KARNATAKA BOARD 2ND PUC MODEL QUESTION PAPER - 1

CHEMISTRY

Time: 3 hours 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 labelled diagrams wherever required.
 - 3. Use log tables and the simple calculators if necessary.

(Use of Scientific Calculators is not allowed)

PART- A

I. Answer ALL of the following. (Each questions carries 1 mark) $10 \times 1 = 10$

1. State Henry's law.

- 2. What is the conclusion drawn when Vant Hoff's factor of a solution is less than one?
 - 3. How molar conductivity varies with dilution?
- 4. Mention one criterion for intermolecular collisions of two reactants to be effective.
 - 5. Name the metal that is refined by Van Arkel method.
 - 6. Name the first noble gas compound prepared by Neil Bartlett?
 - 7. Give an example for Heteroleptic complex.
 - 8. Write the IUPAC name for CH₃-CH(CH₃)-CH₂Cl.

 $\bigcirc \frac{\text{CO, HCI } 9.}{\text{Anhyd AlCl}_3 / \text{CuCl}} \times$ Give the name of the product X.

10. Name the storage polysaccharide present in animals.

PART- B

II.Answer Any FIVE of the following. (Each questions carries 2 mark) 5 × 2 = 10

11. a) Give one example for paramagnetic substance.

- b) Which type of binding force existing in ice?
 - 12. Write anodic and cathodic half-cell reactions taking place in Daniel cell.
 - 13. Show that for first order reaction $t_{87.5\%}$ = 3 $t_{50\%}$.
 - 14. What is lanthanide contraction? What is the cause for it?
- 15. How do you convert bromoethane into tertiary-butylethyl ether? Give the chemical equation of the reaction.
 - 16. What is Stephen's reaction? Give the chemical equation of the reaction.
 - 17. What is the therapeutic action of a) Paracetamol b) Barbituricacid.
 - 18. What are anionic detergents? Give an example.

PART- C

III. Answer Any FIVE of the following. (Each questions carries3 mark) 5 × 3 = 15

19. Explain the extraction of aluminium from purified alumina by Hall-Heroult process.

3

20. Explain manufacture of nitric acid by Ostwald's process.

....3

21. a) How is ozonised oxygen prepared? 2 b) Write the structure of sulphurous acid. 1 22. a) How does phosphorus react with limited amount of chlorine? Give equation. 2 b) What is the product obtained by the reaction between fluorine in excess of bromine? 1 a) 3d Transition metals and their compounds are good catalysts. Give two reasons? 23. 2 b) Give the formula for the calculation of spin only magnetic moment. 1 24. Explain the manufacture of Potassium dichromate from chromite ore. 3 25. Using VBT explain, 3 i) Geometry of the complex ii) Type of hybridization, in the complex ion $[CoF_6]^{3-}$. iii) Is it an inner or outer orbital complex? 26. a) Draw the structures of cis -trans isomers for [Pt (NH₃)₂.Cl₂]. 2 b) How many ions are produced from the aqueous solution of complex $K_3[Al(C_2O_4)_3]$

PART -D

I	V. Answer Any THREE of the following. (Each questions carries5 mark) 3 × 1	5 = 15	
27.	a) Calculate the packing efficiency in a Face Centered Cubic lattice.	3	
	b) If a metal with atomic mass 209 crystallizes in a simple cubic lattice what is t	he edge length of its unit	
	cell. (Given d = 91.5 kg m ⁻³).	2	
28.	a) 5.8g of a non-volatile solute was dissolved in 100g of carbon disulphide	(Molar mass = 76). The	
	vapour pressure of the solution was found to be 190mmHg. Calculate the mole	ecular mass of the solute.	
	The vapour pressure of pure carbon disulphide 195 mm Hg.	3	
	b) What are azeotropes? Give an example.	2	
29.	a) The resistance of M/10 solution is found to be 2.5 X 10 ³ ohms. Calculate mola	r conductance (Given Cell	
	constant = 1.15 cm^{-1}).	3	
	b) Mention two general methods for prevention of corrosion.	2	
	30. a) Derive an expression for rate constant of a first order re	action.	
	4		
	b) What is the effect of positive catalyst on energy of activation?	1	
	31. a) Mention two factors which affect adsorption of a gas on a solid.		
	2		
	b) Is synthesis of ammonia by Haber's process, a homogeneous or heterogeneous catalysis?		
		1	
	c) State Hardy-Schulze rule. Among $Al_2(SO_4)_3$ and $(NH_4)_3PO_4$ which is better	coagulating agent for a	
	negative sol ?	2	

