

## Mock Test

### SECTION - A

Read the given passage and answer the questions 1 to 5 that follow:

In general it is thought that colligative properties are used to find molar mass of unknown solutes, but there are many more uses of colligative property. For example, purification of water, preparation of coolant, clearing snow laden roads, etc.

Answer the following questions as per ideas given in the passage.

1. Define colligative property.
2. Which colligative property is used for purification of water?
3. What is the function of semipermeable membrane?
4. How does coolant work in a vehicle?
5. The snow laden road can be cleared off with help of NaCl or CaCl<sub>2</sub>. Which one is better choice according to you and why?

Questions 6 to 10 are one word answers:

6. Name an oxoanion having oxidation number of metal equal to its group number.
7. Draw structure of 4-methoxy-N, N-dimethyl aniline.
8. How many coordination sites are there in an ethylenediaminetetraacetate ion?
9. Name the best reagent used for the separation of 1<sup>o</sup>, 2<sup>o</sup> and 3<sup>o</sup> amines.
10. Give the name of the polymer which is used for making non-breakable plastic crockery.

Question 11 to 15 are multiple choice questions

11. Hydrolysis of XeF<sub>4</sub> gives
12. Identify X and Y in the following sequence  
$$\text{C}_2\text{H}_5\text{Br} \xrightarrow{\text{X}} \text{Product} \xrightarrow{\text{Y}} \text{C}_3\text{H}_7\text{NH}_2$$
  - (a) X = KCN, Y = LiAlH<sub>4</sub>
  - (b) X = AgCN, Y = LiAlH<sub>4</sub>
  - (c) X = CH<sub>3</sub>NH<sub>2</sub>, Y = HNO<sub>2</sub>
  - (d) X = CH<sub>2</sub>Cl<sub>2</sub>, Y = H<sub>2</sub>/Ni
13. Buna – N is polymer of
  - (a) Butadiene & acrylonitrile
  - (b) Butadiene & Styrene
  - (c) Isoprene
  - (d) Chloroprene
14. Alkyl halides are prepared from alcohol by treating with
  - (a) HCl + ZnCl<sub>2</sub>
  - (b) H<sub>2</sub>SO<sub>4</sub> + KI
  - (c) Red P + F<sub>2</sub>
  - (d) all the above
15. The correct statements pertaining to the adsorption of a gas on a solid surface is (are)
  - (a) Adsorption is always endothermic
  - (b) Physisorption may transform into chemisorption at high pressure
  - (c) Physisorption decreases with increasing temperature but chemisorption initially increases with increasing temperature
  - (d) Chemisorption is more exothermic than physisorption, however it is very slow due to higher energy of activation.

Questions 16 to 20 are assertion & Reason Type Questions.

Use the following key to select the correct answer.

- (a) If both assertion and reason are correct and reason is correct explanation for assertion
- (b) If both assertion and reason are correct but reason is not correct explanation for assertion.
- (c) If assertion is correct but reason is incorrect.
- (d) If assertion and reason both are incorrect.

16. Assertion: Aromatic aldehydes and formaldehyde undergo Cannizzaro reaction.  
Reason: Aromatic aldehydes are almost as reactive as formaldehyde.
17. Assertion: The enthalpy of reaction remains constant in the presence of a catalyst.  
Reason: A catalyst participating in the reaction, forms different activated complex and lowers down the activation energy but the difference in energy of reactant and product remains the same.
18. Assertion: Ethanol is a weaker acid than phenol.  
Reason: Sodium ethoxide may be prepared by the reaction of ethanol with aqueous NaOH.
19. Assertion: Catalyst increase the reaction rate  
Reason: Catalyst provide large surface area for reactions to occur.
20. Assertion: Reaction of SO<sub>2</sub> and H<sub>2</sub>S in presence of Fe<sub>2</sub>O<sub>3</sub> catalyst gives elemental sulphur  
Reason: SO<sub>2</sub> is good reducing agent

**SECTION: B**

21. [Fe(CN)<sub>6</sub>]<sup>4+</sup> and [Fe(H<sub>2</sub>O)<sub>6</sub>]<sup>2+</sup> are of different colours in dilute solutions. Why?

OR

What is the coordination entity formed when excess of aqueous KCN is added to an aqueous solution of copper sulphate? Why is it that no precipitate of copper sulphide is obtained, when H<sub>2</sub>S(s) is passed through this solution?

