

Q1 (A) fill in the blanks (2M)

- a) The General electronic configuration of 4f-series element is - - - - -
- b) Amino derivatives of Naphthalene are called as - - - - -
- c) The pH at which an amino acid in solution has zero charge is - - - - -
- d) The presence of a solute - - - - - the freezing point of the solvent.

Q2 (B) choose the correct alternative (2M)

- i) In aniline, electrophilic substitution occurs at - - - - - position
a) ortho/para b) o/m c) p/m d) Meta
- ii) The Miller indices for Weiss indices 1:2:3 are
a) 312 b) 321 c) 632 d) 123
- iii) The General electronic configuration of 4f-series elements is
a) $(n-2)f^{1-14}, (n-1)d^{0-1} ns^2$ b) $(n-2)f^{1-14}, (n-1)d^{0-1} ns^1$
c) $(n-2)f^{1-14}, (n-1)d^0 ns^0$ d) $(n-2)f^{1-14}, (n-1)d^{0-1} ns^1$

- iv) Acetoacetic ester on reaction with urea gives
- a) 4-methyl urea
 - b) malonyl urea
 - c) thiourea
 - d) methyl urea

Q.1 c] Answer in one sentence (4M)

- i) Which functional groups are present in amino acid?
- ii) What are colligative properties? Name the four colligative properties
- iii) What is general electronic configuration of 3d elements?
- iv) Define catalyst.

UNIT-I

- Q21 a) Explain with suitable reason why Cr^{2+} ion is paramagnetic while Zn^{2+} is diamagnetic? (4M)
- b) What are transition elements? (4M) Discuss their general characteristics?

Q.3. (c) What are the factors influencing the choice of extraction process?
OR

Q.3. (a) Give reasons.

- (i) Transition element show variable oxidation state. 2M
- (ii) Zn differs in properties with other transition elements. 2M

Q.4. (a) Calculate the magnetic moment
i) Fe^{+2} ii) Cr^{+2} iii) Ti^{+3} iv) Ni^{+2}

(b) Discuss the high temp. chemical reduction method for extraction of metal with suitable examples.

Q.4. (A) What are the general characteristics of Lanthanide? 4M

(B) Discuss the oxidation state of actinide?

(c) What are the common methods of extraction of metals?

OR

① Write a notes

i) Lanthanide contraction * 2M

ii) Inner transition element 2M

② Discuss the difference between lanthanide and actinides?

③ Explain the method of magnetic separation.

Q5. ④ Discuss the molecular orbital picture of Naphthalene. 4M

⑤ How will you convert

i) AAE into propionic acid

ii) Acetic acid into malonic ester?

⑥ Discuss the structure of the following compounds

i) sucrose ii) Fructose

OR.

⑦ How will you bring out the following conversion

① α -Naphthol to α -Naphthyl amine

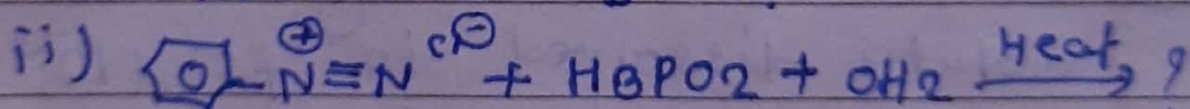
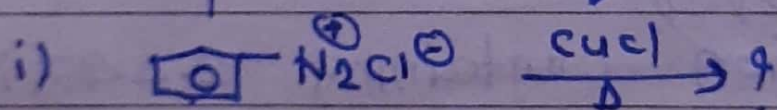
② β -Naphthyl Sulphonic acid to β -Naphthol

Q. What is a reactive methylene group & how is ethylacetoacetate prepared?

R Draw the chair conformation of α -D-Glucose and β -D-glucose & discuss the open chain structure of glucose.

Q.6 A What are the products of reduction of nitrobenzene under different conditions

B complete the following reaction



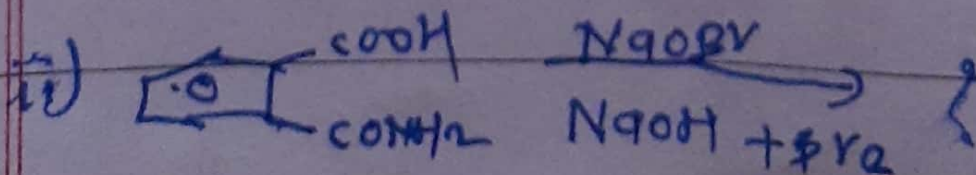
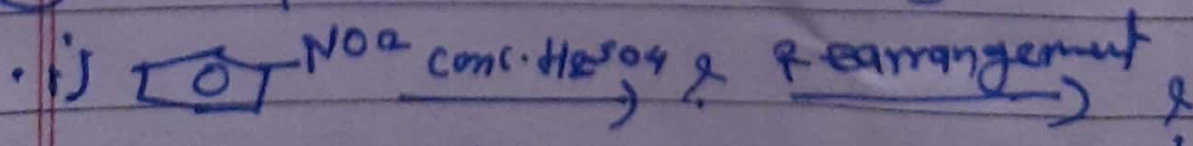
C Explain the following terms in brief

i) zwitterions

ii) Isoelectric point

OR

F complete the following reaction



Q. Write short notes

- i) Gabriel phthalimide synthesis
- ii) Strecker amino acid synthesis

Q. Explain Hofmann's exhaustive methylation reaction

Q. 7. Define ^{the} following terms

- i) Boiling point
- ii) Freezing point

Q. state and explain ~~Def~~ Van't Hoff factor

c) A solution containing 2.44×10^{-3} kg of solute dissolved in 75×10^{-3} kg of water boiled at 373.413 K. Calculate molar mass of solute ($K_b = 0.512 \text{ kg mol}^{-1}$)
or

Q) Describe Cottrell method for determination of elevation of boiling point.

Q) What are colligative properties? Give the reasons for abnormal colligative properties.

Q) A solution containing 0.01 kg of NaCl in 1 kg of water freezes at 272.996 K. The molal depression constant of water is 1.85 K kg mol⁻¹. Calculate the degree of dissociation of NaCl in the solution.

(Molar mass of NaCl = $58.5 \times 10^{-3} \text{ kg mol}^{-1}$)

Q.8 A) Define

i) unit cell ii) point of symmetry
iii) Lattice point iv) BCC

B) Derive Bragg's equation for diffraction of X-rays by crystals.

C) Find out Miller indices of Weiss indices of (i) 2:4:3 (ii) 2:∞:8

of.

- ① Differentiate between crystalline and amorphous solid.
- ② Determine the number of constituent particles in the face centered cubic (FCC) unit cell, simple cubic crystal (SCC) unit cell.
- ③ Explain the structure of KCl on the basis of x-ray diffraction.