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Mock Test Paper for Std X, XII CBSE Board, IIT - JEE Main &amp; Advanced.

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## MOCK TEST PAPER # 2

### CLASS-XII (CHEMISTRY)

**Time Allowed : 3 hours****Maximum Marks: 70****GENERAL INSTRUCTIONS**

- All questions are compulsory
- Q. No. 1 to 5 are very short answer questions and carry 1 mark each.
- Q. No. 6 to 12 are short answer questions and carry 2 marks each.
- Q No. 13 to 24 are also short answer questions and carry 3 marks each.
- Q. No. 25 to 27 are long answer questions and carry 5 marks each.
- Use log tables if necessary, use of calculators is not allowed.

- What is enthalpy of chemisorption higher than that of physisorption ?
- Explain briefly how +2 state becomes more and more stable in the first half of the first row transition elements with increasing atomic number ?
- How does the conductivity of a semiconductor change if its temperature is raised ?
- What is de-icing agent ? How does it work ?
- Why electrolysis of aqueous solution of NaBr and NaI gives Br<sub>2</sub> and I<sub>2</sub> respectively while that of NaF gives O<sub>2</sub> instead of F<sub>2</sub> ?
- For the reaction A → B, the rate of reaction becomes twenty seven times when the concentration of A is increased three times. What is the order of the reaction ?

**OR**

Define the term activation energy why different reaction proceed at different speeds ?

- Why is the reduction of a metal oxide easier if the metal formed is in liquid state at the temperature of reduction ?
- The value of  $\Delta_f G^\circ$  for the formation of Cr<sub>2</sub>O<sub>3</sub> is -540 kJ mol<sup>-1</sup> and that of Al<sub>2</sub>O<sub>3</sub> is -827 kJ mol<sup>-1</sup>. Is the reduction of Cr<sub>2</sub>O<sub>3</sub> possible with Al ?
- a. K<sub>2</sub>[PtCl<sub>6</sub>] is a well known compound whereas the corresponding Ni compound is not known. State reason for it.  
b. Mercury is normally not considered a transition metal. State reason.
- Deduce the (a) shape and (b) magnetic behaviour of [Co(NH<sub>3</sub>)<sub>5</sub>NO<sub>2</sub>]<sup>2+</sup>.
- What are essential and non-essential amino acids ? Give two examples of each type.
- What are nucleic acids ? Mention their two important functions.
- Explain why:
  - Alkyl halides although polar and immiscible in water.
  - Iodoform is formed by reaction of acetone with hypoiodite ion and not iodide ion.

14. How would you account for the following:

- Phenols are much more acidic than alcohols.
- The boiling points of ethers are much lower than those of the alcohols of comparable molecular masses.

15. How will you bring about the following conversion:

- Benzene – Ethyl benzene
- Ethanal – Butyl-2-en-oic acid

16. On electrolysis in acidic solution amino acids migrate towards cathode, while in alkaline solution these migrate towards anode. Comment.

17. Tabulate the differences between chain growth polymerisation and step-growth polymerisation.

18. Account for the following:

- SO<sub>2</sub> is a gas while SeO<sub>2</sub> is a solid.
- Ammonia acts as Lewis base.

**OR**Write the conditions to maximize the yield of H<sub>2</sub>SO<sub>4</sub> by contact process.

19. Justify the placement of O, S, Se, Te and Po in the same group of the periodic table in terms of electronic configuration, oxidation state and hydride formation.

20. Explain the following observation:

- Finely divided substance is more effective as an adsorbent.
- Rate of physical adsorption decreases with rise of temperature.
- Physical adsorption is multilayered while chemical adsorption is monolayered.

21. Give plausible explanation for each of the following:

- Cyclohexanone form cyanohydrin in good yield but 2, 2, 6-trimethylcyclohexanone does not.

ii. These are two -NH<sub>2</sub> groups in semicarbazide. However, only one is involved in the formation of semicarbazones.

iii. During the preparation of esters from a carboxylic acid and an alcohol in the presence of a acid catalyst, the water or the ester should be removed as soon as it is formed.

- Di-tert-butyl ether cannot be prepared by Williamson's synthesis. Explain.
- Alcohols do not react with NaBr but when H<sub>2</sub>SO<sub>4</sub> is added they form alkyl bromides. Explain.
- Sodium metal can be used for drying diethylether and benzene but not for ethanol. Explain.
- Zinc granules are added in excess to a 500 mL of 1.0 M nickel nitrate solution at 25°C until the equilibrium is reached. If the standard reduction potentials of Zn<sup>2+</sup> | Zn and Ni<sup>2+</sup> | Ni are -0.75 V and -0.24 V respectively find out the concentration of Ni<sup>2+</sup> in solution at equilibrium.
- At 380°C, the half-life period for the first order decomposition of H<sub>2</sub>O<sub>2</sub> is 360 min. The energy of activation of the reaction is 200 kJ mol<sup>-1</sup>. Calculate the time required for 75% decomposition at 450°C.
- i. a. Does the hydrolysis of XeF<sub>6</sub> lead to a redox reaction ?  
b. Draw the structure of XeOF<sub>4</sub>.  
c. Complete and balance the following equation: XeF<sub>4</sub> + H<sub>2</sub>O →

ii. Account for the following:

- H<sub>2</sub>S has lower boiling point than H<sub>2</sub>O.
- Reducing character decreases from SO<sub>2</sub> to TeO<sub>2</sub>.

**OR**

i. How would you account for the following ?

- Fluorine atom is more electronegative than iodine atom, yet HF is weaker acid than HI.
- Cl has more electron gain enthalpy than F.
- Give the structure of PCl<sub>5</sub> in  
a. the vapour phase (b) the solid state.
- Why does a nitric acid bottle appear yellow ?

- Why is camphor preferred as a solvent in determination of depression in freezing point ( $\Delta T_f$ )?
- Aquatic species are more comfortable in cold water rather than in warm water. Why ?
- The vapour pressure of pure liquids A and B are 450 and 700 mm Hg at 350 K respectively. Find out the composition of the liquid mixture, if total vapour pressure is 600 mm Hg. Also, find the composition of the vapour phase.

**OR**

i. When kept in water, raisins swell in size. Name and explain the phenomenon involved with the help of a diagram. Give three application of the phenomenon.

ii. Explain why on addition of 1 mol of NaCl to 1 litre of water, the boiling point of water increases, while addition of 1 mol of methyl alcohol to one litre of water decreases its boiling point.

- Give one chemical test to distinguish between the following pairs of compounds.
  - Methylamine and dimethylamine.
  - Secondary and tertiary amines.
- Write the chemical reaction starting the reaction conditions required for each of the following conversions:
  - Methyl bromide to ethylamine
  - Aniline to phenol
  - p-Toluidine to 2-bromo-4-methylaniline.

**OR**

i. Write the chemical reaction stating the reaction conditions required for each of the following conversions:

- Aniline to chlorobenzene
- Acetaldehyde to ethylamine

ii. Give one chemical test to distinguish between the following pairs of compounds.

- Ethylamine and aniline.
- Aniline and benzylamine

c. Aniline and N-methylaniline.













