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Code Number 43/1



INDIAN SCHOOL MUSCAT
THIRD PRELIMINARY EXAMINATION
CHEMISTRY

CLASS: XII
08.02.2018

Sub. Code: 043

Time Allotted: 3 Hrs
Max. Marks: 70

General Instructions:

- All questions are compulsory.
- Questions 1 to 5 are very short answer type and carry one mark each.
- Questions 6 to 10 are short answer type and carry two marks each.
- Questions 11 to 22 are also short answer type and carry three marks each.
- Question 23 carries four marks.
- Questions 24 to 26 are long answer type and carry five marks each.
- Use log tables if necessary, Use of calculators is not allowed.

1. What type of magnetism is shown by a substance if magnetic moments of domains are arranged in same direction? 1
2. Draw the structure of 4-tertbutyl-3-iodoheptane. 1
3. Arrange the following in decreasing order of basic strength in gas phase:
 $C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$, NH_3 1
4. Write the structure of the following:
4-fluoro-2-hydroxyacetophenone 1
5. Give the equation of reaction for the preparation of phenol from cumene. 1
6. Explain the following: 2
 - i) Henry's law about dissolution of a gas in a liquid
 - ii) Boiling point elevation constant for a solvent.
7. Explain the following observations: 2
 - i) Transition metals generally form coloured compounds.
 - ii) The highest oxidation state of a metal is exhibited in its oxide or fluoride.

OR

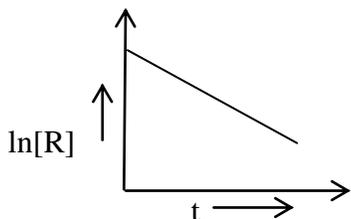
What happens when KI solution is added to

- i) Alkaline solution of KMnO_4 ?
- ii) Acidified solution of KMnO_4 ?

8. Explain the following terms: 2

- i) Electrophoresis
- ii) Dialysis

9. For a certain reaction, variation in the concentration, $\ln[R]$ Vs time(s) plot is given below: 2



- i) What is the order of the reaction?
- ii) What are the units of rate constant k ?
- iii) Give the relationship between k and $t_{1/2}$?
- iv) What does the slope of the above line indicate?

10. What happens in the following activities and why? 2

- i) An electrolyte is added to a hydrated ferric oxide sol in water.
- ii) A beam of light is passed through a colloidal solution.

11. The density of chromium metal is 7.2 g cm^{-3} . If the unit cell has edge length of 289 pm , determine 3

- i) The type of unit cell
- ii) The radius of chromium metal
(At.mass of Cr = 52 u , $N_0 = 6.023 \times 10^{23}$)

12. Describe the preparation of potassium permanganate from pyrolusite ore. Write balanced chemical equation for one reaction to show the oxidizing nature of potassium permanganate. 3

13. Give reasons for the following observations: 3

- i) p-dichlorobenzene has higher melting point than those of o and m -isomers.
- ii) Haloarenes are less reactive than haloalkanes towards nucleophilic substitution reaction.
- iii) The treatment of alkyl chloride with aqueous KOH leads to the formation of alcohol but in the presence of alcoholic KOH, alkene is the major product.

14. Assuming complete ionization, calculate the expected freezing point of solution prepared by dissolving 7.00 g of Glauber's salt, $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ in 100 g of water. 3
(K_f for water = $1.86 \text{ K kg mol}^{-1}$)(RAM of Na = 23 , S = 32 , O = 16 , H = 1 u)

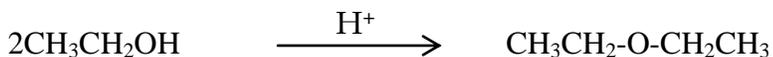
15. How are the following conversions carried out? 3

- i) Ethanoic acid to methanamine
- ii) Nitromethane to dimethyl amine

iii) Chlorobenzene to p-chloroaniline

16. i) Name the method used for refining of zirconium. 3
ii) What is the role of CO in the extraction of iron?
iii) What is meant by the term pyrometallurgy?

