Roll No. | | | | | | | | | | | | Total No. of Pages: 02

Total No. of Questions: 09

B.Tech (Sem. – 1,2)

ENGINEERING CHEMISTRY

Subject Code: BTCH-101

M Code: 54093

Date of Examination : 18-01-23

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

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

SECTION-A

1. Write briefly:

a) Cause of chemical shift in NMR.

b) Difference between Galvanic cell and Electrolytic cell.

c) Cause of alkalinity of raw water.

d) Advantages and limitations of lime soda process.

e) Define Nanomaterials.

f) Write down the formulae of Average molecular weight.

g) Give an example of second generation pertrochemicals.

h) What are self Assembling materials?

i) What type of primary raw material is used for petrochemicals?

j) Write down the formula for calculating Atom Economy.

SECTION-B

2. **a) Distinguish between:** (2,2)

   i) Thermal and photochemical reactions ii) Fluorescence and phosphorescence

   b) The quantum efficiency of photochemical reaction:

   $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$
   Is 1.0×106 with wavelength of 480nm. Calculate the number of moles of HCl(g) produced per joule of radiant energy absorbed. (4)

3. **a) Define following terms** (2,2,2)

   i) Atom Economy ii) Green Chemistry iii) Bio-Catalysis

   b) Give different way to minimise Hazardous waste. (2)

4. Write a detailed note on the construction, working and chemistry behind the photovoltaic cell. (8)

5. a) Calculate the amount of lime (84% pure) and Soda (92% pure) required for treatment of 20,000 liters of water, whose analysis is as follows $Ca(HCO3)2 = 40.5$ ppm; $Mg(HCO3)2 = 36.5$ ppm; $MgSO4 = 30.00$ ppm; $CaSO4 = 34.0$ ppm; $CaCl2 = 27.75$ ppm and $NaCl = 10.00$ ppm. Also calculate the temporary and permanent hardness of water. (4)

   b) Describe method involved in the treatment of water required for industries. (4)

SECTION-C

6. a) Discuss the importance of design and material selection in controlling corrosion. (2)

   b) Discuss briefly: (2,2)

   i) Galvanic corrosion ii) Stress corrosion

   c) Why does steel not rust if covered with ice? (2)

7. a) Discuss the first, second and third generation petrochemicals. (4)

   b) What is natural gas? Write down the properties of natural gas. (4)

8. **Write a short note on the following:** (2,2,2,2)

   a) Two dimensional assemblies b) Nanoscale material

   c) Supermolecular structure d) Coercing colloids

9. a) What are different types of polymerization reactions? Give examples (4)

   b) How does molecular weight affect the properties of polymer? (4)

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.