Code Number: **A**

Aakash
Medical | IIT-JEE | Foundations

Corp. Office: Aakash Educational Services Limited, 3rd Floor, Incuspaze Campus- 2, Plot No. 13, Sector- 18, Udyog Vihar, Gurugram, Haryana - 122015

Time: 3 hrs. **Max. Marks: 70**

Mock Test Paper for Class-XII

CHEMISTRY

Roll No. | | | | | | | | | | | |

GENERAL INSTRUCTIONS

Read the following instructions carefully and follow them:

1. The Question paper consists of parts **A, B, C, D** and **E**
2. **Part A - I** consists of **15 Multiple choice** questions,

   Part A – II consists of **5 fill up the blanks** questions
3. All the questions of **Part A – I and II** are to be answered **compulsorily**
4. **Part B** consists of **5 short answer type** questions carrying **2 marks** each, out of which **3 questions** to be answered
5. **Part – C** consists of **IV** and **V**

   Part C consists of **5 short answer type** questions carrying **3 marks** each, out of which **3 questions** to be answered

   Part C – V consists of **4 long answer type** questions carrying **3 marks** each, out of which **2 questions** to be answered.
6. **Part D** consists of **6 long answer type** questions carrying **5 marks** each, out of which **4 question** to be answered.
7. **Part E** consists of **6 numerical problems** carrying **3 marks** each, out of which **3 question** to be answered.

PART-A

I. Select the correct alternative from the choices given below: **15 x 1 = 15**

1. The mass percentage (W/W) of glucose in water is 10% means.
   (a) 10g of glucose dissolved in 100 g of water
   (b) 10g of glucose dissolved in 90 mL of water
   (c) 10g of glucose dissolved in 100 mL of water
   (d) 10g of glucose dissolved in 90 g of water
2. Which of the following elements is liquid at normal temperature?
   (a) Zinc (b) Mercury (c) Aluminum (d) Water
3. The reagent used in Sandmeyer's reaction is
   (a) N_2 gas (b) Cu and HCl (c) Cu_2Cl_2 and HCl (d) $CuCl_2$
4. The main natural source of acetic acid is
   (a) milk (b) vinegar (c) red ant (d) butter
5. The reaction of aniline, which produces Zwitter ion as a major product is
   (a) direct nitration (b) bromination
   (c) sulphonation (d) Friedel-craft alkylation
6. The method used to separation of isomeric products obtained when phenol reacts with dil. HNO3 at low temperature is
   (a) steam distillation (b) sublimation
   (c) electrolysis (d) solidification
7. The ligand which forms more stable coordination complexes is
   (a) NH_3 (b) CO_2 (c) CN^- (d) H_2O
8. Which of the following groups when present at para position increases the basic strength of aniline?
   (a) $-NO_2$ (b) -Br (c) $-NH_2$ (d) -COOH
9. In the following acids, vitamin is
   (a) ascorbic acid (b) adipic acid (c) aspartic acid (d) saccharic acid
10. The best reagent useful for separation and purification of aldehyde from ketone is
    (a) Tollens' reagent (b) sodium hydrogen sulphite
    (c) sodium sulphate (d) 2,4-DNP reagent
11. **Statement–1:** If on mixing the two liquids, the solution becomes hot, it implies that it shows negative deviation from Raoult's law.

    Statement–2: Solutions which show negative deviation are accompanied by decrease in volume.
    (a) Both Statement–1 and Statement–2 are true
    (b) Statement–1 is true but Statement–2 is false
    (c) Both Statement–1 and Statement–2 are false
    (d) Statement–1 is false but Statement–2 is true

12. Match the following transition metal/compounds with their catalytic activity in the corresponding processes.

Transition metal/compounds	Name of the process
(i) $TiCl_4 + Al(CH_3)_3$	(A) Wacker process
(ii) $PdCl_2$	(B) Contact process
(iii) Ni	(C) Manufacture of polyethene
(iv) V_2O_5	(D) Hydrogenation of fat

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

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

13. Cumene hydroperoxide on hydrolysis of dilute acids gives

(a) phenol and oxygen (b) phenol and hydrogen

(c) hydrogen and oxygen (d) phenol and acetone

14. Among the following cells, the cell used in the apollo space program for providing electric power is

(a) SHE (b) H_2 - O_2 fuel cell (c) Daniel cell (d) Mercury cell

15. The following results have been obtained during kinetic studies of the reaction $A(aq) + 2B(aq) \rightarrow C(aq)$

Choose the correct option for the rate equation for the above reaction.

