

B.Sc. Semester - 3 (CBCS) Examination
Nov/Dec. -2021 [NEW COURSE]
Chemistry-C301(Core)

Time: 2:30 Hours

Marks: 70

Instructions:

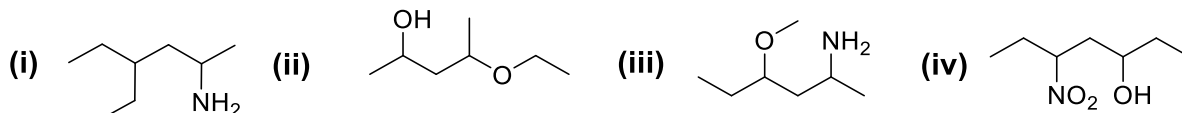
1. All questions are compulsory.
2. Figures to the right indicate marks.

Q. 1 (A) Prove that: Wave function $\Psi = \sin kx$ is eigen function for operator $\frac{d^2}{dx^2}$ but not for $\frac{d}{dx}$ [04]

Q. 1 (B) Answer the following (Any Two) [10]

- (1) Determination of co-efficient for sp – hybridization & the bond angle between hybrid orbitals.
- (2) Write the equation of magnetic moment & calculate magnetic moment for Fe^{+2} , Ni^{+2} , Cr^{+3} , Sc^{+3} .
- (3) Give the uses of lanthanides.

Q. 2 (A) Give the IUPAC name of each of following molecules. [04]



Q. 2 (B) Answer the following (Any Two) [10]

- (1) Discuss: Claisen rearrangement with mechanism and applications.
- (2) Give the synthesis of phenol; (a) Dow process; (b) Cumene process
- (3) Explain: primary, secondary and tertiary amine differentiate test.

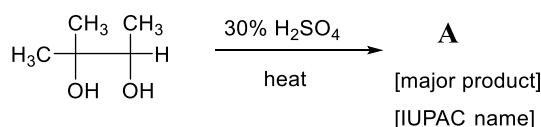
Q. 3 (A) Match the following pair: [04]

Solute in Solvent		Example	
1	Gas in Gas	a	Mercury in Silver
2	Liquid in Liquid	b	Alcohol in Water
3	Solid in Liquid	c	O_2 in H_2O
4	Liquid in Solid	d	O_2 in N_2
		e	Sugar in water

Q. 3 (B) Answer the following (Any Two) [10]

- (1) Explain: Sulphur system by phase diagram.
- (2) State and explain Raoult's Law.
- (3) Give the statement, derivation and limitations of Nernst distribution law.

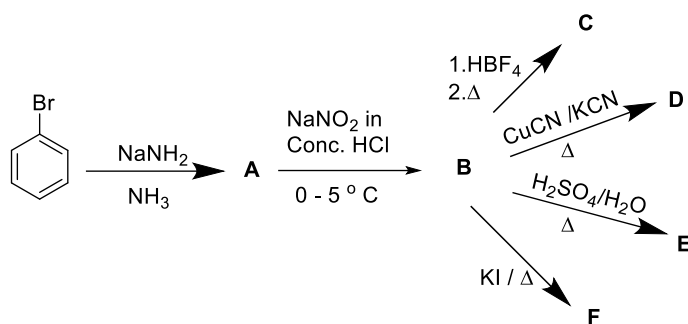
Q. 4 (A) Complete the following reactions & give the full mechanism. [04]



Q. 4 (B) Answer the following (Any Two)

[10]

(1) Complete the following reactions and write name of products A to F.



(2) Give any five postulates of wave mechanics.

(3) Explain: Ullmann reaction with any two applications.

Q. 5 (A) Give the factors affecting on solubility.

[04]

Q. 5 (B) Answer the following (Any Two)

[10]

(1) Define with example: Phase, Component & Degree of freedom.

(2) (a) Give the reason: Aliphatic amine is more basic than aromatic amine.

(b) Explain: Effect of substitution on acidity of phenol.

(3) A mixture of liquids A & B exhibits ideal behaviour. at 90°C , the total vapour pressure of a liquid solution containing 1.5 mol A and 2.5 mol B is 330 torr. Upon the addition of 1 more mol of B to the solution, the vapour pressure is 350 torr. Calculate the vapour pressure of pure A & pure B at 90°C .
