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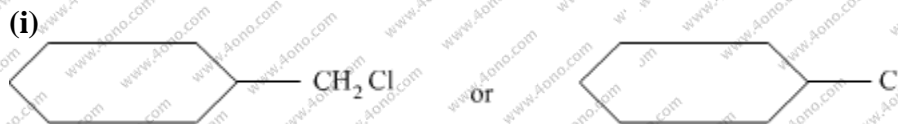
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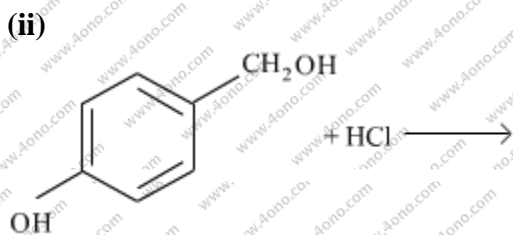
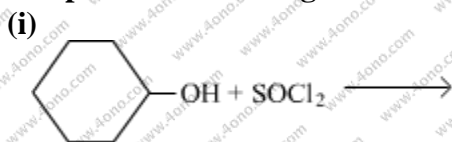
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Q.13. Differentiate between molality and molarity of a solution. What is the effect of change in temperature of a solution on its molality and molarity? 2 Marks

Q.14. Which ones in the following pairs of substances undergoes S_N2 substitution reaction faster and why? 2 Marks



Q.15. Complete the following reactions equations: 2 Marks



Q.16. Explain what is meant by 2 Marks

- (i) A peptide linkage
- (ii) a glycosidic linkage

Q.17. Name two water soluble vitamins, their sources and the diseases caused due to their deficiency in diet. 2 Marks

Q.18. Write the names of monomers of the following polymers. 2 Marks

(i) Figure

(ii) $[\text{CF}_2 - \text{CF}_2]_2$

Or

What is the repeating unit in the condensation polymer obtained by combining $\text{HO}_2\text{CCH}_2\text{CH}_2\text{CO}_2\text{H}$ (succinic acid) and $\text{H}_2\text{NCH}_2\text{NH}_2$ (ethylene diamine).

SECTION-C

- Q.19.** Iron has a body centered cubic unit cell with a edge of 286.65 pm. The density of iron is 7.87 g cm^{-3} . Use this information to calculate Avogadro's number (At. Mass of $Fe = 56 \text{ g mol}^{-1}$) 3 Marks
- Q.20.** 100 mg of a protein is dissolved in just enough water to make 10.0 mL of solution. If this solution has an osmotic pressure of 13.3 mm Hg at 25°C , What is the molar mass of the protein? ($R = 0.0821 \text{ L atm mol}^{-1} \text{ K}^{-1}$ and $760 \text{ mm Hg} = 1 \text{ atm.}$) 3 Marks
- Q.21.** A first order reaction has a rate constant of 0.0051 min^{-1} . If we begin with 0.10 M concentration of the reactant, what concentration of reactant will remain in solution after 3 hours? 3 Marks
- Q.22.** How are the following colloids different from each other in respect of dispersion medium and dispersed phase? Give one example of each type. 3 Marks
- An aerosol
 - A hydrosol
 - An emulsion
- Q.23.** Account for the following: 3 Marks
- NH_3 is a stronger base than PH_3
 - Sulphur has a greater tendency for catenation than oxygen.
 - Bond dissociation energy of F_2 is less than that of Cl_2 .

Or

Explain the following situations:

- In the structure of HNO_3 molecule, the N-O bond (121 pm) is shorter than N-OH bond (140 pm).
 - SF_4 is easily hydrolyzed whereas SF_6 is not easily hydrolyzed.
 - XeF_2 has a straight linear structure and not a bent angular structure.
- Q.24.** For the complex $[Fe(en)_2Cl_2]Cl$, (en=ethylene diamine), identify 3 Marks
- The oxidation number of iron,
 - The hybrid orbits and the shape of the complex,
 - The magnetic behavior of the complex.
 - The number of geometrical isomers,
 - Whether there is an optical isomer also, and
 - name of the complex. (At. No. of Fe = 26)

Q.25. Explain the mechanism of the following reactions: 3 Marks

- Addition of Grignard's reagent to the carbonyl group of a compound forming an adduct followed by hydrolysis.
- Acid catalyzed dehydration of an alcohol forming an alkene.
- Acid catalyzed hydration of an alkene forming an alcohol.

