MODEL QUESTION PAPER 3 PUC II

II PUC Chemistry (34)

Time : 3 Hrs. 15min. **Blue Print for Model Question Papers** Max. Marks: 70

Group	Unit	Title	Hours	Marks	Part-A I 10x1 mark	Part B II 8x2 mark	Part C III 8x3 mark	Part D IV & V 11x5 mark	Total
Group-I Physical	1	The Solid state	8	7		✓		✓	7
	2	Solution	9	8	✓✓			✓	7
	3	Electrochemistry	9	8	✓	✓		✓	8
	4	Chemical kinetics	9	8	✓	✓		✓	8
	5	Surface chemistry	6	5	✓			✓	6
		Total of Group-I	**41**	**36**					**36**
Group-II Inorganic	6	General principles and processes of isolation of elements	5	4	✓		✓		4
	7	The p-block elements	11	10	✓		✓✓✓		10
	8	The d and f-block elements	9	8		✓	✓✓		8
	9	Coordination compounds	7	6			✓✓		6
		Total of Group-II	**32**	**28**					**28**
Group-III Organic	10	Haloalkanes and haloarenes	7	6	✓			✓	6
	11	Alcohols, phenols and ethers	8	7		✓		✓	7
	12	Aldehydes, ketones and carboxylic acids	9	8	✓	✓		✓	8
	13	Amines	6	5				✓	5
	14	Biomolecules	7	6	✓			✓	6
	15	Polymers	5	5				✓	5
	16	Chemistry in everyday life	5	4		✓✓			4
		Total of Group-III	**47**	**41**					**41**
		TOTAL	**120**	**105**	**10**	**10**	**15**	**35**	**105**

Model paper – 3

II PUC – CHEMISTRY (34)

Time: 3hours 15 minutes Maximum marks: 70

Instructions*:*

1. *The question paper has four parts: A, B, C and D. All parts are compulsory.*

2. *Write balanced chemical equations and draw labeled diagrams wherever required.*

3. *Use log tables and the simple calculator if necessary.*
(Use of scientific calculators is not allowed)

PART-A

I. Answer ALL of the following. (Each question carries 1 mark) 10x1=10

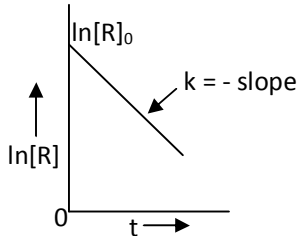
(Answer each question in one word or in one sentence)

1. What is the effect of increase in temperature on the solubility of gas in a liquid?

2. Define osmotic pressure .

3. Mention the concentration of H^+ ions in the solution used in SHE .

4. From the following plot, predict the order of the reaction.



5. $2SO_2(g)+O_2(g) \xrightarrow{NO(g)} 2SO_3(g)$. Is this reaction an example for Homogenous or Heterogeneous catalysis.

6. Name the depressant used in separation of ZnS from PbS by froth floatation process.

7. Which noble gas does not occur in nature?

8. R-X + NaI $\xrightarrow{\text{Dry Acetone}}$ R-I + NaX. This reaction is known as _ _ _ _ _ _

9. Give reason: Acetic acid is soluble in water.

10. Among the following which is a fat soluble vitamin
Vitamin-B_{12}, Vitamin-C, Vitamin-D.

PART-B

II.Answer any FIVE of the following. (Each question carries 2 marks) 5x2=10

11. Give two differences between p-type & n-type semiconductors.

12. What is limiting molar conductivity? Represent graphically the variation in molar conductivity with concentration for acetic acid.

13. Rate constant of a first order reaction is $6.93X10^{-3}$ min^{-1}. Calculate the half-life period.

14. i) What is actinide contraction?
    ii) Which is the common oxidation state exhibited by actinides?

15. How do you prepare diethyl ether by dehydration of ethanol?

16. How do you convert benzamide to benzoic acid?

17. Give one example each for i) Tranquilizer ii) Antiseptic.

18. What is saponification with an example.

PART-C

III. Answer any FIVE of the following. (Each question carries 3 marks) 5x3=15

19. How copper is refined by electrolytic method. 3

20. i) Write the structure & mention basicity of hypo phosphorous acid. 2
    ii) Which gas is liberated when zinc reacts with dil HNO_3? 1

21. Draw the flow chart for the manufacture of sulphuric acid by Contact process.
    Name the catalyst used in the process 3

22. i)Give any two reasons for the anomalous behaviour of fluorine 2
    ii)Give one example of interhalogen compounds 1

23. What are interstitial compounds? 1
    Write any two characteristics of interstitial compounds 2

24. i) Write the two chemical equations to show the inter conversion of chromates & dichromates in aqueous solution 2
    ii)Complete the equation : $5C_2O_4^{2-} + 2MnO_4^- + 16H^+ \longrightarrow$ 1

25. With the help of valence bond theory account for the geometry & magnetic property of $[Co(NH_3)_6]^{3+}$ 3

26. i)What is an ambidentate ligand? 1
    Name the type of structural isomerism that arises in the co-ordination compound containing such a ligand 1
    ii) Give the IUPAC name of $K_2[Zn(OH)_4]$ 1

PART-D

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

27. a) Calculate the packing efficiency in a CCP crystal lattice 4
    b) What is the number of particles per unit cell of a simple cube. 1

28. a) Calculate the osmatic pressure of 0.05% urea solution in water at 20^0c.
    Given R =0.0821Latm $mol^{-1}K^{-1}$. Molar mass of urea = 60g mol^{-1} 3
    b) Give two general characteristics of an ideal solution of two liquids 2

29.a)Calculate the emf of the cell in which the following reaction takes place
    $Ni(S)+2Ag^+(0.002M) \longrightarrow Ni^{2+}(0.160M) + 2Ag(S)$, Given that $E^0_{Cell} = 1.05V$ 3
    b) A galvanic cell after use is recharged by passing current through it.
    What type of cell is it? Give an example 2

30.a) Rate constant of a reaction at 300K & 400K are $0.034S^{-1}$& $0.136S^{-1}$ respectively.
    Calculate the activation energy for the reaction [Given: R = $8.314JK^{-1}mol^{-1}$] 3

b) Derive the expression for half-life of zero order reaction 2

31. a) Mention two applications of adsorption 2

b) What are emulsions? Give an example for O/W emulsion 2

c) What is the cause for Brownian movement? 1

V. Answer any FIVE of the following. (Each question carries 3 marks) 4x5=20

32. a) Explain SN^2 mechanism with an example 2

b) Name the product formed when chloromethane reacts with (i)aqueous KOH & (ii)alcoholicAgCN 2

c) Give an example of polyhalogen compound 1

33. a) Explain esterification reaction between acetic acid & ethyl alcohol as example 2

b) Boiling point of alcohol is greater than the boiling point of hydrocarbons of comparable molar masses, Why? 1

c) What is the effect of $-NO_2$ group on the acidic strength of phenol? Give reason 2

34. a) Explain Etard reaction 2

b) Name the products A & B in the following reaction 2

$$2CH_3CHO \xrightleftharpoons{\text{dilNaOH}} A \xrightleftharpoons[-H_2O]{\Delta} B$$

c) Name the reagent used in the decarboxyaltion of carboxylic acid 1

35. a) How do you convert benzene diazonium chloride into chlorobenzene. Name the reaction 3

