

GOVERNMENT OF KARNATAKA
KARNATAKA SCHOOL EXAMINATION & ASSESSMENT BOARD
MODEL QUESTION PAPER – 1

Class: II Year PUC

Academic Year: 2024-25

Subject: Chemistry (34)

Maximum Marks: 70

Time: 3.00 Hours

No. of Questions: 46

Instructions

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part-A carries 20 marks. Each question carries 1 mark.
b. Part-B carries 06 marks. Each question carries 2 marks.
c. Part-C carries 15 marks. Each question carries 3 marks.
d. Part-D carries 20marks. Each question carries 5 marks.
e. Part-E carries 09 marks. Each question carries 3 marks.
3. In Part-A questions, **first attempted answer** will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).
7. For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

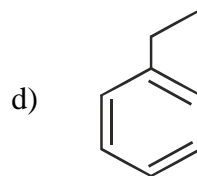
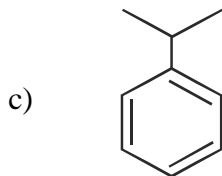
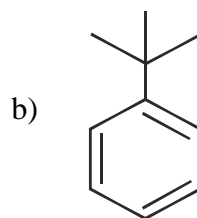
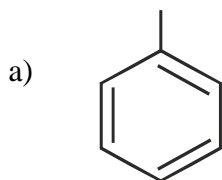
PART-A

I. Select the correct option from the given choices.

15 × 1 = 15

1. The role of CO_2 in Kolbe's reaction is
 - a) acts as catalyst
 - b) act as nucleophile
 - c) act as weak electrophile
 - d) act as strong electrophile.
2. In DNA, the linkage between different nitrogenous bases is
 - a) phosphate linkage
 - b) glycosidic linkage
 - c) peptide linkage
 - d) hydrogen bonding.
3. The complex $\text{PtCl}_2.4\text{NH}_3\text{Br}_2$ is treated with excess of AgNO_3 solution, two mole of AgBr is precipitated. The primary and secondary valence of this complex is
 - a) 6 and 1
 - b) 6 and 2
 - c) 4 and 6
 - d) 3 and 6
4. **Statement I:** Enantiomers are non-superimposable mirror images on each other.
Statement II: A racemic mixture shows zero optical rotation.
Identify the correct statement
 - a) Both statement I and II are correct
 - b) Both statement I and II are incorrect
 - c) Statement I is correct and statement II is incorrect.
 - d) Statement I is incorrect and statement II is correct.
5. The most stable manganese compound is
 - a) Mn_2O_7
 - b) MnF_4
 - c) MnO_2
 - d) MnSO_4

6. Among the following alkyl benzenes which one will not give the benzoic acid on oxidation with acidic KMnO_4 solution.



7. An ambidentate ligand is



8. The E° of Fe^{2+}/Fe , Zn^{2+}/Zn and Sn^{2+}/Sn are -0.44 V, -0.76 V and -0.14 V respectively. Which metal/s is/are act as sacrificial electrode to protect iron from rusting?

a) Both Zn and Sn

b) Zn only

c) Sn Only

d) neither Zn nor Sn.

9. The chemical name of phosgene is

a) chromyl chloride

b) triphenylphosphine

c) phosphorusoxychloride

d) carbonyl chloride.

10. In a solution containing non-volatile solute, the mole fraction of solvent is 0.9. The relative lowering of vapour pressure is

a) 1

b) 0.1

c) 0.9

d) 1.1

11. All natural and artificial radioactive decay of unstable nuclei take place by

a) zero order kinetics

b) half order kinetics

c) first order kinetics

d) second order kinetics

12. Match the following

List-I	List-II
A) Glucocorticoids	i) Responsible for development of secondary female characteristics.
B) Mineralocorticoids	ii) Responsible for preparing the uterus for implantation of fertilised egg
C) Testosterone	iii) Control carbohydrates metabolism
D) Estradiol	iv) Responsible for development of secondary male characteristics.
	v) Control level of excretion of water and salt by kidney.

a) A-(iv), B- (v), C-(ii), D-(i)

b) A-(iii), B-(v), C-(iv), D-(i)

c) A-(ii), B-(i), C-(v), D-(iv)

d) A-(iii), B-(ii), C-(iv), D-(i)

13. p-Aminoazobenzene is prepared from benzenediazonium chloride and aniline in

a) acidic medium

b) basic medium

c) neutral medium

d) both acidic and basic medium.