Experiment	Concentration of [A] $(molL^{-1})$	Concentration of [B] $(molL^{-1})$	Rate of formation of 'C' $(molL^{-1}min^{-1})$
I	0.1	0.1	6.0×10^{-3}
II	0.2	0.3	7.2×10^{-2}
III	0.1	0.4	2.4×10^{-2}
IV	0.4	0.3	2.88×10^{-1}

(a) $Rate = K[A]^1[B]^2$ (b) $Rate = K[A]^1[B]^0$

(c) $Rate = K[A]^2[B]^1$ (d) $Rate = K[A]^4[B]^1$

II. Fill in the blanks by choosing the appropriate word/words from those given below: 5 x 1 = 5

(soft, hard, chloroform, three, nucleotide, two)

16. The polyhalo compound used as an aesthetic during surgery was_____.

17. Nucleic acids are the long chain polymers of_____.

18. Van't Hoff factor for KCl solution assuming the complete dissociation is_____.

19. The number of hydroxyl groups present in glycerol is_____.

20. Transition metals are known to make interstitial compounds. Formation of interstitial compounds makes the transition metal more_____.

PART-B

III. Answer any THREE of the following questions **3 x 2 = 6**

21. What is Lucas reagent? Which class of alcohol does produces turbidity immediately with it?
22. Write the S_N2 mechanism for conversion of chloromethane to methanol.
23. For the reaction: $H_2(g) + I_2(g) \rightarrow 2HI(g)$; draw the diagram showing plot of potential energy versus reaction coordinate to explain the role of activated complex in a reaction.
24. Name the hormone released rapidly due to rise in blood glucose level to keep the blood glucose level within the narrow limit. Mention the number of amino acids present in this hormone.
25. What are transition elements? Give an example.

PART-C

IV. Answer any THREE of the following questions: **3 x 3 = 9**

26. Using Valence Bond Theory [VBT] explain geometry, hybridization & magnetic property $[CoF_6]^{3-}$ ion. [Given: Atomic number of cobalt is 27]
27. Heteroleptic complexes with co-ordination number 6 show geometrical isomerism. A complex $[MA_3B_3]$ shows geometrical isomerism. If central metal ion M has +3 oxidation state. Predict the denticity and draw the structure of two geometrical isomers of the complex and name them.
28. What is Lanthanoid contraction? Mention two consequence of it.
29. How many square pyramidal units present in decacarbonyldimanganese(0)? Write its molecular and structural formulae.
30. Complete the following equations.

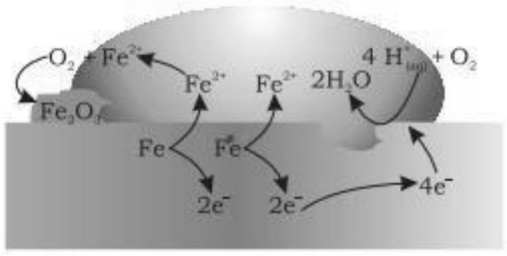
(a) $\_\_\_\_\_ + 8Na_2CO_3 + 7O_2 \rightarrow 8Na_2CrO_4 + 2Fe_2O_3 + 8CO_2$

(b) $MnO_2 \xrightarrow[\text{Oxidised with air}]{\text{Fused with KOH}} \square$

(c) $2KMnO_4 \xrightarrow{513\ K} K_2MnO_4 + O_2 + \_\_\_\_\_$

V. Answer any TWO of the following questions: **2 x 3 = 6**

31. Mention three factors that affect the rate of a chemical reaction.
32. Name the concentration term which is commonly used in medicine and pharmacy. Write the definition and mathematical equation for that concentration term.
33. Depending on the magnitude of conductivity of the materials, mention the three types of materials with an example.
34. The diagram shows that when iron is exposed to atmospheric air,



(a) Name the phenomenon involved in this diagram.

(b) write the atmospheric oxidation reaction of iron.

(c) mention any one method to avoid this phenomenon.

PART-D

VI. Answer any FOUR of the following questions **4 x 5 = 20**

35. (a) Write the Haworth structure of maltose. Why they show reducing property?

