2019 VI 10 **1430** **Seat No.** | | | | | |

Time : 2½ Hours **CHEMISTRY**

Subject Code

H	7	0	3

Total No. of Questions : 27 (Printed Pages : 9) **Maximum Marks : 55**

INSTRUCTIONS : (*i*) *All* questions are compulsory, however question numbers **16**, **22**, **26** and **27** have internal choice.

(*ii*) Section-A consists of **9** questions of **1** mark each.
Section-B consists of **10** questions of **2** marks each.
Section-C consists of **6** questions of **3** marks each.
Section-D consists of **2** questions of **4** marks each.

(*iii*) Every question should be attempted only once.

(*iv*) Use of calculator is not permitted, however logarithmic tables will be provided on request.

Section-A

1. The ores that are concentrated by froth floatation method are 1
   - Carbonates
   - Oxides
   - Sulphides
   - Phosphates

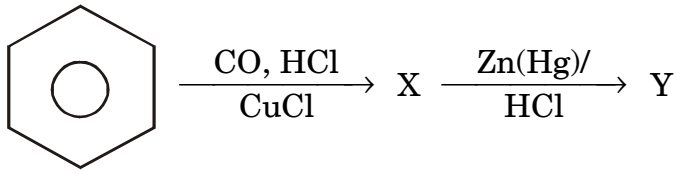
2. The number of tetrahedral voids present per atom in a cubic close packed structure is 1
   - 1
   - 2
   - 3
   - 4

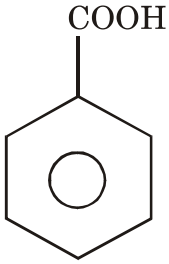
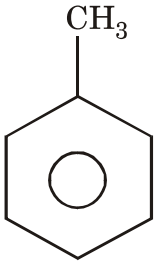
3. If $KMnO_4$ is reduced by oxalic acid in acidic medium, then the oxidation number of Mn changes from 1
   - +4 to +2
   - +6 to +4
   - +7 to +2
   - +7 to +4

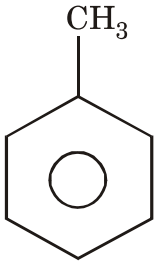
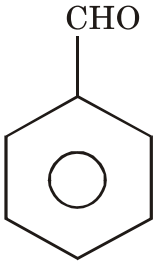
4. Xerophthalmia is caused due to deficiency of vitamin 1

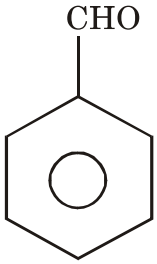
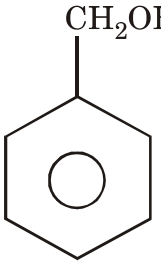
- A
- B
- C
- D

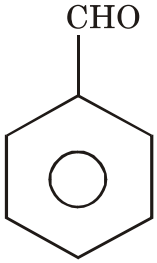
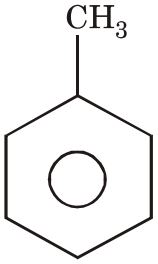
5. The structures of X and Y formed in the following reaction are 1



- X =  ; Y = 

- X =  ; Y = 

- X =  ; Y = 

- X =  ; Y = 

6. Draw a neat labelled diagram to show the purification of a colloidal solution by dialysis. 1

7. How much electricity in coulombs is needed to discharge 0.5 mole of Cr^{3+} ions ? (F = 96500 C) 1

8. Mixing acetone and chloroform occurs with reduction in volume. Name the type of deviation from Raoult's law shown by the above mixture and state whether the process is endothermic or exothermic. 1

9. Arrange the following compounds in decreasing order of basic strength in aqueous solution : 1

$$C_2H_5NH_2,\ (C_2H_5)_2NH,\ (C_2H_5)_3N,\ NH_3.$$

Section-B

10. Answer the following questions : 2

(*i*) Write one point of difference between calcination and roasting.

(*ii*) Draw a neat labelled diagram of an electrolytic cell used for the extraction of aluminium.

11. For the reaction : 2

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow{H^+} C_6H_{12}O_6 + C_6H_{12}O_6$$

Write :

(*i*) Differential rate equation

(*ii*) Rate law equation

(*iii*) Molecularity

(*iv*) Order of the reaction.

12. Draw a neat labelled diagram to show Frenkel defect and write any *one* condition for an ionic solid to show this defect. 2

13. A first order reaction is 20% completed in 10 minutes. Calculate the time required for 75% completion of the reaction. 2

14. Answer the following questions : 2

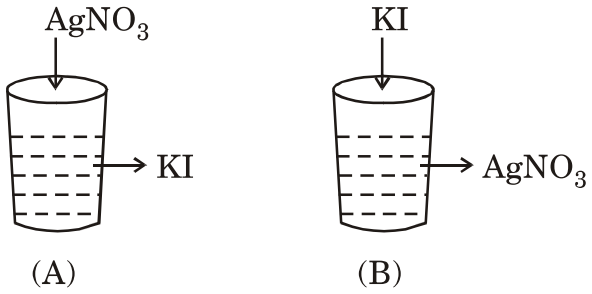
(*i*) Write *one* point of difference between essential and non-essential amino acids.

(*ii*) Write a chemical equation to show the action of HI on glucose.

15. Match the classes of drugs given in Column I with their action given in Column II : 2

Column I	**Column II**
• Analgesics	• Applied to inanimate objects
• Disinfectants	• Pain killing effect
• Antibiotics	• Treatment of acidity
• Tranquilizers	• Applied to diseased skin surface
	• Treatment of stress
	• Inhibit the growth of microorganisms.

16. (*i*) A colloidal solution of AgI is prepared by two different methods as shown below : 2



What is the charge on AgI colloidal particles in the two test tubes (A) and (B) ?

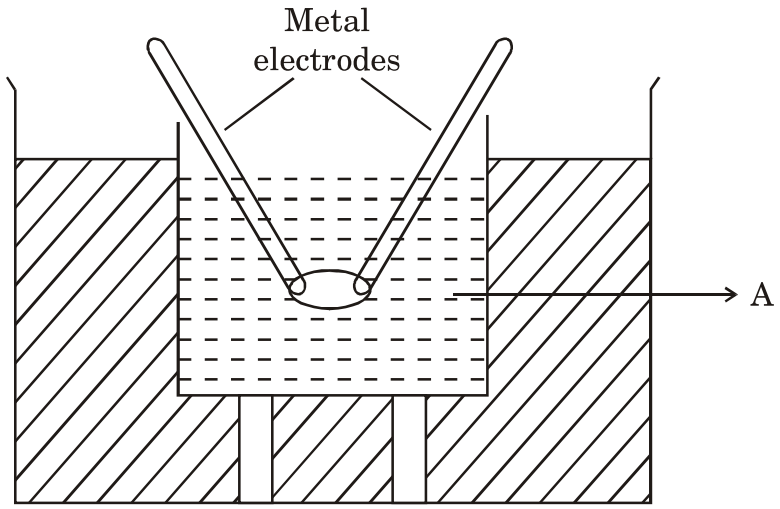
(*ii*) Name the following phenomenon/process :

(*a*) Zig-zag movement of colloidal particles.

(*b*) Removal of adsorbate from the surface of adsorbent.

Or

(*i*) The diagram given below represents a method for the preparation of colloids. With reference to the diagram answer the questions that follow :



What is the nature of the sol obtained by this method — lyophilic or lyophobic ? Identify A in the diagram.

(*ii*) Name the following phenomenon/process :

(*a*) Migration of colloidal particles in an electric field.

(*b*) Converting a precipitate into colloid.

17. Answer the following : 2

(*i*) Fluorine forms only one oxo acid HOF. Write the reason.

(*ii*) Draw the structure of $XeOF_4$.

18. A compound X having the molecular formula C_3H_7NO reacts with bromine in presence of NaOH to give a compound Y. The compound Y reacts with $NaNO_2$ + HCl to form ethanol and nitrogen gas. Identify the compounds X and Y and write the chemical equations involved. 2

19. Answer the following : 2

(*i*) Arrange the following polymers in the increasing order of their intermolecular forces :

Nylon 6, Neoprene, Polyvinyl Chloride.

(*ii*) Write the chemical equation for the preparation of Nylon 6, 6.

Section-C

20. Draw a neat labelled diagram to show the elevation in boiling point of a solvent when a non-volatile solute is added to it.

The vapour pressure of a 5% aqueous solution, by mass, of a non-volatile organic substance at 373 K is 745 mm of Hg. Calculate the molar mass of the solute.