....4

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V. Answer ANY FOUR of the following. (Each questions carries 5 mark) $4 \times 5 = 20$

	32. a) Complete the following reaction and write its name		
	$2C_6H_5Cl + 2Na$ Dry ether ? + 2NaCl	2	
	b) Explain Zaitsev rule with an example.	2	
	c) A Haloalkane when boiled with aqueous KOH which gives an alcohol ha	aving inversed configuration.	
	Name the mechanism involved in this reaction.	1	
	33. a) Explain the mechanism involved in the conversion o3	f ethanol into ethene.	
	b) An organic compound with molecular formula C_6H_6O gives white pred	cipitate with bromine water.	
	Identify the functional group in the organic compound and write the chemic	al equation for the reaction.	
	34. a) Explain Cannizaro's reaction with an example.		
	2		
b) Name the product obtained by the reaction of acetyl chloride with dimethylcadmium.			
		1	
	c) Explain the reaction between carboxylic acid and PCI ₅ .	2	
35.	a)Explain carbylamine reaction by taking methyl amine as an example.	2	
	b) Why do primary amine have higher boiling point than tertiary amines?	1	
	c) Give an example for a coupling reaction of diazonium salt and give its cher	nical equation.	
		2	
	 36. a) Deficiency of which vitamin leads to night blindness 1 	?	
	b) Which hormone is responsible for the hyperthyroidism?	1	
	c) What is a Zwitter ion of an amino acid? Give its general formula.	2	
	d) What is a nucleotide?	1	
	37. a) What are Elastomers? Give example.		
	b) Write the partial structure of nylon 6, 6 and Bakelite.	2	
	c) What is vulcanization of rubber?	1	
		5	

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II – PUC – CHEMISTRY (34)

SCHEME OF VALUATION FOR MODEL QUESTION PAPER - 1

Note: Any other correct alternate answer can be honoured wherever applicable.

Ι.	PART - A	Marks
1.	Henry's law states that "the partial pressure of the gas in vapour phase is	
	proportional to the mole fraction of the gas in the solution."	1
	OR	
	"The mole fraction of the gas in the solution is proportional to the partial	
	pressure of the gas over the solution.	
2.	The solute in the solution undergoes association.	1
	OR	
	ΔT_b or ΔT_f will be half of the normal value and molar mass will be twice the	
	expected value.	
3.	It increases with dilution	1
4.	Proper orientation of molecules.	1
	or	
	Energy of activation of the molecules.	
5.	Zirconium OR Zr	1
	OR	
	Titanium OR Ti	2.2
6.	Xenonhexafluroplatinate(IV)	1
7.	[Co(NH ₃) ₄ CO ₃] Cl OR any suitable example	1
8.	1-Chloro-2-methylpropane	1
9.	Benzaldehyde	1
10.	Glycogen	1
II.	PART -B	
11.	a) O_2 OR Compounds of Cu^{+2} OR Fe ⁺³ OR Cr ⁺³ OR any suitable example.	1
	b) Hydrogen bonding	1
12.	At anodic: $Zn_{(s)} \longrightarrow Zn^{+2} + 2e^{-1}$	1
	At Cothodia: $Cu^{2+} + 2a^{-}$	1
	At Californic . $u + 2e \longrightarrow Uu_{(s)}$	