22. (a) Draw the shape of BrF<sub>4</sub><sup>-</sup>.  
(b) Arrange according to increasing order of boiling point: HF, HCl, HI, HBr.

OR

Give reason for the following:

- (i) Fluorine and iodine both are non-metals, but iodine shows some metallic properties.  
(ii) HF is not stored in glass bottles but kept in wax bottles.
23. Define osmosis & osmotic pressure.
24. Show that in a first order reaction, time required for completion of 99.9% of reaction is 10 times of the half times of the half life (t<sub>1/2</sub>) of the reaction.
25. Write chemical reaction to affect the following change:  
(a) Benzene to m-bromophenol                      (b) Benzoic acid to aniline
26. What are detergents? Give an example.
27. A person having nasal congestion take cimetidine as medicine. Did he take the appropriate medicine?

**SECTION: C**

28. (a) What is the significance of leaching in the extraction of Al?  
(b) Describe a method for refining of nickel.  
(c) Out of Pig iron and Cast iron which form of iron contains more carbon.
29. (a) Find coordination number of metal ion in [Co(ox)<sub>2</sub>Cl<sub>2</sub>]<sup>+</sup>?  
(b) Which will react with ethylene diamine-cis [Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>] or trans [Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>]?  
(c) What is the role of coordination compounds in analytical chemistry. Give one example.

OR

Draw geometrical and optical isomers of the following:

- (i) [CoCl<sub>2</sub>(en)<sub>2</sub>]<sup>+</sup>                      (ii) [Co(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>]                      (iii) [Co(NH<sub>3</sub>)Cl(en)<sub>2</sub>]<sup>2+</sup>
30. Calculate the mass of a non volatile solute AB<sub>2</sub>(molar mass 60 g/ mol) which should be dissolved in 5 litre of water to boil it at 108°C, if K<sub>b</sub> for water is 0.52 K Kg mol<sup>-1</sup>. (The solute is 80% dissociated in H<sub>2</sub>O).

OR

Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 1,85,000 g per mole in 450 mL of water at 37°C.

31. Illustrate the following reaction with a suitable chemical reaction:  
(a) Carbylamine reaction                      (b) Crossed aldol condensation                      (c) Sandmeyer reactions
32. (a) Name three type of RNA.  
(b) Define peptide linkage.  
(c) Name the deficiency disease caused by vitamin 'D'.

33. Why vitamin A and vitamin C are essential for us? Give their important sources.
34. (a) If slope of this line is  $-1.25 \times 10^4$  K, what will be the value of  $E_a$ ?  
 (b) If intercept of the line on Y-axis is 14.34 find Arrhenius constant 'A'.

**SECTION - D**

35. (i) State the relationship amongst cell constant of a cell, resistance of the solution in the cell and conductivity of the solution. How is molar conductivity of a solution related to conductivity of its solution?  
 (ii) A voltaic cell is set up at 25°C with the following half cell  $\text{Al}/\text{Al}^{3+}$  (0.001 M) and  $\text{Ni}/\text{Ni}^{2+}$  (0.50 M). Calculate the cell voltage [ $E_{\text{Ni}^{2+}/\text{Ni}}^0 = -0.25$  V,  $E_{\text{Al}^{3+}/\text{Al}}^0 = -1.66$  V].

OR

- (i) Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10.  
 (ii) State Faraday's laws of electrolysis. How much charge in terms of Faraday, F is required for reduction of 1 mol  $\text{CrO}_7^{2-}$  to  $\text{Cr}^{3+}$ .
36. (i) Complete the following chemical reactions:



- (ii) Describe the preparation of potassium dichromate from chromite ore with chemical equations involved. What is the effect of increasing pH on a solution of potassium dichromate?

OR

Explain the following:

- (i) Copper (I) ion is not stable in an aqueous solution.  
 (ii) Transition metals in general acts as good catalysts.  
 (iii) Lanthanoid contraction is less than actinoid contraction.  
 (iv) Melting point of Fe is more than Mn.  
 (v) Name the lanthanoid having +4 oxidation state and which acts as oxidising agent.

37. Two moles of an organic compound 'A' ( $\text{C}_7\text{H}_6\text{O}$ ) on treatment with a strong base gives two compound 'B' and 'C'. 'B' on oxidation with alkaline  $\text{KMnO}_4$  gives 'C'. B on reaction with 'C' in the presence of conc.  $\text{H}_2\text{SO}_4$  gives fruity smelling compound 'D'. Write all the reactions and draw structures of A, B, C & D. 5

OR

Complete the following reactions:

