera angles and camera movements.
44. What is three point lighting? With the support of illustrations, list the position of each light in this lighting plan.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Group 2 (a) Botany and Biotechnology

BB 1541 : PLANT PHYSIOLOGY

(2015-2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** the questions in a word or **one or two** sentences. Each question carries **1** mark. Draw diagrams only if specified in the question.

1. What do you mean by DPD?
2. What do you mean by Imbibition?
3. What are Coenzymes?
4. What is Absciscic Acid?
5. What do you mean by Respiratory Quotient?
6. What is Osmotic potential?
7. What is Plasmolysis?
8. What is Diffusion?
9. What are Phycobilins?
10. What do you mean by Kranz Anatomy?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks. Answer not to exceed **one** paragraph.

11. Give a note on Carotenoids.
12. Differentiate between Hydroponics and Aeroponics.
13. Differentiate between Tropic and Nastic movements.
14. Differentiate between C4 and CAM plants.
15. How do Cytokinins differ from Gibberellins in action?
16. Write a note on semipermeable membrane.
17. Differentiate between Nitrification and Denitrification.
18. Give a note on Donnan equilibrium.
19. Give a note on Senescence.
20. What is Calvin cycle? What are its features?
21. What do you mean by photoperiodism?
22. What are the commercial uses of synthetic ethylene?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks. Answer not to exceed **120** words.

23. Differentiate between short day and long day plants.
24. What are Auxins? What are their functions?
25. Give a note on Active and Passive absorptions.

26. What is Vernalization and what is its importance? Describe the processes involved.
27. What do you mean by Light reaction? Briefly describe the processes involved.
28. Differentiate between competitive and non competitive enzyme inhibition.
29. Describe the factors affecting transpiration.
30. What is anaerobic respiration? Which are the different types?
31. Describe the factors influencing photosynthesis.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks. Answer not to exceed **3** pages.

32. Describe the processes involved in Glycolysis and Tricarboxylic acid cycle.
33. Describe the processes involved in the Cyclic and Non-cyclic photophosphorylation
34. What are essential elements? Describe the functions and deficiency symptoms.
35. Describe the various plant hormones and their functions.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

**Common for Group 2 (a) : Botany and Biotechnology and Group 2 (b)
Biotechnology (Multimajor)**

**BB 1542/BV 1541.1 : ANGIOSPERM MORPHOLOGY AND SYSTEMATIC
BOTANY**

(2015-2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in a word one or **two** sentences. Each question Carries **1** mark.
Draw diagrams only if specified in the question.

1. Who is known as the father of taxonomy?
2. What is a tepal?
3. Define carpel.
4. Contrast Staminate and Pistillate flower.
5. What is diadelphous stamen?
6. Which are the non-essential whorls of a flower?
7. Define gynostegium.

8. What is OTU?
9. Name the fruit of Tomato.
10. What is exalbuminous seed?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** of the following (answer not to exceed one paragraph). Each question carries **2** marks.

11. Define valid publication.
12. Mention the features of Hypanthodium.
13. For the Apiaceae. What is the
 - (a) inflorescence and
 - (b) fruit type?
14. Define aestivation. What are the different types?
15. What is a perfect flower?
16. Give the ovary position and placentation for the Cucurbitaceae.
17. Contrast actinomorphic and zygomorphic flower.
18. Mention any two principles of the International Code of Botanical Nomenclature.
19. Explain briefly the importance of Taxonomy.
20. Explain corymb.
21. Mention the characteristic features of stamen in Asteraceae.
22. Define binomial nomenclature. Who proposed it?

(8 × 2 = 16 Marks)

SECTION-C

Answer any **six** of the following (answer not to exceed **120** words). Each question carries **4** marks.

23. Describe Papilionaceous corolla.
24. Explain the major roles of Botanical gardens.
25. Discuss the economic importance of Rutaceae.
26. Briefly describe the Phylogenetic system of classification you have studied.
27. What are the basic principles of Numerical taxonomy?
28. Discuss the adnation in Solanaceae.
29. Write the Binomial of the following
 - (a) Wheat
 - (b) Rice
 - (c) Fennel
 - (d) Black gram
30. What is placentation? Briefly explain different kinds of placentation.
31. Write a note on the position of stamen in a flower with relation to perianth.

