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Code Number 43/3



INDIAN SCHOOL MUSCAT
THIRD PRELIMINARY EXAMINATION
CHEMISTRY

CLASS: XII

Sub. Code: 043

Time Allotted: 3 Hrs

08.02.2018

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. Write the IUPAC name of the following organic compound: 1
$$\begin{array}{c} \text{C}(\text{CH}_3)_3 \\ | \\ \text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CHCH}(\text{Cl})\text{CH}_2\text{CH}_3 \end{array}$$
3. Arrange the following in decreasing order of basic strength in gas phase: 1
 $\text{C}_2\text{H}_5\text{NH}_2, (\text{C}_2\text{H}_5)_2\text{NH}, (\text{C}_2\text{H}_5)_3\text{N}, \text{NH}_3$
4. Write the structure of the following: 1
4-fluoro-2-hydroxyacetophenone
5. Name the reagent used in the conversion of : 1
 - i) Butan-2-one to butan-2-ol
 - ii) Bromination of phenol to 2,4,6-tribromophenol
6.
 - i) On mixing acetone with chloroform, a reduction occurs in total volume. What type of deviations from ideal behavior for solutions is shown in this case and why? 2
 - ii) How can the direction of osmosis be reversed? Write one use of reverse osmosis.
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

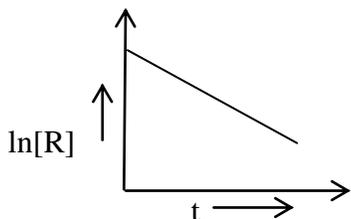
What happens when KI solution is added to

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

8. Explain the following terms: 2

- i) Electrophoresis
- ii) Dialysis

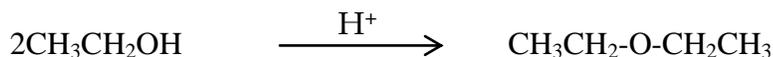
9. For a certain reaction, variation in the concentration, $\ln[R]$ Vs time(s) plot is given below: 2



- 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. 2
- i) Why is it necessary to remove CO when ammonia is obtained by Haber's process?
 - ii) Explain what is observed when 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. 3
- i) Write the steps involved in the preparation of $\text{K}_2\text{Cr}_2\text{O}_7$ from Na_2CrO_4 .
 - ii) What is the effect of increasing pH on a solution of dichromate?
13. Explain why 3
- i) Benzylic and allylic halides follow $\text{S}_{\text{N}}1$ mechanism?
 - ii) Iodination of alkanes require the presence of an oxidizing agent like HNO_3 or HIO_3 .
 - iii) Grignard reagent should be prepared under anhydrous conditions.
14. Assuming complete ionization, calculate the expected freezing point of solution prepared by dissolving 7.00g 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. Assign reasons for the following : 3
 i) H_2S is more acidic than H_2O .
 ii) NH_3 is more basic than PH_3 .
 iii) Sulphur has a greater tendency for catenation than oxygen.
22. Write the names of the monomers of the following polymers : 3
 i) Nylon-6,6
 ii) Bakelite
 iii) Terelene

23. Natural sweeteners, eg; sucrose add to calorie intake and therefore, cannot be used by diabetic patients. 4
Such people use saccharin, alitame, aspartame as artificial sweeteners. These are boon for people who want to control their calorie intake.
- 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
a) XeF_4
b) H_3PO_4
ii) Assign reasons for the following :
a) SF_6 is kinetically inert.
b) NF_3 is an exothermic compound whereas NCl_3 is not.
c) 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 :
 - $\text{S} + \text{H}_2\text{SO}_4 \rightarrow$
 - $\text{F}_2 (\text{Excess}) + \text{Cl}_2 \rightarrow$
 - $\text{Zn} + \text{HNO}_3 (\text{dilute}) \rightarrow$

25. i) State the following laws : 5
a) Faraday first law of electrolysis
b) 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 E^0 of the cell is 0.89 V. Whether the potential of the cell will increase or decrease, if the concentration of Sn^{4+} is increased in the cell? Calculate EMF of the cell.
26. i) A compound 'A' with molecular formula $\text{C}_5\text{H}_{12}\text{O}$ on oxidation forms compound 'B' with molecular formula $\text{C}_5\text{H}_{10}\text{O}$. 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 C_5H_{12} . Identify A, B, C and give the chemical reactions involved. 5
- 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