b)Explain Hoffmann Bromamide reaction with an example 2

36. a) Write the Haworth structure of maltose 2

b) What are hormones? Give one biological function of insulin 2

c) What are nucleosides? 1

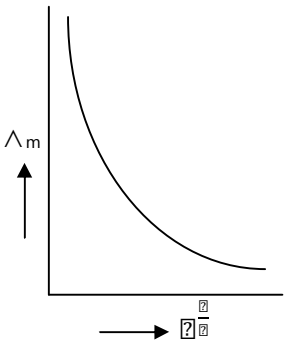
37. a) Name the monomers of Nylon-6,6 2

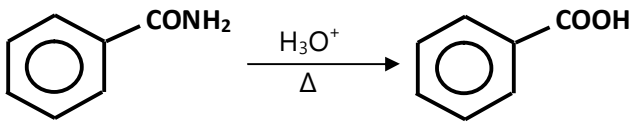
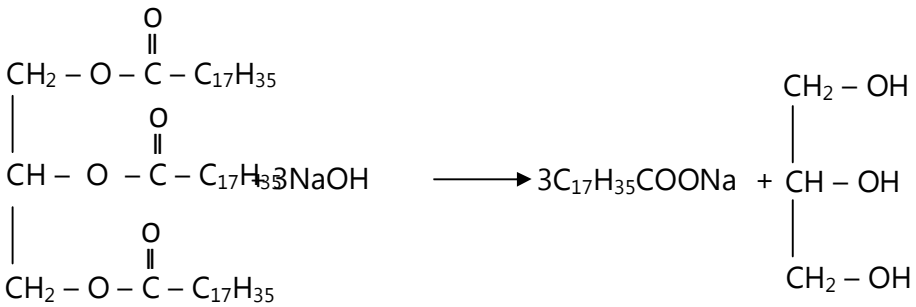
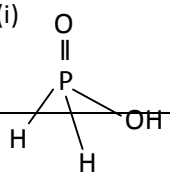
b) How is Neoprene prepared? Give equation 2

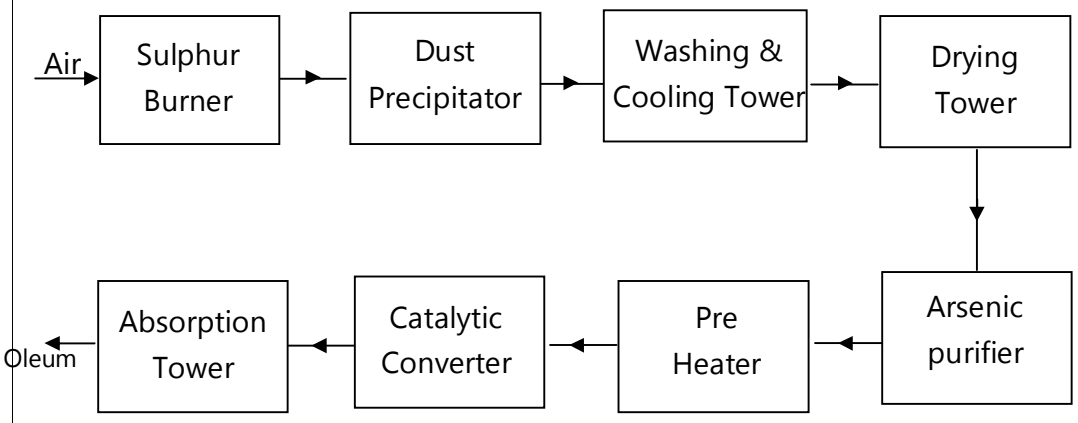
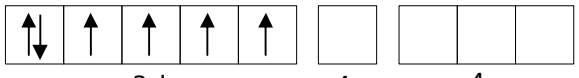
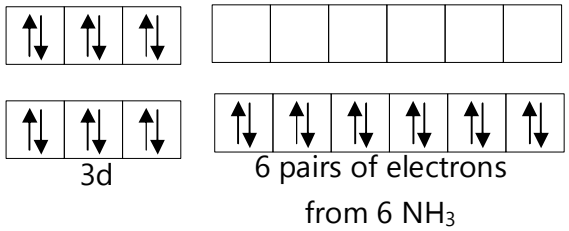
c) Give an example for thermoplastic polymer. 1

Scheme of valuation for model question paper – 3 (ZIET)