(6 × 4 = 24 Marks)

SECTION-D

Answer any **two** questions (Not more than **three** pages). Each question carries **15** marks.

32. Briefly explain the floral and vegetative characters of Poaceae. Why Poaceae does considered as the advanced family among angiosperms.

33. Explain the principles and steps in preparation of herbarium. Mention the significance of herbaria.
34. Give an account on the classification of fruits.
35. Describe the vegetative and floral characters of Euphorbiaceae with special reference to various inflorescences.

(2 × 15 = 30 Marks)

St. Xavier's College

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Name :

Fifth Semester B.Sc. Degree Examination, February 2021.

Career Related First Degree Programme under CBCSS

Group 2 (a) Botany and Biotechnology

BB 1571 – RECOMBINANT DNA TECHNOLOGY

(2015 - 2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in a word or one or two sentences. Each question carries **1** mark.

1. State the function of DNA ligase
2. What is palindromic sequence?
3. What is phagemid?
4. Define transformation.
5. What is a probe?
6. What is linker?
7. Define a vector.
8. What is blunt ended DNA?

9. What is a competent cell?
10. Define marker gene?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks. (Answer not to exceed a paragraph)

11. What is DNA barcoding?
12. What is a reporter gene? Mention its significance.
13. What is biolistics?
14. How an antibiotic resistant gene is useful in screening recombinants?
15. State the principle of AFLP.
16. What are shuttle vectors?
17. What is YAC?
18. What is a low copy number plasmid?
19. What is Hybrid Release Translation?
20. What is restriction modification?
21. What is RAPD?
22. What is Cartagena protocol?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries 4 marks. (Answer not to exceed 120 words)

23. What is northern hybridisation?
24. Explain the desirable features of a plasmid vector.
25. What is DNA fingerprinting?
26. What is immunoblotting?
27. What is RFLP?
28. Explain the role of transgenic organisms in medicine.
29. Explain the impact of Human Genome Project.
30. Describe the properties of type II restriction enzymes with a suitable example.
31. What is meant by biosafety levels?

(6 × 4 = 24 Mark)

SECTION – D

Answer **any two** questions. Each question carries 15 marks (Answer not to exceed 3 pages).

32. Explain the different types of PCR.
33. What is enzymatic sequencing. Add a note on automated sequencing.
34. Explain the steps in the construction of cDNA library. Mention the merits of DNA libraries.
35. Describe Gene therapy.

(2 × 15 = 30 Marks)

Reg. No. :

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Fifth Semester B.Sc. Degree Examination, February 2021

Career Related First Degree Programme Under CBCSS

Group 2 (a) – Botany & Biotechnology

BB 1573 – ANIMAL BIOTECHNOLOGY

(2015-2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions.

1. What is the most common pH indicator in animal cell culture medium?
2. Define cell lines.
3. Define differentiation.
4. What is apoptosis?
5. Write the principle of dye exclusion test.
6. Define gene knock out.
7. What is the role of factor VIII protein?
8. Application of flow cytometry in ATC.
9. What is microcarrier?
10. What is the appropriate pH to maintain the cell lines?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions.

11. What is natural media?
12. What is protein free media? What are its uses?
13. Explain the ESC cells and its applications.
14. For what type of cells roller bottles are most suited. Give its limitations.
15. Which cell lines are commonly used for the production of vaccine? Give an example of vaccine producing using cell culture technology.
16. Explain organ culture.
17. Explain the production of monoclonal antibodies.
18. Explain microinjection.
19. Give applications of HeLa cell lines.
20. Write the importance of aseptic condition in ATC.
21. The function of insulin in mammalian cell culture.
22. What does MTT assay measure?

SECTION – C

(8 × 2 = 16 Marks)

Answer **any six** questions.