(Given vapour pressure of water at 373 K is 760 mm Hg.) 3

21. State the oxidation state and coordination number of Cr in $\left[Cr(NH_3)_5 Br\right]^{2+}$ ion. Using valence bond theory, deduce the structure of $\left[Ni(CN)_4\right]^{2-}$ ion. 3

22. Draw a neat labelled diagram of a Dry cell and write the cell reactions taking place at both the electrodes.

Write any *two* advantages of fuel cells. 3

Or

Draw a neat labelled diagram of lead storage cell and write the reactions taking place at both the electrodes during discharging of the cell.

Write the products of electrolysis of aqueous NaCl at the electrodes.

23. Answer the following questions : 3

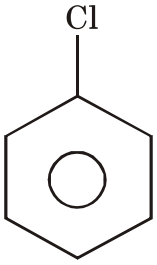
(*i*) Name any *two* elements of the *d* block which are not considered as transition elements.

(*ii*) Transition elements forms alloys. Write the reason.

(*iii*) $Lu + H_2O \longrightarrow X + H_2$; identify X.

24. Complete the following reactions and write the names of the main product formed : 3

(*i*) $CH_3CH_2CH_2Cl \xrightarrow{AgCN} ?$

(*ii*)  $+ CH_3COCl \xrightarrow[AlCl_3]{\text{anhydrous}} ?$

(*iii*) $CH_3—\underset{\displaystyle Cl}{\underset{|}{CH}}—CH_2CH_3 \xrightarrow[KOH]{\text{alcoholic}} ?$

25. Write chemical equations for the following conversions : 3

(*i*) Phenol to Benzene

(*ii*) Acetaldehyde to Butan-2-ol

(*iii*) Anisole to 4-Nitroanisole.

Section-D

26. With respect to group 15 elements, answer the following : 4

(*i*) Comment on the trend in ionisation enthalpy giving reason.

(*ii*) Write any *two* reasons for the anomalous behaviour of nitrogen.

(*iii*) Draw the structure of H_3PO_4.

(*iv*) Write a chemical equation for the preparation of PH_3.

Or

With respect to group 16 elements, answer the following :

(*i*) Comment on the trend in electronegativity giving reasons.

(*ii*) Write any *two* reasons for the anomalous behaviour of oxygen.

(*iii*) Draw the structure of H_2SO_4.

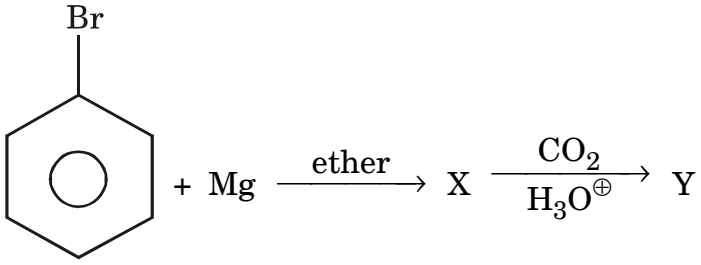
(*iv*) Write a chemical equation to show the action of chlorine gas on SO_2 in the presence of charcoal.

27. Answer the following questions : 4

(*i*) Arrange the following compounds in the decreasing order of their acidic strength :

FCH_2COOH, CH_3COOH, $ClCH_2COOH$.

(*ii*) Write structures of X and Y in the following reaction :



(*iii*) Write a chemical equation for the preparation of Methane from sodium acetate.

(*iv*) Name the product formed when :

(*a*) Toluene is oxidised using $KMnO_4$, KOH followed by hydrolysis.

(*b*) Acetyl chloride reacts with H_2 in presence of Pd and $BaSO_4$.

Or

Answer the following questions :

(*i*) Arrange the following compounds in order of their increasing reactivity towards HCN :

$$CH_3CHO,\ HCHO,\ CH_3COCH_3.$$

(*ii*) Write structures of A and B in the following reaction :

$$CH \equiv CH \xrightarrow[HgSO_4]{H_2O,\ H^+} A \xrightarrow{(O)} B$$

(*iii*) Write a chemical equation for the preparation of Benzamide from Benzoic acid.

(*iv*) Write structures of the following :

(*a*) Phenyl hydrazine derivative of benzaldehyde

(*b*) Cyclohexanone oxime.