13.	Expression of k when 87.5% of react an t is reacted	
	2.303, 100	
	$K = \frac{1000}{12.5}$	1
	2.303	
	$k = \frac{1}{t_{02,577}} x 0.9031(1)$	
	Expression of k when 50% of react an t is reacted	1
	2 303 100	
	$k = \frac{2.505}{t} \log \frac{100}{50}$	
	2 303	
	$k = \frac{2.505}{t} \times 0.3010(2)$	
	$V = E_{\text{superior}} (1) / E_{\text{superior}} (2)$	
	K = Equation (1) / Equation (2)	
	$t_{87.5\%} = t_{50\%}$	
14.	The overall decrease in atomic and ionic radii from Lanthanum to Lutetium is	1
	known as Lanthanide Contraction.	
	It causes radii of 3 rd transition series to be very similar with those of the	1
	corresponding members of second transition series.	
15.	$C_2H_5Br + (CH_3)_3C-O-Na \rightarrow (CH_3)_3C-O-C_2H_5 + NaBr$	1
	Explanation	1
16.	$RCN + SnCl_2 + HCl \rightarrow RCH = NH$ RCH_{H}	1
	Explanation	1
17.	a) Decreases body temperature during fever	1
	b) Tranquilizer	1
18.	The sodium salts of sulphonated long chain alcohols or hydrocarbons are called	1
	anionic detergents.	1
111		1
19.	Diagram	1
	At cathode: $AI^{(Molten)} + 3e^{-} \rightarrow AI_{(I)}$	1
20	At anode: $C_{(s)} + O^- \rightarrow CO_{(g)} + 2e^- or C_{(s)} + 2O^- \rightarrow CO_{2(g)} + 4e^-$	1
20.	Catalytic oxidation of ammonia by atmospheric oxygen.	1
	$4NH_{3(g)} + 5O_{2(g)} - \frac{7}{7} > 4NO_{(g)} + 6H_2O_{(g)}$	1
	Nitiric oxide oxidises into nitrogen dioxide	1
	$2NO_{(g)} + O_{2(g)} \rightarrow 2NO_{2(g)}$	
	Nitrogen dioxide dissolves in water to give nitric acid	1
	$3NO_{2(g)} + H_2O_{(I)} \rightarrow 2HNO_{3(aq)} + NO_{(g)}$	
21.	a) Explanation	1
	30 ₂ > 2O ₃	1
		1
	$ b \rangle \qquad \qquad$	
22	a) Evolution	1
<i></i>	$P_4 + 6 C_2 \rightarrow 4PC_2$	1
	b) BrF ₅	1
	· -	

23.	a) 1) Large surface area,	1
	2) Variable valence	1
	b) $\mu = \sqrt{n(n+2)}$	1
24.	Explanation with	
	4 FeCr_2O_4 + 8 $\operatorname{Na}_2\operatorname{CO}_3$ + 7 O_2 \rightarrow 8 $\operatorname{Na}_2\operatorname{Cr}O_4$ + 2 Fe_2O_3 + 8 CO_2	1
	$2Na_2CrO_4 + 2 H^+ \rightarrow Na_2Cr_2O_7 + 2 Na^+ + H_2O$	1
	$Na_2Cr_2O_7 + 2 \text{ KCl} \rightarrow K_2Cr_2O_7 + 2 \text{ NaCl}$	1
25.	Geometry:- Octahedral	1
	Hybridisation:- sp ³ d ²	1
	Type of complex:- Outer orbital complex	1
26.	a) structure of isomers	1+1
	b) 4 ions	1
IV.		
27.	a) Packing efficiency =%	1
		1
	4	
	$= 4x \frac{7}{3} r^3 x 100\%$ edge length $a = 2\sqrt{2} r$	1
	$\frac{3}{a^3}$	
		1
	$=\frac{-70}{10}=74\%$	S-21
		A 19 1
	b) $a^{3} = \frac{1}{N \cdot d}$	1
	1×200	
	$=\frac{1\times 20^{3}}{6.023 \times 10^{23} \times 0.15 \times 10^{-3}}$	
	0.023 X10 X 91.3 X10	
	$=3.359 \times 10^{-6} \text{ cm}$	
28.	$\frac{\mathbf{P}^0 - \mathbf{P}}{\mathbf{P}} = \frac{\mathbf{W} \cdot \mathbf{M}}{\mathbf{W}}$	1
	$\frac{a}{P^0} - \frac{1}{mW}$	
	195–190 5.8x 76	1
	$-\frac{195}{m \times 100} = \frac{1}{m \times 100}$	
	5 8 x 76 x 195	1
	$m = \frac{3.637703175}{100 \times 5}$	
	100 x 5	1
	$=171.9 \mathrm{g}\mathrm{mol}^{-1}$	1
	b) A solution which distils over without change in composition	1
	Example: 95.6% ethanol + 4.4 % water OR any other suitable example.	

