Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (2011 Onwards) (Sem.–1,2)

ENGINEERING CHEMISTRY

Subject Code : BTCH-101

Paper ID : [A1106]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B &C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B& C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B &C.

SECTION - A

1. **Write briefly :**

(a) Calculate the number of vibrational degrees of freedom in CO_2 and SO_2.

(b) Distinguish between photo physical and photochemical process.

(c) What are Optical Sensors?

(d) Differentiate between Scale and Sludge.

(e) What do you mean by Anodic Sacrificial Protection?

(f) CO_2 should not be present in boiler feed water. Why?

(g) What are atactic polymers?

(h) Which of the following will exhibit infrared spectra and why? N_2, HCl, O_2, CO_2.

(i) What are Reinforced Composite Materials?

(j) What are Coercing Colloids?

SECTION - B

2. (a) State and explain Franck-Condon principle.

   (b) Why butadiene shows absorption at higher wavelength than ethene? Give suitable energy level diagram.

3. (a) Draw a well labelled Jablonski diagram and explain the terms involved in it.

   (b) Define quantum yield. What are the reasons for low and high quantum yield?

4. (a) Discuss the methods of disinfection of water.

   (b) Calculate the amount of lime and soda required to soften 50,000 litres of water having following analysis:

   $Ca(HCO_3)_2$ = 8.1 mg; $Mg(HCO_3)_2$ = 5.0 mg; $CaSO_4$ = 13.6 mg; $MgCl_2$ = 2.0 mg; $MgSO_4$= 12.0 mg; NaCl = 4.7 mg.

5. (a) What do you mean by green chemistry? Briefly explain atom economy.

   (b) What are advantages of using ionic liquids in organic reactions?

SECTION - C

6. (a) What is Corrosion? Discuss the factors affecting corrosion.

   (b) Explain the following types of corrosion :

   (i) Waterline corrosion

   (ii) Stress corrosion

7. (a) What is Polymerization? Discuss various types of polymerization.

   (b) In a polymer, there are 100 molecules of molecular weight 100, 200 molecules of molecular weight 1000 and 300 molecules of molecular weight 10,000. Find M_n and M_w.

8. (a) Discuss two dimensional assembly and mesoscale assembly.

   (b) Explain super molecular structures.

9. (a) Discuss third generations petrochemicals by giving suitable examples.

   (b) What is crude oil? Give composition and classification of crude oil.