17. Write the mechanism of the following reaction : 3



18. A first order reaction takes 40 minutes for 30% decomposition. Calculate $t_{1/2}$ for this reaction. 3

OR

Consider the reaction : $2\text{A} + \text{B} \rightarrow \text{C} + \text{D}$

Following results were obtained in experiments designed to study the rate of reaction:

Exp No:	Initial conc		Initial rate formation
	[A]	[B]	[D] (M/min)
1	0.10	0.10	1.5×10^{-3}
2	0.20	0.20	3.0×10^{-3}
3	0.20	0.40	6.0×10^{-3}

- i) Write the rate law for the reaction.
ii) Calculate the value for the rate constant for the reaction.
19. i) What type of linkage holds together the monomers of DNA? 3
ii) What are the expected products of hydrolysis of lactose?
iii) What happens when D-glucose is treated with
a) HI
b) HNO_3
20. i) Write the formula for the following coordination compound: 3
Amminebromidochloridonitrito-N-platinate(II)
ii) Why is geometrical isomerism not possible in tetrahedral complexes having two different types of unidentate ligands coordinated with the central metal ion?
iii) On the basis of crystal field theory, write the electronic configuration of d^4 ion if $\Delta_t > p$.
21. Account for the following : 3
i) XeF_2 is linear molecule without a bend.
ii) The electron gain enthalpy with negative sign for fluorine is less than that of chlorine, still fluorine is a stronger oxidizing agent than chlorine.
iii) Nitrogen shows catenation properties less than phosphorous.
22. i) Classify the following as addition and condensation polymers: 3
Terylene, Bakelite, Polyvinyl chloride, Polythene.
ii) Explain the difference between Buna – N and Buna – S.

23. Natural sweeteners, eg; sucrose add to calorie intake and therefore, cannot be used by diabetic patients. Such people use saccharin, alitame, aspartame as artificial sweeteners. These are boon for people who want to control their calorie intake. 4
- Why is the use of aspartame limited to cold food and soft drinks?
 - What is the drawback of alitame?
 - Which is a better artificial sweetener than alitame and why?
 - What are the values possessed by people taking less sugar?
24. i) Draw the structure of the following compounds: 5
- XeF₄
 - H₃PO₄
- ii) Assign reasons for the following :
- SF₆ is kinetically inert.
 - NF₃ is an exothermic compound whereas NCl₃ is not.
 - HCl is a stronger acid than HF though fluorine is more electronegative than chlorine.
- OR
- How is ammonia prepared on a large scale? Name the process and mention the optimum conditions for the production of ammonia by this process.
 - Complete the following chemical equations :
 - NH₄Cl (aq.) + NaNO₂ (aq.) →
 - P₄ + 3NaOH + 3H₂O →
 - Why is K_{a2} << K_{a1} for H₂SO₄ in water?
25. i) State the following laws : 5
- Faraday first law of electrolysis
 - Kohlrausch's law of independent migration of ions.
- ii) The resistance of 0.01 M NaCl solution at 25° C is 200Ω. The cell constant of the conductivity cell used is unity. Calculate the molar conductivity of the solution.
- OR
- Define the following terms :
 - Molar conductivity (λ_m)
 - Secondary batteries
 - Calculate the potential of the following cell reaction at 298K:
 $\text{Sn}^{4+}(1.50\text{M}) + \text{Zn}(\text{s}) \rightarrow \text{Sn}^{2+}(0.50\text{M}) + \text{Zn}^{2+}(2.0\text{M})$
 The standard potential E⁰ of the cell is 0.89 V. Whether the potential of the cell will increase or decrease, if the concentration of Sn⁴⁺ is increased in the cell? Calculate EMF of the cell.
26. i) A compound 'A' with molecular formula C₅H₁₂O on oxidation forms compound 'B' with molecular formula C₅H₁₀O. The compound 'B' gives iodoform test but does not reduce ammoniacal silver nitrate solution. The compound 'B' on reduction with Zn-Hg/ HCl gives compound 'C' with molecular formula C₅H₁₂. Identify A, B, C and give the chemical 5

reactions involved

ii) Account for the following:

- a) $\text{Cl-CH}_2\text{COOH}$ is a stronger acid than acetic acid.
- b) Carboxylic acids do not give the reactions of carbonyl group.

OR

i) Arrange the following compounds in increasing order of their reactivity towards HCN:
Acetaldehyde, Di-tert-butyl ketone, Acetone .

ii) Give simple chemical tests to distinguish between the following pairs of compounds:

- a) Benzoic acid and phenol
- b) Benzaldehyde and acetaldehyde

iii) Write the chemical equations to illustrate the following name reactions:

- a) Rosenmund reduction
- b) Cannizzaro's reaction

End of the Question Paper