Roll No. ☐☐☐☐☐☐☐

TCH–101

B. Tech. (First Semester)
Mid Semester EXAMINATION, 2017
(All Branches)
ENGINEERING CHEMISTRY

Time : 1:30 Hours]   [Maximum Marks : 50

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False :   (1×5=5 Marks)

(a) Functionality of ethene molecule is ....

(b) Nylon 6, 6 is an example of .... polymer.

(c) The hydrogen bonding present in salicylaldehyde molecule is known as ....

(d) The calorific value which includes the latent heat of steam is known as ....

(e) The main constituent of Biogas is ....

2. Attempt any *five* parts :   (3×5=15 Marks)

(a) Explain isotactic and atactic polymers with suitable example.

(b) Explain why all macromolecules are not polymers but all polymers are macromolecules.

(c) Differentiate between addition and condensation polymerization.

(d) Discuss any *two* consequences of hydrogen bonding.

(e) On the basis of molecular orbital theory, prove that the nitrogen molecule is stable and diamagnetic in nature.

(f) Write a short note on characteristics of a good fuel.

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c).   (5×2=10 Marks)

   (a) Explain the classification of polymers on the basis of monomer unit.

   (b) Define functionality and its significance.

   (c) What are polyamides ? Give the preparation, monomer units and repeating unit of any *three* polyamides.

4. Attempt any *two* parts of choice from (a), (b) and (c).   (5×2=10 Marks)

   (a) Describe the postulates of Molecular Orbital theory with *one* example.

   (b) Give the difference between Bonding molecular orbital and Antibonding molecular orbital with example.

   (c) Explain how the lone pair affects the bond angle of a molecule/ion and give the formation of ammonia and ammonium ion on the basis of VSEPR theory.

5. Attempt any *two* parts of choice from (a), (b) and (c).   (5×2=10 Marks)

   (a) Explain Gross calorific and Net calorific value of a fuel. How does GCV differ from NCV ? Give the condition when GCV is equal to NCV.

   (b) List the raw materials which can be utilized for biogas manufacture. How is biogas obtained from the raw material ?

   (c) A 0.80 g sample of solid fuel was completely combusted in the excess of oxygen using bomb calorimeter. The rise in temperature of water in calorimeter was 2.5°C. Calculate the High calorific value of the fuel, if water taken in calorimeter is 2000 g and water equivalent of calorimeter is 2200 g. Also calculate low calorific value of a fuel. (Given : % Hydrogen in fuel = 2.2).

400