Note : Any other correct alternative answers can be honored wherever applicable

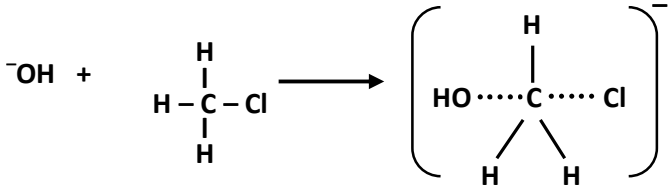
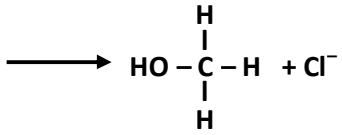
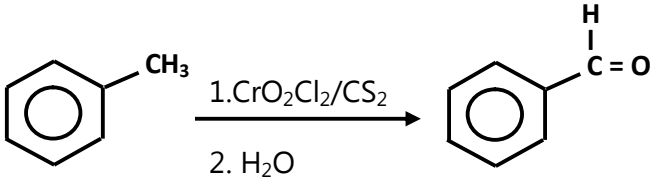
Q.No	Value points	Marks
I	**PART-A**	
1	Decreases	1
2	External pressure to be applied on the solution side just to stop the flow solvent from its side to solution side across SPM	1
3	1M or 1 Molar	1
4	First order	1
5	Homogenous	1
6	Sodium cyanide or NaCN	1
7	Radon or Rn	1
8	Finkelstein reaction	1
9	Due to the formation of hydrogen bond (H-bond) b/w acetic acid molecules & water	1
10	Vitamin-D	1
II	**PART-B**	
11	<table><tr><td>p-type</td><td>n-type</td></tr><tr><td>1. Doped with trivalent atoms(B,Al)</td><td>1. Doped with pentavalent atoms(P,As,Sb)</td></tr><tr><td>2. Negative charges (electrons) contributes to conduction</td><td>2. Holes contributes to conduction</td></tr></table>	2
12	Molar conductivity at infinite dilution  	1 1
13	$t_{1/2} = \frac{0.693}{k}$ $t_{1/2} = \frac{0.693}{0.00693\ min^{-1}}$ $t_{1/2}$ = 100 min	1 1
14	(i)The steady decrease in atomic size of the actinides with increase in the atomic number (ii)+3	1 1

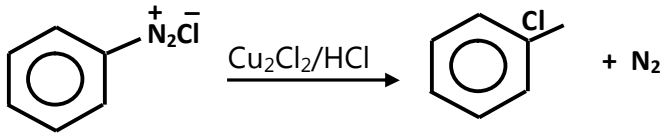
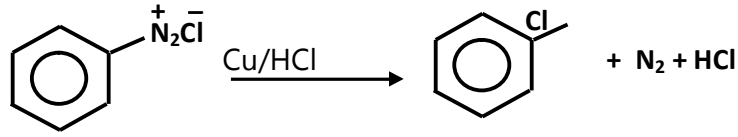
15	When ethanol is heated with Con H_2SO_4 at 414K, diethyl ether is formed $CH_3CH_2OH \xrightarrow[413K]{H_2SO_4} CH_3CH_2OCH_2CH_3$ **OR** Self explanatory equation	1 1 **OR** 2
16	When benzamide is heated with dil acid hydrolysis takes place to form benzoic acid  **OR** Self explanatory equation	1 1 **OR** 2
17	(i) Noradrenaline OR Equanil OR Chlordiazepoxide OR Meprobamate OR Any other suitable example (ii) Dettol OR Chloroxylenol OR Tincture of iodine OR Terpineol OR Furacine OR Soframicine OR Any other suitable example	1 1
18	When fat is heated with aqueous NaOH solution, soap is formed  **OR** Self explanatory equation	1 1 **OR** 2
III	**PART-C**	
19	Impure copper is made as anode & thin sheet of pure copper is made as cathode. Acidified copper sulphate solution is taken as electrolyte On passing electric current, pure copper deposits on the cathode At anode : $Cu \longrightarrow Cu^{2+} + 2e$ At cathode : $Cu^{2+} + 2e \longrightarrow Cu$	1 1 1
20	(i) 	1