14. The chemicals used to convert commercial alcohol into denatured alcohol are
- a) CuSO_4 and Pyrolidine b) Cu_2S and Pyrolidine
 c) CuSO_4 and Pyridine d) Cu_2S and Pyridine.
15. During osmosis, the solvent molecules are moving from
- a) Hypotonic solution to hypertonic solution
 b) Hypertonic solution to hypotonic solution
 c) Higher concentrated solution to lower concentrated solution
 d) Higher osmotic pressure solution to lower osmotic pressure solution.

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:

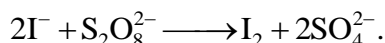
(aldehydes, phenol, fluorobenzene, decreases, greater, benzene) 5×1= 05

16. The melting point of interstitial compound is _____ than the pure metal.
 17. Benzenediazonium fluoroborate on heating decomposes to give _____
 18. The simplest hydroxy derivative of benzene is _____
 19. When a non-volatile solute is added to the pure solvent, the freezing point of solvent _____
 20. Ozonolysis of alkenes followed by reaction with zinc dust and water gives _____

PART-B

III. Answer ANY THREE of the following. Each question carries two marks. 3 × 2 = 06

21. Explain Swartz reaction with an example.
 22. Write the reactions show that glucose contains a) five hydroxyl groups b) aldehyde group.
 23. Define half-life period of a reaction. Write the relationship between half-life period and initial concentration of zero order reaction.
 24. Write the reactions involved in preparation of phenol from cumene.
 25. Iron (III) catalyses the reaction between iodide and persulphate ions in the reaction:



Explain the catalytic action of catalyst iron (III) by using chemical reactions.

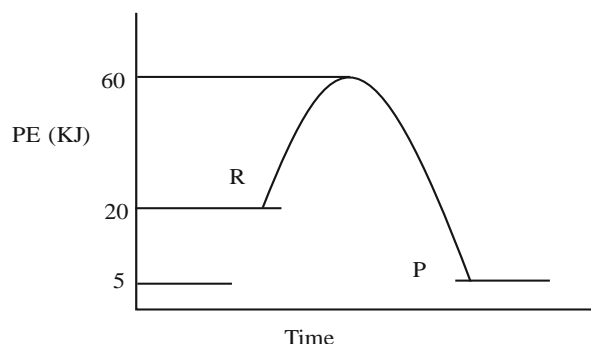
PART-C

IV. Answer ANY THREE of the following. Each question carries three marks. 3 × 3 = 09

26. Study of actinoids elements is more difficult? Give any three reasons.
 27. For the complex, Mercury (I) tetrathiocyanato-S-cobaltate (III)
- a) What is coordination number of Co.
 b) Identify the ligand present in this complex.
 c) Does ionization isomer for the following compound exist?
28. A student of 2nd PU performs two trails of reactions between KI and KMnO_4 . In first trail student add small amount of acid to reaction mixture and in second trail student forgot to add acid to reaction mixture. Then student observed that different colour was obtained in first and second trail. Give reason for above observation. Write the possible chemical reactions to both the trails.
 29. Define Crystal field splitting. Sketch the energy level diagram for the crystal field splitting of d-orbital in a tetrahedral complex.
 30. What is the significance of synergic effect in metal carbonyls? How many bridged and non-bridged CO (carbonyl) ligands are present in octacarbonyldicobalt (0) complex compound?

