KSPUCPA

PE-2020

SECOND PUC PREPARATORY EXAMINATION - 2020

Time : 3 Hrs. 15 Mins. | CHEMSITRY (34) | Max Marks : 70

No. of Pages : 02 | Total No. of Ques. : 37

Instructions :

1. The question paper has four parts A, B, C & D. All parts are compulsory.
2. Part-A carries 10 marks. Each question carries 1 mark.
   Part-B carries 10 marks. Each question carries 2 marks.
   Part-C carries 15 marks. Each question carries 3 marks.
   Part-D carries 35 marks. Each question carries 5 marks.
3. Write balanced chemical equations and draw labelled diagrams wherever necessary.
4. Use log tables and simple calculator if necessary. (Use of Scientific Calculator is not allowed)

PART - A

I Answer ALL the questions, Each question carries ONE mark. 10x1=10

1) At a given temperature and pressure nitrogen gas is more soluble in water than helium gas. Which one of them has higher value of K_H ?
2) On mixing equal volumes of acetone and ethanol, what type of deviation from Raoult's law is expected ?
3) What happens to molar conductivity when one mole of KCl dissolved in one litre is diluted to 5 litres ?
4) What happens to the $t_{1/2}$ of a 1st order reaction, if the initial concentration of the reactants is increased ?
5) Name the process usually employed for the purification of Nickel.
6) Name most abundant noble gas in earth atmosphere.
7) How many moles of AgCl will be precipitated when an excess of $AgNO_3$ solution is added to 1 molar solution of $[CrCl(H_2O_5]Cl_2$?
8) Name the organic product formed when chlorobenzene is treated with sodium in dry ether.
9) $C_6H_5COCl \xrightarrow[Pd+BaSO_4]{H_2} C_6H_5CHO$. Name the reaction.
10) Deficiency of which vitamin causes the disease pernicious anaemia ?

PART -B

II Answer any FIVE of the following. Each question carries TWO marks. 5x2=10

11) What is meant by the term coordination number is solids ? What is the coordination number in a face centered cubic close packing structure ?
12) State Faraday's first law of electrolysis. For the electrode reaction $Zn^{2+}_{(aq)} + 2e^- \rightarrow Zn(s)$ what quantity of electricity in coulombs is required to deposit one mole of zinc?
13) A reaction is first order with respect to the reactant A and second order with respect to the reactant B in reaction $A + B \rightarrow$ product.
    a) Write the differential rate equation.
    b) How is rate of reaction affected on increasing the concentration of B by two times ?
14) Give any two differences between lanthanoids and actinoids.
15) Name the product formed when phenol is treated with acidified solution of $Na_2Cr_2O_7$. Give equation.
16) Identify A and B in the following reaction : $2C_6H_5CHO + Conc.NaOH \rightarrow A + B$.
17) What is the role of these as food additives ? i) Sodium benzoate ii) Aspartame.
18) Explain saponification of oils/fats with equation.

PART - C

III Answer any FIVE of the following. Each question carries THREE marks. 5x3=15

19) Describe the three steps involved in the leaching of bauxite to get pure Alumina.
20) Write the equations involved in the preparation of nitric acid by Ostwald's process by maintaining the reaction conditions.
21) Complete the following equations :
    i) $CH_4 + 2O_2 \longrightarrow$
    ii) $2Fe^{2+} + SO_2 + 2H_2O \longrightarrow$
    iii) $C_{12}H_{22}O_{11} \xrightarrow{Conc.H_2SO_4}$ **(1+1+1)**

(P.T.O.)

22) a) Which is the strongest acid among the hydrogen halides ? Give one reason. (X = F, Cl, Br, I)

b) Write the structure of Chloric acid ($HClO_3$) **(2+1)**

23) Give reason for the following :

i) Transition metals are good catalytic agent.

ii) Second ionization enthalpy of copper is very high.

iii) Spin magnetic moment of SC^{3+} is zero. **(1+1+1)**

24) Write the equations involved in the preparation of potassium dichromate from chromite ore.

25) With the help of valence bond theory account for hybridization, geometry and magnetic property of $[Ni(CN)_4]^{2-}$ complex ion. (Z for Ni = 28).

26) a) For the given complex, $[Co(NH_3)_5Br]SO_4$ write the IUPAC name and its ionization isomer.

b) Which set of d-orbitals of metal ion experience more repulsion in octahedral field from ligand? **(2+1)**

PART - D

IV Answer any THREE of the following. Each question carries FIVE marks. 3x5=15

27) a) Calculate the packing efficiency in a unit cell of cubic close packing (CCP) structure.

b) Name the crystal defect which lowers the density of an ionic crystal. **(3+2)**

28) a) A solution containing 18 g of non-volatile non-electrolyte solute is dissolved in 200g of water freezes at 272.07 K. Calculate the molecular mass of solute.
(Given K_f = 1.86K Kg/mol. Freezing point of water = -273 K).

b) Define isotonic solution. What happens when blood cell is dipped in a solution containing more than normal saline concentration ? **(3+2)**

29) a) Calculate the emf of the cell for the reaction : $Mg + 2Ag^+ \rightarrow Mg^{2+} + 2Ag$.
Given E^0 of Mg is -2.37 V and E^0 Ag = 0.80 V.
$[Mg^{2+}]$ = 0.001 M $[Ag^+]$ = 0.0001 M and log 10^5 = 5.

b) What are fuel cells ?

30) a) Derive integrated rate equation for the first order reaction.

b) According to collision theory, what are the two factors that lead to effective collisions? **(3+2)**

31) a) Write any two differences between physisorption and chemisorptions.

b) Name the phenomenon OR effect for the following.

i) Colloidal particles are in zig-zag motion.

ii) When an electrical potential is applied across two platinum electrodes dipping in a colloidal solution, particles move towards one or the other electrodes.

iii) Scattering of light by colloidal particles. **(2+3)**

PART-E

V Answer any FOUR of the following. Each question carries FIVE marks. 4x5=20

32) a) Write equations for the steps in SN^1 mechanism of conversion of tert-butyl bromide into Tert-butyl alcohol.

b) Identify the products A, B and C in the following equation :

$$CH_3OH \xrightarrow{\text{Red P+Cl}_2} A \xrightarrow{\text{NaI+ dry acetone}} B \xrightarrow{C_2H_5I\text{+Na in dry ether}} C$$ **(2+3)**

33) a) Write the mechanism of acid catalysed dehydration of ethanol to ethene.

b) Explain Williamson's ether synthesis reaction. Write the general equation. **(3+2)**

34) a) Write the organic compound formed in the following equations :

i) $C_6H_6 + CH_3COCl \xrightarrow{\text{Anhydrous AlCl}_3}$

ii) $CH_3COCH_3 + NH_2OH$

iii) $CH_3MgBr + CO_2 \xrightarrow[H_3^+O]{\text{dry ether}}$ **(3+2)**

35) a) Identify the reactant A in the following reaction : $A + 2R-X \rightarrow R_4N^+X^-$.

b) Explain Hoffmann's bromamide degradation reaction for the preparation of methanamine. Which is more basic among aqueous solutions of aniline and ammonia ? Give one reason. **(1+4)**

36) a) Write Haworth structure of maltose.

b) What is denaturation of proteins ? Which level of structure remains intact during denaturation of protein ? Name the base present only in DAN but not in RNA. **(2+3)**

37) a) Write the partial structure of i) Neoprene ii) Terylene (Dacron) iii) Nylon-6

b) Explain the preparation of Buna-N with equation. **(3+2)**

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