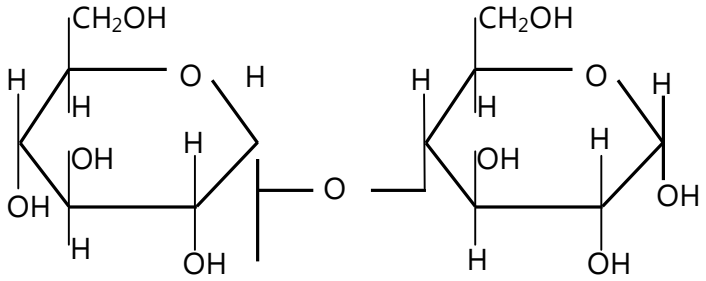
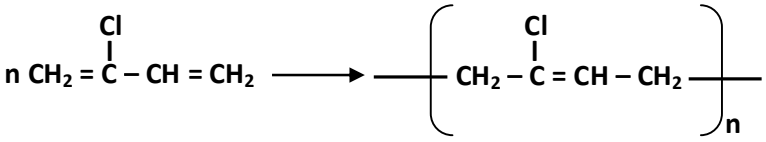
	Basicity = 1 (ii) Nitrous oxide OR N_2O	1 1
21	 (ii) Vanadium pentoxide	2 1
22	(i) Smallest size, Highest electronegativity, Non availability of d-orbital's, High ionization enthalpy, low F-F bond dissociation enthalpy (any two) (ii) ClF_3, ICl, BrF_5 OR any other suitable example	2 1
23	The compounds formed by the trapping of small atoms like H, C, N etc into the crystal lattice of metals Characteristics 1. High m.p. than the pure metal 2. Very hard 3. Chemically inert 4. Retain metallic conductivity (any two)	1 2
24	$2CrO_4^{2-} + 2H^+ \longrightarrow Cr_2O_7^{2-} + H_2O$ $Cr_2O_7^{2-} + 2OH^- \longrightarrow 2CrO_4^{2-} + H_2O$ $2Mn^{2+} + 8H_2O + 10CO_2$	1 1 1
25	E C of $Co^{3+} = 3d^6$ or  d^2sp^3 hybridized orbitals of Co^{3+} $[Co(NH_3)_6]^{3+}$ Geometry : Octahedral Magnetic property : Diamagnetic 	 1 1 1

26	(i) Ligands which can ligate through two different atoms OR Uni dentate ligands have more than one donar atom OR Any other correct stateemnt Linkage isomerism (ii)Potassium tetrahydroxidozincate(II)	1 1 1
IV	**PART-D**	
27	a) Let a is the edge length of the cube, a =2 $\sqrt{2a}$r Each unit cell in hcp has effectively 4 spheres. Total volume of four sphere is equal to 4 X (4/3) ?r3 and volume of the cube is a^3 or $(2\sqrt{2a}r)^3$ Packing efficiency = $\frac{\text{[illegible]}}{\text{[illegible]}}$ Packing efficiency = $\frac{\text{[illegible]}}{(\text{[illegible]}\sqrt{\text{[illegible]}}\ \text{[illegible]})^{\text{[illegible]}}}$ % = 74% b)1 or One	1 1 1 1 1
28	a) ? = $\frac{\text{[illegible]}}{\text{[illegible]}}$ = $\frac{\text{[illegible]}}{\text{[illegible]}}$ = 0.2atm b) 1.Obeys Raoult's law 2. ΔH of mixing is zero 3. ΔV of mixing is zero 4. Does not forms azeotropic mixtures 5. (A-B) interactions are same as that of (A-A) or (B-B) interactions	1 1 1

