

33

FIRST PRE - BOARD EXAMINATION (2022-23)

SUBJECT : CHEMISTRY (043)

CLASS XII

MM:70

Time: 3 hours

General Instructions:

Read the following instructions carefully.

- a) There are 35 questions in this question paper.
- b) SECTION A consists of 18 multiple-choice questions carrying 1 mark each.
- c) SECTION B consists of 7 very short answer questions carrying 2 marks each.
- d) SECTION C consists of 5 short answer questions carrying 3 marks each.
- e) SECTION D consists of 2 case- based questions carrying 4 marks each.
- f) SECTION E consists of 3 long answer questions carrying 5 marks each.
- g) All questions are compulsory.
- h) Use of log tables and calculators is not allowed.
- i) This question paper has 6 no. of printed pages.

SECTION A

1. The reaction of carboxylic acid and alcohol catalysed by conc H_2SO_4 is called:- 1
(a) Dehydration (b) Saponification (c) Esterification (d) Neutralisation

2. Which of the following compounds is gem-dihalide? 1
(a) Ethylidene chloride (b) Ethylene dichloride
(c) Methyl chloride (d) Benzyl chloride

3. Which one of the following ions exhibits colour in aqueous solution? 1
(a) Sc^{3+} (b) Ni^{2+} (c) Ti^{4+} (d) Zn^{2+}

4. For a complex reaction _____ 1

- (a) order of overall reaction is same as molecularity of the slowest step.
- (b) order of overall reaction is less than the molecularity of the slowest step.
- (c) order of overall reaction is greater than molecularity of the slowest step.
- (d) molecularity of the slowest step is zero .

5. The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called _____ 1

- (a) Cell potential
- (b) Cell emf
- (c) Potential difference
- (d) Cell voltage

6. Zn does not show variable valency because of : 1

- (a) complete d sub-shell
- (b) inert pair effect
- (c) $4s^2$ sub-shell
- (d) None of these

7. The best reagent for converting 2-phenyl propanamide into 2-phenyl propanamine is: 1

- (a) excess H_2
- (b) Br_2 in aqueous NaOH
- (c) iodine in the presence of red phosphorus
- (d) $LiAlH_4$ in ether

8. The hybridisation of Co in high spin complex, $K_3[CoF_6]$ is: 1

- (a) sp^3d^2
- (b) sp^3
- (c) d^2sp^3
- (d) sp^3d

9. Which is most acidic : 1

- (a) Phenol
- (b) 4-nitrophenol
- (c) o-Cresol
- (d) 2-nitrophenol

10. Hoffmann Bromamide Degradation reaction is shown by _____ 1

- (a) $ArNH_2$
- (b) $ArCONH_2$
- (c) $ArNO_2$
- (d) $ArCH_2NH_2$

11. Which one of the following compounds is obtained by dehydrogenation of secondary alcohols? 1

- (a) Ketone (b) Aldehyde (c) Carboxylic acid (d) Amine

12. Which of the following statements is correct? 1

- (a) The rate of a reaction decreases with passage of time as the concentration of reactants decreases.
(b) The rate of a reaction is same at any time during the reaction.
(c) The rate of a reaction is independent of temperature change.
(d) The rate of a reaction decreases with increase in concentration of reactants.

13. Which of the following statements is not true about glucose? 1

- (a) It is an aldohexose. (b) On heating with HI it forms n-hexane.
(c) It is present in furanose form. (d) It does not give 2, 4- DNP test.

14. The reagent which does not react with both, acetone and benzaldehyde:- 1

- (a) Sodium hydrogensulphite (b) Phenyl hydrazine
(c) Fehling's solution (d) Grignard reagent

Directions : In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

A. Both Assertion & Reason are true and the reason is the correct explanation of the assertion.

B. Both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

C. Assertion is true statement but Reason is false.

D. Assertion is false statement but Reason is true.

15. **Assertion:** Phenols do not react with phosphorus halides while alcohols do react. 1

Reason: In phenols C-O bond has partial double bond character due to resonance while it is not so in alcohols.

16. Assertion: Low spin tetrahedral complexes are not formed. 1

Reason: For tetrahedral complexes, CFSE is lower than pairing energy.

17. Assertion: Complex reaction takes place in different steps and the slowest step determines the rate of reaction. 1

Reason: Order and molecularity of a reaction are always equal.

18. Assertion: The diazotisation reaction must be carried in ice cold solution (0-5°C). 1

Reason: At higher temperature, benzene diazonium chloride reacts with water to give phenol.

SECTION B

19. State a condition under which a bimolecular reaction is kinetically first order reaction. 2

20. Explain what is meant by:- 2

- (a) Pyranose structure of glucose,
(b) Glycosidic linkage.

21. Out of o- and p- dibromo benzene which one has higher melting point and why? 2

22. How many ions will the complex $[\text{Co}(\text{NH}_3)_6]\text{Cl}_2$ produce when it will be reacted with AgNO_3 ? Show with the help of a reaction. 2

23. Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10. 2

24. Will the elevation in boiling point be same if 0.1 mol of Sodium chloride or 0.1 mol of sugar is dissolved in 1L of water? Explain. 2

25. Amongst the isomeric alkanes of molecular formula C_5H_{12} , identify the one that on photochemical chlorination yields a single monochloride. 2

SECTION C

26. Write the mechanism for dehydration of alcohol. ✓ 3

27. Magnetic moment of $[\text{MnCl}_4]^{2-}$ is 5.92 BM. Explain giving reason. 3

28. (a) How does sprinkling of salt help in clearing the snow covered roads in hilly areas? Explain the phenomenon involved in the process. 3

(b) Why soda water bottle kept at room temperature fizzes on opening?

The law is not applicable if the components are not completely miscible or if the components have widely different structures. The vapour pressure of a liquid decreases if some non-volatile solute is dissolved in it because some molecules of the solvent on the surface are replaced by the molecules of the solute.

(a) Explain the terms ideal and non-ideal solutions in the light of forces of interactions operating between molecules in liquid solutions.

(b) Trifluoroacetic acid and acetic acid both depress the freezing point of water. Which one of the two will cause a greater depression of freezing point? Why?

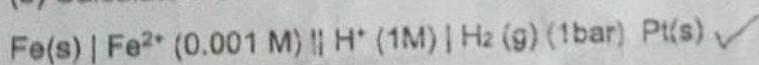
(c) NaCl and C_6H_6 have to be dissolved in n-hexane. Which of the two will dissolve in it? Explain.

(d) What type of solution is formed by mixing equal volumes of n-hexane and n-heptane?

SECTION E

33.(a) Write the chemistry of recharging the lead storage battery, highlighting all the materials that are involved during recharging. 2+3

(b) Calculate the emf of the following cell at 298 K.



(Given $E^{\circ} \text{ cell} = + 0.44V$)

34. When liquid 'A' is treated with a freshly prepared ammonical silver nitrate solution, it gives bright silver mirror. The liquid forms a white crystalline solid on treatment with sodium hydrogensulphite. Liquid 'B' also forms a white crystalline solid with sodium hydrogensulphite but it does not give test with ammonical silver nitrate. Which of the two liquids is aldehyde? Write the chemical equations of these reactions also. 5

35. (a) Give reasons:- 3+2

(i) Mn shows the highest oxidation state of +7 with oxygen but with fluorine, it shows the highest oxidation state of +4.

(ii) Transition metals show variable oxidation states.

(b) Name the following:-

(i) Any compound (from 3d series) where the transition metal is in the +7 oxidation state.

(ii) A member of the lanthanoid series which is well known to exhibit +4 oxidation state.