23. Explain the advantages of culture based on immobilized cells.
24. Differentiate between embryonic and adult stem cells.
25. Explain synthetic media in detail.

26. What is cryopreservation? Explain its benefits.
27. What is serum-free media? What are its uses?
28. Give a note on growth kinetics in cell culture.
29. Explain bioethics in cell culture.
30. Explain transgenic animals with goat as example.
31. What are the points to consider in the characterization of cell lines?

(6 × 4 = 24 Marks)

SECTION – D

Answer any two questions.

32. Discuss gene therapy, types and its applications.
33. Give an account of different bioreactors for the large-scale animal cell culture.
34. Describe various types of stem cells.
35. Describe primary and secondary cell lines and their applications.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021

Career Related First Degree Programme Under CBCSS

Group 2(a) – Botany and Biotechnology

BB 1541 : PLANT PHYSIOLOGY

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** the questions in a word or **one or two** sentences. Each question carries **1** mark.

Define the following:

1. Diffusion
2. Stomata
3. Nitrification
4. Exosmosis
5. Photoperiodism
6. Turgor pressure
7. Cristae

8. Apical dominance
9. Cofactor
10. Senescence

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks. Answer not to exceed one paragraph.

11. Comment on Oxidative decarboxylation.
12. What is Parthenocarpy?
13. Explain Solution culture.
14. Distinguish between competitive and non competitive inhibition.
15. Comment on CAM Plants.
16. What is Photorespiration?
17. What are Respiratory substrates?
18. Comment on Tropic movements.
19. Explain the Sources of nitrogen.
20. Comment on the Phases of growth.
21. What are Photosynthetic pigments?
22. Explain Crop rotation.
23. Comment on the physiological aspects of water stress.
24. Distinguish between enzymes and co-enzymes.
25. Comment on Oxidative Pentose Pathway.
26. Explain the major types of seed germination.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks. Answer not to exceed **120** words.

27. Write a brief account on transpiration.
28. Explain Plasmolysis and comment on its significance.
29. Discuss in brief the process of anaerobic respiration.
30. Comment on different types of membranes.
31. Write a brief account on nitrogen fixation.
32. Discuss in brief the oxidation of fats.
33. Describe the structure of photosynthetic apparatus.
34. Write a brief account on vernalization.
35. Give an account of ascent of sap.
36. Comment on the factors affecting growth.
37. Comment on seed dormancy and its causes.
38. Explain the process of Guttation.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks. Answer not to exceed **three** pages.

39. What are Growth hormones? Write an account of various growth hormones.
40. What is tight reaction and explain in detail the mechanism of cyclic and non-cyclic photophosphorylation.

41. Write an account of mineral nutrients and add a note on the mechanism of their absorption by plants.
42. Describe the process of Glycolysis and comment on the factors affecting respiration.
43. Explain C4 pathway of carbon assimilation and comment on the factors affecting photosynthesis.
44. Comment on the organs of water absorption in plants and explain the mechanism of water absorption.

(2 × 15 = 30 Marks)

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Fifth Semester B.Sc. Degree Examination, February 2021

Career Related First Degree Programme Under CBCSS

Common for Group 2(a) Botany & Biotechnology and

Group 2(b) Biotechnology (Multimajor)

**BB 1542/BV 1541.1 : ANGIOSPERM MORPHOLOGY AND SYSTEMATIC
BOTANY**

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer the following. Answer **all** questions in a word or **one** or **two** sentences. Each question carries **1** mark. Draw diagrams only if specified in the question.

1. Name a special type of inflorescence.
2. Name a family with milky white latex.
3. Define obdiplostemonous condition.
4. Give an example for an artificial system of classification.
5. Name a family with spirocyclic flower.
6. Expand ICBN.
7. Name the nature of anther in Asteraceae.

8. What is the type of placentation in Solanaceae?
9. Name a family with pollinia.
10. A family with gynostegium?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks. Answer not to exceed **one** paragraph.