(b) What are fibrous proteins? Name the protein present in hair.

36. (a) Write the three steps involved in the acid catalysed dehydration of ethanol to ethoxy ethane at 413K.

(b) Explain Kolbe's reaction with equation.

37. (a) When alkyl chlorides are reacts with sodium iodide in dry acetone gives alkyl iodide.

(i) Name this reaction.

(ii) Write the general equation.

(iii) Mention the role of dry acetone.

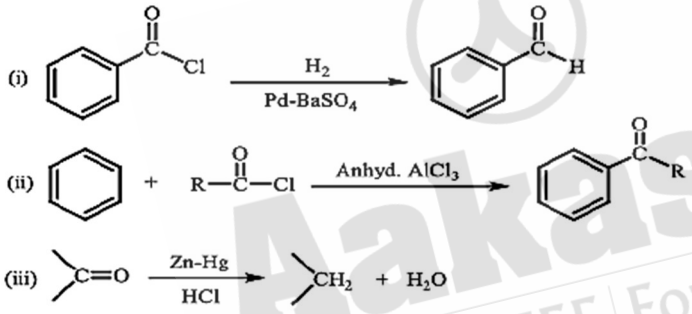
(b) What is meant by racemic modification? "They are optically inactive". Give reason.

38. (a) Which type of amines answers for carbylamine reaction (isocyanide test)? Explain this reaction with an example.

(b) Identify the compounds "X" and "Y" in the following conversion.

$$C_6H_5-NH_2 \xrightarrow[273-278K]{NaNO_2+2HCl} "X" \xrightarrow{"Y"} C_6H_5-I+KCl+N_2$$

39. (a) Mention the name of the following reactions



(b) Among methanal and ethanal, which one undergoes Cannizaro reaction? Give reason.

40. The compound "A" has molecular formula C_7H_8 is heated with alkaline $KMnO_4$ followed by acidification gives compound "B" of the molecular formula $C_7H_6O_2$. This compound "B" turns blue litmus to red. The sodium salt of compound "B" is heated with reagent "X" gives hydrocarbon "C" of molecular mass 78 g mol^{-1}.

(a) Write the structure of compounds "A", "B" and "C".

(b) Identify "X" and mention its role in the reaction.

PART-E

V. Answer any THREE of the following questions: **3 x 3 = 9**

41. The cell in which the reaction

$$2Fe^{+3}_{(aq)} + 2I^{-}_{(aq)} \rightleftharpoons 2Fe^{+2}_{(aq)} + I_2$$

$$E^{\circ}_{cell} = 0.236\ V \text{ at } 298\ K$$

Calculate the value of log K_c (K_c = equilibrium constant) of the cell reaction.

42. The first order rate constant at 600 K is $2\times10^{-5}s^{-1}$ and energy of activation is 209.8 k J mol^{-1} for a reaction. Calculate the rate constant at 700 K. [Given: R=8.314 $JK^{-1}mol^{-1}$]

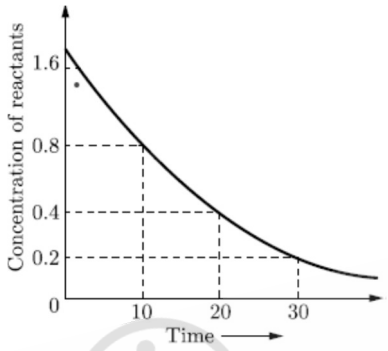
43. Henry's constant for the molality of methane in benzene at 298 K is 4.27×10^5 mm Hg. Calculate the mole fraction of methane in benzene at 298 K under 760 mm Hg.

44. Calculate the limiting molar conductivity of Cl^- ion by using the following data,

$\lambda^\circ_m Ca^{+2} = 119.0\ Scm^2mol^{-1}$ & $\lambda^\circ_m CaCl_2 = 271.6\ Scm^2mol^{-1}$

45. Calculate the osmatic pressure in pascal exerted by a solution prepared by dissolving 0.925 g of polymer of molar mass 1,85,000 in 500 mL of water at 37^0C. [Given: $R = 8.314 \times 10^3\ PaLK^{-1}mol^{-1}$]

46. Analyse the given below graph, drawn between concentrations of reactant in $molL^{-1}$ v/s time in minute, calculate the average rate of the reaction in terms of minutes and seconds.



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