

THE GURUKUL INSTITUTE

13/5 C, 2^{ND FLOOR} GANPATI COMPLEX

VASUNDHARA, GHAZIABAD.

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Class – XII
Subject – Chemistry

Time:3hrs

MM:70




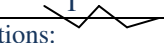
General instructions:All questions are compulsory.Marks for each question are indicated against it.Questions number 1to 8 are very short –answer questions, carrying 1 mark each. Answer these in one word or about one sentence each.

Questions number 9 to18 are short –answer questions, carrying 2 marks each. Answer these in about 30 words each.

Questions number19 to27 are short –answer questions, carrying 3 marks each. Answer these in about 40 words each.

Questions number28 to30 are long-answer questions of 5 marks each. Answer these in about 70 words each.

7 Use log tables, if necessary. Use of calculators is not permitted

Q1	Which point defect in crystals alter the density of the relevant solid?	1
Q2	Define the term 'Dialysis' .	1
Q3	Which is better reducing agent CO or C at high temperature?	1
Q4	Why is Bi(V) a stronger oxidant than Sb(V)?	1
Q5	Give the I.U.P.A.C.name of the following compound. $\text{CH}_3 - \underset{\text{Br}}{\text{C}} = \text{CH} - \text{CH}_2\text{OH}$	1
Q6	Write the structural formula of 4-oxo pentanal.	1
Q7	Arrange the following compounds in increasing order of basic strength in their aqueous solutions. $\text{NH}_3, \text{CH}_3\text{NH}_2, (\text{CH}_3)_2\text{NH}, \text{C}_6\text{H}_5\text{NH}_2, (\text{CH}_3)_3\text{N}$	1
Q8	Write the monomers used for getting the following polymer . i)Teflon ii)Polyvinyl chloride	1
Q9	A reaction is first order in A and second order in B.How is the rate of reaction be affected if the concentration of this reaction is i)Doubled ii)Reduced to half	2
Q10	Explain the role of (i)CO in the refining of Ni . (ii)Cryolite in the metallurgy of aluminium.	2
Q11	i)Draw the structure of XeF_4 molecule. ii)Why F_2 is stronger oxidizing agent than Cl_2 ?	2
Q12	i)Write the method of preparation of Phosphine gas from P_4 . ii)How is O_3 estimated quantitatively?	2
Q13	i)Discuss about the solution shows positive deviation from ideal solution. ii)Define the term van't Hoff factor.	2
Q14	Which one in the following pairs of substances undergoes $\text{S}_\text{N}2$ substitution reaction faster and why? i)  CH_2Cl and  $-\text{Cl}$ ii)  Cl and  I	2
Q15	Complete the following reactions: i) $\text{CH}_3\text{CH}=\text{C}(\text{CH}_3)_2 + \text{HBr} \xrightarrow{\text{peroxide}}$? ii) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} + \text{NaI} \xrightarrow{\text{acetone and heat}}$	2
Q16	Explain the following : a) Denaturation of protein. b) Two strands of DNA are not identical but complimentary to each other. Explain this statement.	2
Q17	Why vitamin A and Vitamin C essential to us ? Give important sources.	2
Q18	What is a biodegradable polymer?Write the monomer of Nylon 6 and Neoprene.	2