11. Describe the spike inflorescence.
12. Comment on helicoid cyme.
13. What is drupe?
14. What are the advantages of natural system of classification?
15. List any two significance of herbarium.
16. What is labellum?
17. Define multiple fruit.
18. Comment on OUT.
19. What is resupination?
20. Differentiate hypogynous and epigynous flowers.
21. Comment on Papilionaceous corolla.
22. Mention the binomial of any two pulses.
23. Name of any two botanical gardens.
24. What is Cyathium?

25. Give any two economic importance of Rutaceae.
26. What is binomial of Custard Apple and Cashew nut?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** of the following. (Answer not to exceed **120** words). Each question carries **4** marks.

27. Comment on special type of inflorescence.
28. Discuss the cohesion and adhesion of stamens.
29. List of the principles of ICBN.
30. Describe the androecium of Malvaceae.
31. Mention the floral characters of Asclepiadaceae.
32. Describe the structure of spikelet.
33. What are the primitive characters of Annonaceae?
34. Discuss the floral features of Nymphaeaceae?
35. List any four advanced characters of Orchidaceae.
36. List the botanical name of any two medicinal plants of Apocynaceae.
37. Mention the merits of Bentham and Hooker's System of classification.
38. Comment on the economic importance of Cucurbitaceae.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. (not more than three pages). Each question carries **15** marks.

39. Outline the Bentham and Hookers system of Classification.
40. Write an essay on different types of inflorescence with examples.
41. Give an account on the salient features of Asteraceae.

42. Write an essay on Cytotaxonomy with suitable examples.
43. Briefly describe the Herbarium techniques. Mention the importance of herbarium in plant systematics.
44. What are the salient features of Verbenaceae? Mention any two economically important plants of Verbenaceae.

(2 × 15 = 30 Marks)

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(Pages : 4)

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Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Group 2(a) Botany And Biotechnology

BB 1571 : RECOMBINANT DNA TECHNOLOGY

(2018 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in a word or one or **two** sentences. Each question carries **1** mark.

1. Name the bond hydrolysed by restriction endonuclease.
2. What are nucleases?
3. What is gene therapy?
4. Define cosmid vectors.
5. Define transformed cells.
6. What is a genomic library?
7. Define sequencing.
8. What is RFLP?

P.T.O.

9. What was the goal of HGP?
10. What is golden rice?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks.

11. Define recombinant DNA technology.
12. What are the types of restriction enzymes?
13. What is the function of DNA polymerases?
14. Write a short note on alkaline phosphatase.
15. What is the use of southern blotting?
16. What is the use of gene cloning in biopharmaceutical industry?
17. Write a short account on RAPD.
18. Mention the use of pBR322.
19. What is DNA microarray?
20. What is the significance of shuttle vectors?
21. What is plasmid? Mention one use.
22. Write on the use of restriction endonuclease.
23. What is the role of Helium on particle bombardment gene transfer?
24. Write on the benefits of BT cotton.

25. Write on the use of Electroporation.
26. Mention the role of containment in Biosafety ethics.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks. (Answer not to exceed **120** words)

27. Write a short account on Ligases.
28. Comment on the applications of YAC and BAC.
29. What is the role of transgenic organisms in medicine?
30. Give an account on the use and function of alkaline phosphatase.
31. Write a short account on DNA bar coding.
32. What are the special features needed for a vector?
33. Write a short account on cDNA library.
34. What are the different types of PCR?
35. Write a short account on the uses of genetically engineered microorganism.
36. What is nucleic acid blotting? Explain in detail.
37. Why is western blot called immunoblotting? Write an account on western blotting.
38. Differentiate between somatic and germline gene therapy.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks. (Answer not to exceed 3 pages)

39. Write a detailed account on the characteristics and classification of Endonucleases.
40. Describe the Maxam and Gilbert method of nucleic acid sequencing.
41. Give a comparative account of direct gene transfer and vector mediated gene transfer.
42. Discuss on the role of transgenic organisms and its impact in agriculture, medicine and environment.
43. How recombinant DNA molecule is constructed? Explain with necessary diagrams.
44. Explain the principle and procedure of reverse transcription PCR.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, February 2021.

