Paper Code: CY-301	**Roll No.**										

B. Tech.
THIRD SEMESTER EXAMINATION, 2016-17
APPLIED ENGINEERING CHEMISTRY

[Time: 3 Hours] [Max. Marks: 100]

Note:- Attempt All questions. All questions carry equal marks. Assume suitable data if required.

1. Attempt any two parts of the following: **(10x2=20)**

(a) (i) Write the mechanism of Diazotization reaction. Give an example each of Gomberg reaction, Sandmeyer reaction and Gatterman reaction.
(ii) Discuss the conversion of alcohols to mesylates and tosylates.

(b) (i) Discuss the mechanism of Benzoin condensation and Perkin reaction.
(ii) Write a note on reduction of nitrobenzene under different conditions.

(c) (i) Write a note on Crown ethers and epoxides.
(ii) Give the mechanism of Hoffmann bromamide and Hell-Volhard-Zelinsky reactions.

2. Attempt any four parts of the following: **(5x4=20)**

(a) What are chiral drugs? Discuss the structure and biological activity of Ibuprofen.
(b) Explain why the chair form of cyclohexane is more stable than the boat form? Draw the preferred conformation for *cis*- 2- Methyl cyclohexanol , *trans*- 2- Methyl cyclohexanol and *trans*- 1,4- Dimethyl cyclohexane.
(c) What are aromatic and anti - aromatic compounds? Explain aromaticity in non- benzenoid compounds.
(d) Complete the following:
(i) $(CH3)_3CMgCl + CO_2 \rightarrow ?$
(ii) $CH_3MgBr + CH_3CN \rightarrow ?$
(iii) $2CH_3MgBr + CH_3OH \rightarrow ?$
(iv) CH_3MgBr + ethylene oxide (C_2H_4O) $\rightarrow ?$
(v) $2CH_3MgBr + (CH_3)_2CHCOOC_2H_5 \rightarrow ?$
(e) Write a note on Relative configuration. What were the shortcomings of this configuration assignment?
(f) Give the mechanism of reaction of $LiAlH_4$ and carbonyl compounds? Give the final product obtained by the reaction of LAH with $RCONH_2$ and RN_3.

3. Attempt any two parts of the following: **(10x2=20)**

(a) (i) Define the terms homogeneous catalysis, heterogeneous catalysis, negative catalysis, auto catalysis, catalytic poison.
(ii) Acetone boils at 56.38°C and a solution of 1.41 g of an organic solid in 20 g of acetone boils at 56.88 °C. If *K* for acetone per 100g is 16.7, calculate the mass of one mole of the organic solid.

(b) What will happen if D- Glucose is treated with strong base? Write a note on Killiani-Fischer synthesis.

(c) (i) 0.440g of a substance dissolved in 22.2g of benzene lowered the freezing point of benzene by 0.567° C. Calculate the molecular mass of the substance (K_f =5.12°Cmol^{-1}).
(ii) Write brief notes on Gold number, Lyophilic and Lyophobic colloids.

4. Attempt any two parts of the following: **(10x2=20)**

(a) Differentiate between adsorption and partition chromatography. Discuss in brief the principle, components and applications of GLC.
(b) Write a brief introduction of Mass spectroscopy. Explain the Nitrogen rule and McLafferty rearrangement.
(c) Give a brief account of principle of HPLC. Differentiate between preparative and analytical HPLC. What are the applications of HPLC in industry?

5. Attempt any four parts of the following: **(5x4=20)**

(a) Write down the structures of cane sugar and milk sugar. Give the structures of their mild acid hydrolysis products.
(b) State the differences between RNA and DNA.
(c) What are reducing and non reducing sugars? Give the reaction products of the reaction of D-Glucose with i) HIO_4 ii) HNO_3 iii) Br_2 water
(d) Write the mechanism of the reaction of D-Glucose with excess of phenyl hydrazine.
(e) Discuss the end group analysis in proteins.
(f) What are essential amino acids? How are proteins related to α- amino acids? Name two sulphur containing α- amino acids.