

B.Sc. Semester - 3 (CBCS) Examination
Oct/Nov - 2022 [NEW COURSE]
Chemistry-C301(Core)

Time: 2:30 Hours

Marks: 70

Instructions:

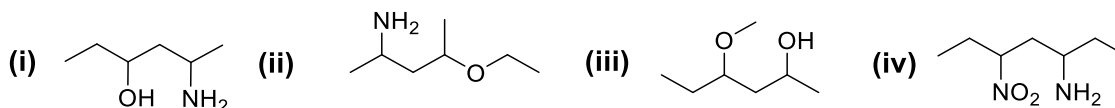
1. All questions are compulsory.
2. Figures to the right indicate marks.

Q. 1 (A) Prove that: wave function $\Psi = \cos kx$ 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]

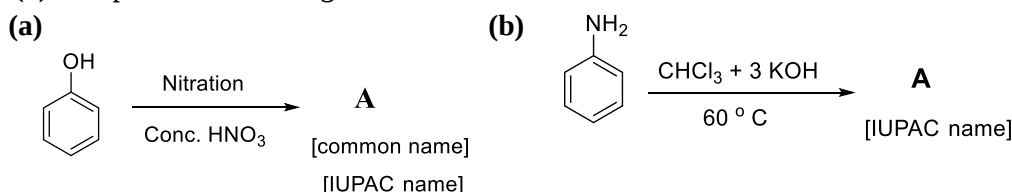
- (1) Write any five postulates of wave mechanics.
- (2) Give the Atomic number, Name, Symbol, Electronic configuration and oxidation state of Lanthanide elements.
- (3) Give the uses of lanthanides.

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



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

- (1) Discuss: Fries rearrangement with mechanism and applications.
- (2) Give the Williamson ether synthesis for; (a) Symmetric ether & (b) Asymmetric ether
- (3) Complete the following reactions;



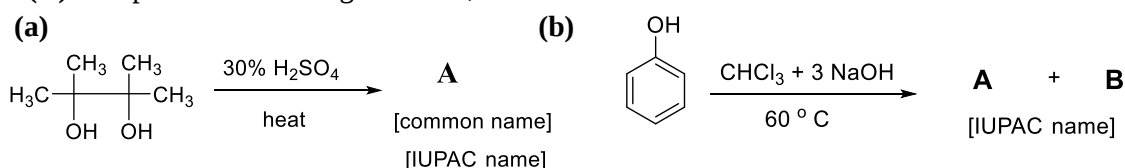
Q. 3 (A) Match the following pair: [04]

Solute in Solvent		Example	
1	Gas in Gas	a	H ₂ in Palladium
2	Liquid in Liquid	b	Petrol in Kerosene
3	Solid in Liquid	c	O ₂ in H ₂ O
4	Gas in Solid	d	H ₂ in N ₂
		e	Salt in water

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

- (1) Explain: water system by phase diagram.
- (2) Write note on: Azeotropic mixtures.
- (3) Give any five applications of Nernst distribution law.

Q. 4 (A) Complete the following reactions; [04]



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

[10]

(1) Explain: Lucas Test with examples.

(2) Calculate magnetic momentum for:-

(a) Cr^{+3} (b) Mn^{+2} (c) Ti^{+3} (d) Fe^{+2} (e) Ni^{+2}

(3) Explain: Benzyne mechanism.

Q. 5 (A) Explain: Phase & component with examples.

[04]

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

[10]

(1) Preparation & chemical reactions of diazonium salts.

(2) 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.

(3) State and explain Raoult's Law.