Career Related First Degree Programme under CBCSS

Group 2 (a) Botany and Biotechnology

BB 1572: PLANT BIOTECHNOLOGY

(2018 Admission-Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in a word or one/two sentences. Each question carries **1** mark.

1. The ability of plant cell develop into a complete plant is known as _____
2. What are somatic hybrids?
3. When filter sterilization is employed in tissue culture?
4. Define somatic embryogenesis.
5. What is the main advantage of meristem culture?
6. What is a scorable marker?
7. What is a crown gall?
8. Mention the role of acetosyringone in agrobacterium mediated gene transfer.

9. Name any two direct gene transfer methods employed in plants.
10. What is the meaning of BT in Bt cotton?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. Each question carries 2 marks. Answer not to exceed **one** paragraph.

11. Write short note on pollen culture.
12. Define callus and suspension cultures.
13. Name two auxins and cytokinins used in plant tissue culture media.
14. Differentiate androgenic and gynogenic haploids.
15. What is mean by biotransformation?
16. What are the advantages of micropropagation?
17. Why nitrogen is provided in two forms - as nitrates and as ammonium compounds - during tissue culture media preparation?
18. What are binary vectors?
19. Differentiate scorable marker from selectable markers.
20. Comment on electroporation.
21. Name any two transgenes encoding valuable polypeptides/enzymes expressed in plants.
22. Comment on golden rice.
23. Write a note on Cry proteins.
24. What is the action of macerozyme on plant cell?

25. What is terminator technology?
26. What is mean by disarming of Ti plasmid?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **Six** questions. Each question carrier **4** marks. Short essay type.

27. How different types of sterilization is employed in tissue culture?
28. Explain the procedure of protoplast isolation.
29. Give an account on somatic hybridization technique.
30. List the use of plant growth regulators in tissue culture.
31. How embryogenesis is different from organogenesis? Explain the different types of embryogenesis.
32. Comment on any four type of direct gene transfer methods in plants.
33. Give an account on virus-mediated gene transfer.
34. How transgenic plants contributed in agriculture and horticulture sector?
35. How the plants can be made tolerant against salinity stress through biotechnological intervention?
36. Give an account on *Agrobacterium tumefaciens*
37. How haploids are produced in tissue culture? Mention its significance.
38. What is protoplast culture? Describe the protocol for the isolation of protoplast.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **Two** questions. Each question carries **15** marks. Essay type.

39. How therapeutic proteins are produced in transgenic plants?
40. Write a detailed account on agrobacterium-mediated genetic transformation of plants.
41. Give an account on somaclonal variation and its applications
42. Explain the technique of plant tissue culture, mention media preparation and culturing of explants.
43. What is callus tissue? Describe the protocol and discuss the significance of callus culture.
44. Give an outline of the principle of cell suspension culture and its application in biological studies.

(2 × 15 = 30 Marks)

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Fifth Semester B.Sc. Degree Examination, February 2021

Career Related First Degree Programme under CBCSS

Group 2 (a) – Botany and Biotechnology

BB 1573 : ANIMAL BIOTECHNOLOGY

(2018 Admission – Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** the questions in a word or **1** or **2** sentences. Each question carries **1** mark.

1. Name the subpopulation of a cell line that has been positively selected from a culture by cloning.
2. What is an immortalized cell line?
3. Name the serine protease that catalyzes the conversion of plasminogen to plasmin which is responsible for dissolving blood clots.
4. What is hybridoma technology?
5. Name two broad types of mammalian stem cells used.
6. What is animal cell culture?
7. What are adherent cells?
8. What are progenitor cells?
9. What is explant culture?
10. What are diploid cell strains?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks. (Answer not to exceed **1** paragraph)

