647510 **BSc3CheC301x** **Seat No :_____**

B.Sc. Semester - 3 (*CBCS*) Examination
Oct/Nov. -2019 [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) Write note on: Lanthanide contraction **[04]**

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

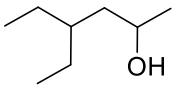
(1) Determination of co-efficient for sp^2 - hybridization.

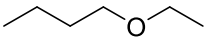
(2) Show that $\Psi = \sqrt{\frac{2}{a}} \sin \frac{\pi}{a} x$ is normalized wave function and

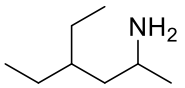
$\Psi_I = \sqrt{\frac{2}{a}} \sin \frac{\pi x}{a}$ *and* $\Psi_{II} = \sqrt{\frac{2}{a}} \sin \frac{2\pi x}{a}$ are orthogonal to each other, where $0 < x < a$.

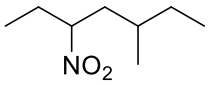
(3) Give the uses of lanthanides.

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

(i) 

(ii) 

(iii) 

(iv) 

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

(1) Discuss: Fries rearrangement with mechanism and applications.

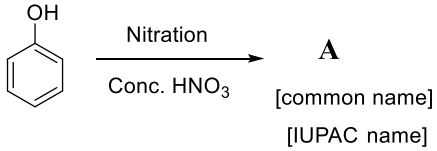
(2) Give the following synthesis of alcohol;

(a) by Grignard reaction.

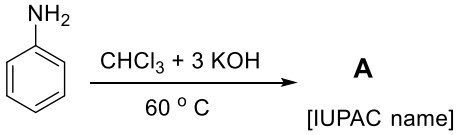
(b) by reduction of aldehyde, ketone, carboxylic acid.

(3) Complete the following reactions;

(a)



(b)



Q. 3 (A) Give the limitations of Henry's Law. **[04]**

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

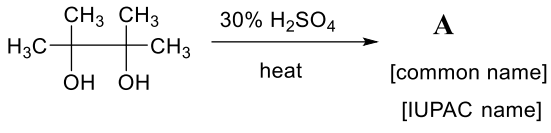
(1) Explain: water system by phase diagram.

(2) Write note on: Azeotropic mixtures.

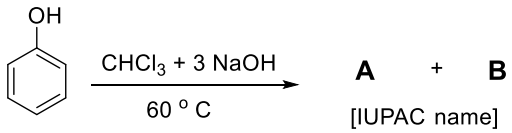
(3) Give the statement, derivation and limitations of Nernst distribution law.

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

(a)



(b)



Q. 4 (B) Answer the following (Any Two) **[10]**

(1) Write note on: Basicity of amines with effect of substitution.

(2) Prove that: wave function Ψ = cosikx is eigen function for operator $\frac{d^2}{dx^2}$ but not for $\frac{d}{dx}$

(3) Explain: Benzyne mechanism.

Q. 5 (A) Explain: Phase & component with examples. **[04]**

Q. 5 (B) Answer the following (Any Two) **[10]**

(1) State and explain Raoult's Law.

(2) Preparation & chemical reactions of diazonium salts.

(3) A mixture of liquids A & B exhibits ideal behaviour. At 90 ℃, 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 ℃.