Q.26. How will you bring about the following conversions: 3Marks

- (i) Ethanol to acetone
- (ii) Benzene to acetophenone
- (iii) Benzoic acid to benzaldehyde.

Q.27. Explain the following types of substances with one suitable example, For each case: 3 Marks

- (i) cationic detergents.
- (ii) Food preservatives.
- (iii) Analgesics.

SECTION-D

Q.28. (a) Define molar conductivity of a substance and describe how for weak and strong electrolytes, molar conductivity changes with concentration of solute. How is such change explained? 5 Marks

(b) A voltaic cell is set up at 25°C with the following half cells:



What would be the voltage of this cell? ($E_{\text{cell}}^0 = 0.46 \text{ V}$)

OR

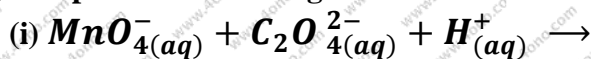
(a) State the relationship amongst cell constant of a cell, resistance of the solution in the cell and conductivity of the solution How is its solution? How is molar conductivity of a solute related to conductivity of its solution?

(b) A voltaic cell is set up at 25°C with the following half-cells:



Calculate the cell voltage [$E_{\text{Ni}^{2+} \mid \text{Ni}}^0 = -0.25 \text{ V}$, $E_{\text{Al}^{3+} \mid \text{Al}}^0 = -1.66 \text{ V}$]

Q.29. (a) complete the following chemical reaction equations: 5 Marks



(b) Explain the following observations about the transition/inner transition elements:

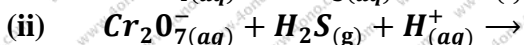
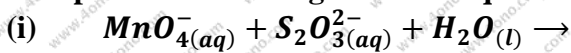
(i) There is in general an increase in density of element from titanium (Z=22) to copper (Z=29).

(ii) There occurs much more frequent metal-metal bonding in compounds of heavy transition element (3rd Series).

(iii) The members in the actinoid series exhibit a larger number of oxidation states than the corresponding members in the lanthanoid series.

OR

(a) Complete the following chemical equations for reactions:



(b) Give an explanation for each of the following observations:

(i) The gradual in size (actinoid contraction) from element to element is greater among the actinoids than that among the lanthanoids (lanthanoid contraction).

(ii) The greatest number of oxidation states are exhibited by the members in the middle of a transition series.

(iii) With the same d-orbitals configurations (d^4) Cr^{2+} ion is a reducing agent but Mn^{3+} ion is an oxidizing agent.

Q.30. (a) Illustrate the following name reactions by giving example. 5 Marks

(i) Cannizzaro's reaction

(ii) Clemmensen reduction

(b) An organic compound A contains 69.77% carbon, 11.63% hydrogen and rest oxygen. The molecular mass of the compound is 86. It does not reduce Tollen's reagent but forms an addition compound with sodium hydrogen sulphite and gives positive iodoform test on vigorous oxidation it gives ethanoic and propanoic acid. Derive the possible structure of compound A.

OR

(a) How are the following obtained?

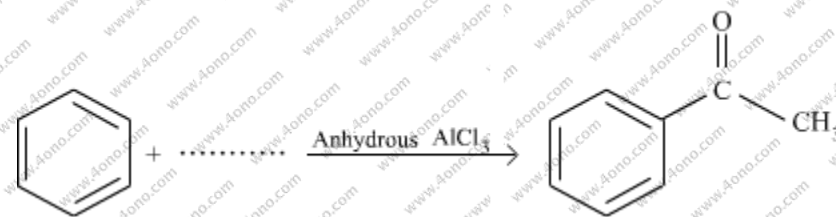
(i) Benzoic acid from ethyl benzene.

(ii) Benzaldehyde from toluene.

(b) Complete each synthesis by giving the missing material, reagent or products:



(ii)



(iii)