11. What are viral vaccines?
12. How cell lines are classified based on their life span?
13. What is cell therapy?
14. What is therapeutic cloning?
15. What is continuous cell culture?
16. What is a bioreactor? Mention its parts.
17. Mention the different types of animal cell cultures.
18. Mention unique properties of stem cells.
19. What are the sources and advantages of adult stem cells?
20. What are the conditions required for cell line growth?
21. Write the characteristics of human cell lines citing examples.
22. How stem cells can be utilized for cancer treatment?
23. What is cell viability assay?
24. What is GMO?
25. How are adult stem cells obtained?
26. What are cell lines used for?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks. (Answer not to exceed **120** words)

27. Describe the Roller bottles and spinner flasks.
28. Distinguish between primary and secondary cell cultures.
29. Describe the operational stages in a bio-process.
30. Why are adult stem cells preferable to embryonic stem cells?
31. Mention the growth requirements of animal cell culture in a medium.
32. What are the criteria for choosing cell lines?
33. Describe the processes to obtain a primary cell culture.
34. Explain the different Animal bioreactors.
35. Explain the production and practical uses of transgenic animals.
36. Explain different diagnostic monoclonal antibodies.
37. Comment on the methods used to introduce foreign DNA in to mammalian cells.
38. Elaborate the bioethical issues in animal cell culture.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks. (Answer not to exceed **3** pages)

39. Mention the guide lines that should be followed in animal cell culture technique.
40. Briefly describe the benefits of animal cell culture.

41. Explain the applications of cell culture.
42. Explain in detail the types of animal cell culture.
43. Briefly explain maintenance, characterization and application of stem cell cultures.
44. Explain different growth factors influencing animal cell cultures.

(2 × 15 = 30 Marks)

St. Xavier's College

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Fifth Semester B.Sc. Degree Examination, February 2021

Career Related First Degree Programme Under CBCSS

Group 2 (a) Botany and Biotechnology

Open Course

BB 1552 : FOOD AND DAIRY BIOTECHNOLOGY

(2018 Admission - Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** the questions in **a word** or **one** or **two** sentences. **Each** question carries **1** mark.

1. Name the microorganism used in the production of cheese.
2. What is shelf life period?
3. Write the use of lactase in dairy industry.
4. What is stomach flu?
5. Name two natural preservatives for food.
6. What is dry heat sterilization?
7. Define asepsis.

8. Name the organism causing Cholera.
9. Mention any two advantages for a fermented food.
10. What is blanching?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks. (Answer not to exceed **one** paragraph).

11. How is biotechnology used in food industry?
12. List the characters of spoiled cheese.
13. Write a note on starter culture.
14. How temperature is useful in short term preservation of food?
15. What is Koji?
16. How can wood smoke preserve food?
17. Explain the process of canning.
18. High moisture content can enhance food spoilage. Why?
19. What is yoghurt? How is it prepared?
20. Mention the important moulds in food spoilage.
21. How curd is separated from fermented milk?
22. What is anaerobic respiration?
23. Mention the function of an autoclave.
24. What is vacuum packing?

25. Write a short note on Rennet in cheese production.
26. What are microbiological indicator organisms?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. **Each** question carries **4** marks. (Answer not to exceed **120** words).

27. Explain the contamination and spoilage of milk.
28. Discuss the significance of mycotoxins in food industry.
29. Differentiate food poisoning from food spoilage.
30. What are the sources of food contamination?
31. Explain how microbes can be cultured in a laboratory.
32. Describe the process of fermentation in buttermilk production.
33. What is salting in food preservation?
34. Discuss the role of radiations in food preservation.
35. Mention any four microbes beneficial to dairy industry.
36. What are the causes for spoilage of canned food?
37. Comment on chemical food preservatives.
38. How does nutrient content affect microbial growth in food?

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks. (Answer not to exceed **3** pages).

39. Write a note on microbes in food spoilage. What are the factors affecting growth of spoilage organisms?
40. Give an account on cause and prevention methods of food borne diseases.
41. Explain the physical and chemical methods for food preservation.
42. What is pasteurization? Give an account on milk borne disease and milk quality testing methods.
43. Explain the importance of enzymes in food and dairy industry with examples.
44. Discuss the role of microbes in fermented food production.

(2 × 15 = 30 Marks)