	6. Measured VP = VP predicted by Raoult's law (Any two)	2
29	a) $E_{cell} = E^{\theta}_{cell} - \frac{0.0591}{n} \log \frac{[Zn^{2+}]}{[Cu^{2+}]}$ $= 1.05 - \frac{0.0591}{2} \log \frac{0.001}{(0.001)^2}$ $= 0.914V$ b) Secondary cell Example : Lead-storage battery or Nicad storage cell or any other example (Any one)	1 1 1 1 1
30	a) $\log \frac{K_2}{K_1} = \frac{E_a}{2.303 R} \left[\frac{T_2 - T_1}{T_1 T_2}\right]$ or $E_a = \frac{2.303 \times R \times T_1 T_2}{T_2 - T_1} \log \frac{K_2}{K_1}$ $E_a = \frac{2.303 \times 8.314 \times 298 \times 308 \times \log \frac{0.540}{0.045}}{10}$ $= 13834 Jmol^{-1}$ or $13.8 KJmol^{-1}$ b) W K T rate constant (k) expression for zero order reaction $k = \frac{[R]_0 - [R]}{t}$ or $t = \frac{[R]_0 - [R]}{k}$ When $t = t_{1/2}$, $[R] = \frac{[R]_0}{2}$ $t_{1/2} = \frac{[R]_0 - \frac{[R]_0}{2}}{k} = \frac{[R]_0 - \frac{[R]_0}{2}}{k} = \frac{[R]_0}{2k}$	1 1 1 1 1 1
31	a) In gas mask or Control of humidity or Removal of colouring matter from solutions or Production of high vaccum or In heterogeneous catalysis or Separation of inert gases or In curing diseases or In froth floatation process or Adsorption indicators or In chromatographic analysis (any two) b) Liquid-Liquid colloidal system OR dispersion of finely divided droplets in another liquid OR	2 1

	Any other suitable definition Example : Milk, vanishing cream or any other suitable example	1
	c) Due to the collision of the dispersed phase particles with molecules of the dispersion medium.	1
V	**PART-D**	
32	a)  1  1	
	b) (i) Methanol or Methyl alcohol (ii) Methyl carbylamine or N-Methyl carbylamine or Methyl isocyanide or Isocyanomethane or Methyl isonitrile	1 1
	c) CH_2Cl_2 or $CHCl_3$ or CCl_4 or Freons or DDT or any other suitable example	1
33	a) When acetic acid is heated with ethyl alcohol in the presence of Con H_2SO_4 as dehydrating agent, ethyl acetate is formed. $CH_3COOH + C_2H_5OH \xrightarrow{\text{Con } H_2SO_4} CH_3COOC_2H_5 + H_2O$ **OR**	1 1 **OR**
	Self explanatory equation	2
	b) H-bonding	1
	c) Increases Since $-NO_2$ is electron withdrawing group OR Due to –I effect	1 1
34	a) When toluene treated with CrO_2Cl_2& CS_2, followed by hydrolysis benzaldehyde is formed.  **OR**	1 1 **OR**

	Self explanatory equation	2
	b) A = Aldol or 3-hydroxybutanal	1
	B = Chrotanaldehyde or But-2-enal	1
	c) Sodalime	1
35	a) When benzene diazonium chloride reacts with Cuprous chloride in HCl, chlorobenzene is formed	1
		1
	OR	**OR**
	Self explanatory equation	2
	Name of the reaction : Sandmeyers reaction	1
	OR	1
	a) When benzene diazonium chloride reacts with Copper in the presence of HCl, chlorobenzene is formed	1
		**OR**
	OR	2
	Self explanatory equation	1
	Name of the reaction : Gatterman reaction	1
	b) When amide reacts with bromine in the presence of aqueous/alcoholic NaOH, primary amine is formed.	1
	$R\text{-}CONH_2 + Br_2 + 4NaOH \longrightarrow R\text{-}NH_2 + Na_2CO_3 + 2NaBr + 2H_2O$	**OR**
	OR	2

	Self explanatory equation **OR** By taking R = CH_3 OR C_6H_5 as example	
36	a)  b) Biochemical messengers or Chemical substances secreted by endocrine (ductless) glands Regulates the blood sugar level c) Pentose sugar + Nitrogen base	2 1 1 1
37	a) Hexamethylenediamine Adipic acid b) Neoprene is formed by the free radical polymerization of chloroprene  c) Polyethylene or PVC or Polystyrene or Polyvinyls or any other suitable example (any one)	1 1 1 1 1