29	a) $k = \frac{1}{\Lambda} x \frac{1}{R}$	
	$=1.15 \text{ x} \frac{1}{2.5 \text{ x} 10^3}$	1
	$=4.60 \times 10^{-4} \text{ ohm}^{-1} \text{ cm}^{-1}$	1
	1000 x k	1
	$M_{\rm m} = \frac{M}{M}$	-
	$-\frac{1000 \text{ x} 4.60 \text{ x} 10^{-4}}{1000 \text{ x} 4.60 \text{ x} 10^{-4}}$	1
	0.1	1
	$=4.60 \text{ ohm}^{-1} \text{cm}^2 \text{ mol}^{-1}$	
	b) i) painting	
	ii) Electrochemical method	
	Or any other suitable method	
30	a) Consider a first order reaction	
	$R \rightarrow P$	
	$B_{ata} = d[\mathbf{R}]_{-k[\mathbf{R}]}$	
	$\kappa dt = -\frac{dt}{dt} - \kappa [\kappa]$	1.20
	$\frac{d[R]}{dR} = -k dt$	1
	[R] - Kut	0.0
		1
	Integrating the above equation we get	-
	$\ln[R] = -kt + I$ (1)	
	When t =0 , $[R] = [R]_0$	1
	Equation (1) becomes	
	$\ln[\mathbf{R}]_0 = \mathbf{I}$	
	Therefore equation (1) becomes	
	$\ln[\mathbf{R}] = -\mathbf{k} \mathbf{t} + \ln[\mathbf{R}]_0$	1
	$k = \frac{1}{\ln \ln (R)_0}$	1
		1
	$k = \frac{2.303}{100} \log \frac{[R]_0}{100}$	
	t [R]	
••	b) Energy of activation decreases	
v.		
31	a) i) Surface area of adsorbent	
	ii) Nature of adsorbent or adsorbate	2
	or any suitable factor	
	b) Heterogeneous Catalysis	
	cause precipitation	1
	Al ₂ (SO ₄) ₃	1
32		1
	or Biphenyl	1
	Fittig reaction	1

	b) In dehydrohalogenation reaction the preferred product is that alkene which	
	has the greater number of alkyl groups attached to the doubly bonded carbon	
	atom	1
	$CH_3 - CH_1 - CH_1 + KOH_{(alc)} \rightarrow CH_3 - CH_2 - CH_3 + KBr + H_2O$	1
	H Br	
	c) S _N 2	
33.	a) Step: 1 : Formation of protanated alcohol	
	Equation	1
	Step 2: Formation of Carbocation	
	Equation	1
	Step 3: Elimination of proton and formation of alkene	1
	Equation	
	b) The organic compound is phenol	1
	ОН ОН	1
	Br Br	
		100
	Br	1
	2,4,6 - tribromopnenoi	
34	a) Statement	1
	$2H-CHO \longrightarrow CH_{3}OH + H - COONa$	1
	OR	
	$2C H CHO + KOH \longrightarrow C H CH OH + C H COOK$	1
	$2c_{6}n_{5}c_{10} + kon \qquad 7c_{6}n_{5}c_{10}c_{10} + c_{6}n_{5}c_{10}c_{10}$	1
	b) Acetone	1
25	$\frac{1}{2} Correct Evaluation$	1
35.	a) correct explanation	1
	$R - NH_2 + CHCI_3 + 3KOH \longrightarrow R - NC + 3KCI + 3H_2O$	1
	b) Due to intermolecular association OR more hydrogen bonding	1
	c) $ArN_2X \xrightarrow{CuCl/HCl} ArCl + N_2$	1
	Explanation	1
36.	a) Vitamin A	1
	b) Thyroxin	1
	c) The amino acid forms dipolar ion called Zwitter ion in the aqueous solution.	1
		1
	$\dot{N}H_2$ + $\dot{N}H_3$	
	Covalent form Zwitter ion	
	d) Basic unit of nucleic acid containing one sugar unit beterocyclic base and	1
	phosphoric acid is called nucleotide	
37	a) The polymers that have elasticity like rubber in which polymer chains are	1
57.	held together by the weakest intermolecular forces are referred to as	-
	elastomers	
	Example: natural rubber neonrene vulcanized rubber	1
	b) Nylon:	-
1	,	1

$\begin{pmatrix} H & H & O & O \\ \begin{pmatrix} I & -I & H & O & -I \\ N - I & -I & -I & -I \\ N - I & -I & -I & -I \\ \end{pmatrix}$	1
Nylon 6,6	1
Bakelite : O-H $O-H\leftarrow CH_{a} \leftarrow CH_{a} \downarrow$	1
Bakelite	
 c) Rubber when heated with sulphur with an appropriate additive to a temperature of 373K to 415K 	