V. Answer ANY TWO of the following. Each question carries three marks. $2 \times 3 = 06$

31. Direct measurement of conductivity of ionic solutions by Wheatstone bridge is not possible. Give reasons. Suggest a remedy to resolve it.
32. For the reaction $R(s) \rightarrow P(g)$, the potential energy diagram is given below:



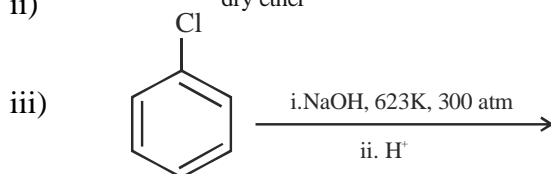
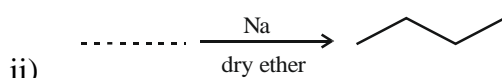
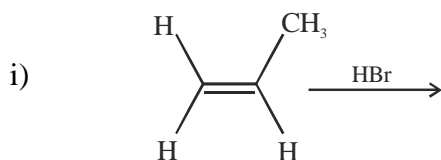
By observing the above diagram, answer the following.

- What is the value of activation energy of the reaction?
 - What is the value of ΔH of the reaction?
 - Draw potential energy diagram for the reaction $P(g) \rightarrow R(s)$.
33. State Faraday's II law of electrolysis. Mention any two factors which determines the product of electrolysis.
34. Name the two components present in binary solution. Which component determines the physical state of binary solution?

PART-D

VI. Answer ANY FOUR of the following. Each question carries five marks. $4 \times 5 = 20$

- How do you distinguish between primary, secondary and tertiary amines by using Hinsberg's reagent with chemical equations involved?
 - Give the preparation of p-hydroxyazobenzene. (3+2)
36. a) Between methanal and ethanal, which would undergo aldol condensation? Write the chemical reaction involved in it.
- b) Although phenoxide ion has more number of resonating structures than carboxylate ion, carboxylic acid is a stronger acid than phenol. Why? (3+2)
37. a) What is peptide bond? Give an example for dipeptide.
- b) What are oxidoreductase enzymes? Name the enzyme that catalyses hydrolysis of maltose into glucose
- c) Give any one main natural source of Vitamin K? (2+2+1)
38. a) Complete the following equation:



- b) Explain Saytzeff rule with an example. (3+2)
39. a) Give the chemical equation for the Conversion of propanenitriles into corresponding ketones by using phenyl magnesium bromide. Write the IUPAC name of the product.
- b) Explain Hell-Volhard-Zelinsky (HVZ) reaction with an example. (3+2)
40. a) Write the reaction involved in the mechanism of acid catalyzed dehydration of alcohol to alkene.
- b) Explain the preparation of anisole by Williamson synthesis. (3+2)

PART-E

(NUMERICAL PROBLEMS)

VII. Answer ANY THREE of the following. Each question carries three marks. 3 × 3 = 09

41. Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life ($t_{1/2}$) of the reaction.
42. A 5% solution (w/w) of cane sugar ($C_{12}H_{22}O_{11}$) in water has freezing point of 271 K. calculate the freezing point depression constant. Given freezing point of pure water is 273.15 K.
43. The molar conductivity of 0.025 mol L^{-1} methanoic acid is $46.1 \text{ S cm}^2 \text{ mol}^{-1}$. Calculate its degree of dissociation. Given $\lambda_{(H^+)}^{\circ} = 349.6 \text{ S cm}^2 \text{ mol}^{-1}$ and $\lambda_{(HCOO^-)}^{\circ} = 54.6 \text{ S cm}^2 \text{ mol}^{-1}$.
44. Henry's law constant for the molality of methane in benzene at 298 K is $4.27 \times 10^5 \text{ mm Hg}$. Calculate the mole fraction of methane in benzene at 298 K under 760 mm Hg.
45. Two electrolytic cells A and B containing solutions of $AgNO_3$ and $CuSO_4$ respectively are connected in series. A steady current of 1.5 amperes was passed through them until 1.45 g of silver is deposited at the cathode of cell A. How long did the current flow and What mass of copper was deposited? [Atomic mass of copper = 63.5 and silver = 108].
46. The rate constant of a reaction is given by: $\log k = 13.25 - \frac{(1.28 \times 10^3)K}{T}$. Calculate the activation energy and pre-exponential factor (A).

PART - F

(For visually challenged students only)

32. Give any three factors which affect a rate of reaction. 3