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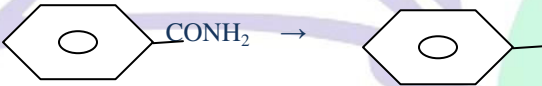
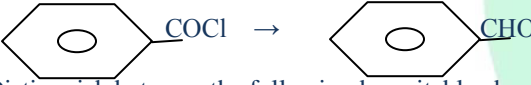
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Q19	If the radius of Copper atom is 127.8 pm and density of copper metal is 8.95 g/cm, ³ is the copper unit cell a face centred cubic, a body centred or simple cubic structure. (Given : At.mass of Cu=63.5, N _A =6.022x10 ²³)	3																				
Q20	Determine the amount of CaCl ₂ dissolved in 2.5 liter of water such that its osmotic pressure is 0.75 atm at 27°C, assuming that it is completely dissociated. (Given: At.mass of Ca=40 u, Cl=35.5 u)	3																				
Q21	For a first order reaction, show that time required for 99% completion of a first order reaction is twice the time required for the completion of 90%. or The reaction between A and B is first order with respect to A and zero order with respect to B. Fill in the blanks in the following table.	3																				
	<table border="1"> <thead> <tr> <th>Exp.</th> <th>[A] / mol L⁻¹</th> <th>[B] / mol L⁻¹</th> <th>Initial Rate Mol L⁻¹ min⁻¹</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>0.1</td> <td>0.1</td> <td>2.0 × 10⁻²</td> </tr> <tr> <td>02</td> <td>-</td> <td>0.2</td> <td>4.0 × 10⁻²</td> </tr> <tr> <td>03</td> <td>0.4</td> <td>0.4</td> <td>-</td> </tr> <tr> <td>04</td> <td>-</td> <td>0.2</td> <td>2.0 × 10⁻²</td> </tr> </tbody> </table>	Exp.	[A] / mol L ⁻¹	[B] / mol L ⁻¹	Initial Rate Mol L ⁻¹ min ⁻¹	01	0.1	0.1	2.0 × 10 ⁻²	02	-	0.2	4.0 × 10 ⁻²	03	0.4	0.4	-	04	-	0.2	2.0 × 10 ⁻²	
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Q22	i) Why heat of chemisorption is always more than that of physisorption? ii) Define activity of catalyst. iii) Define an emulsion with one example.	3																				
Q23	i) Bleaching action of Cl ₂ is permanent but not in case of SO ₂ . ii) R ₃ P=O is known while R ₃ N=O is not known. iii) What happens when H ₃ PO ₃ is heated. Or i) SF ₄ is easily hydrolysed whereas SF ₆ is not easily hydrolysed. ii) How XeF ₄ can be prepared? iii) Complete the following reaction P ₄ + HNO ₃ →	3																				
Q24	For the complex [Fe(H ₂ O) ₆]Cl ₂ , identify i) the oxidation number of iron, ii) the hybridization and shape of complex, iii) the number of solvate isomers, iv) name of complex, v) the magnetic moment of iron. vi) whether it can show optical isomerism.	3																				
Q25	i) Explain the mechanism of acid catalysed dehydration of ethanol forming ethene. ii) Convert methanal to Ethanol by using Grignard's reagent. iii) Write the reaction between phenol and Br ₂ (aq).	3																				
Q26	Give an example for each and describe the following reaction. i) A coupling reaction ii) Kolbe's reaction iii) Aldol condensation	3																				
Q27	i) Write the difference between antiseptic and disinfectants with one example in each. ii) What is non ionic detergent.	3																				
Q28	i) Transition metal compounds generally act as catalyst. (give reason) b) ii) Discuss the lanthanoid contraction. iii) E ⁰ Mn ³⁺ /Mn ²⁺ has higher positive value than E ⁰ Cr ³⁺ /Cr ²⁺ (Atomic number Cr=24, Mn=25)	5																				

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	<p>iv) How KMnO_4 can be prepared from pyrolusite ore? V) Why do the transition elements form coloured compounds? Explain. vi) Write the reaction between KMnO_4 and FeSO_4 in acidic medium.</p> <p style="text-align: center;">Or</p> <p style="text-align: center;">Account for the following : (i) Out of the ions Co^{2+}, Sc^{3+} and Cr^{3+} which one would give coloured aqueous solutions and why ? (ii) Explain why chromium is a typical hard metal while mercury is a liquid. (iii) Why in permanganate ion, there is a covalency between manganese and oxygen ? (iv) Why do the transition elements form interstitial compound? (v) Complete the given reaction : $\text{Cr}_2\text{O}_7^{2-} + \text{H}^+ + \text{Fe}^{+2} \rightarrow \dots\dots\dots$</p>	
Q29	<p>i) Write the anode and cathode reaction of lead storage battery. ii) Define the molar conductivity . iii) Calculate the equilibrium constant for the reaction $2\text{Cr}(s) + 3\text{Cd}^{+2} \rightarrow 2\text{Cr}^{+3}(s) + 3\text{Cd}$ [$E^0\text{Cr}^{3+}/\text{Cr} = -0.74 \text{ V}$ and $E^0\text{Cd}^{2+}/\text{Cd} = +0.40\text{V}$]</p> <p style="text-align: center;">Or</p> <p>(i) State Kohlrausch's law. (b) Write down the reactions involved in the working of a H_2—O_2 fuel cell. (c) A solution of $\text{Ni}(\text{NO}_3)_2$ is electrolysed between platinum electrodes using a current of 5.0 amperes for 20.0 minutes. What mass of Ni is deposited at the cathode. [At. Wt. Ni = 58.7]</p>	5
Q30	<p>Complete the following reaction.</p> <p>i) </p> <p>ii) </p> <p>iii) Distinguish between the following by suitable chemical test a) Phenol and benzoic acid b) Benzaldehyde and aniline</p> <p style="text-align: center;">Or</p> <p>i) An organic compound with the molecular formula $\text{C}_9\text{H}_{10}\text{O}$ forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction . On vigorous oxidation it gives 1,2-benzenedicarboxylic acid. Identify the organic compound. ii) Arrange the following acid in increasing order of acidity: $\text{CH}_3\text{CH}_2\text{CH}(\text{Br})\text{COOH}$, $\text{CH}_3\text{CHBrCH}_2\text{COOH}$, $(\text{CH}_3)_2\text{CHCOOH}$, $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ III) Convert toluene to benzaldehyde.</p>	5