Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 51365

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

First Semester

Civil Engineering

CY 2111/CY 14/080010001— ENGINEERING CHEMISTRY – I

(Common to all branches except Marine Engineering)

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why do we express hardness of water in terms of $CaCO_3$ equivalents?
2. Write the principle of break point chlorination.
3. What is the structural change that occurs in an elastomer during vulcanization?
4. Write the preparation and uses of PVC.
5. Distinguish between physisorption and chemisorption.
6. Define enthalpy of adsorption? What is the thermodynamic condition for an adsorption process to be spontaneous?
7. What are the moderators used in nuclear reactor?
8. Write the differences between primary and secondary batteries. Give examples.
9. Define viscosity index. How it is determined?
10. What are the special characteristics of carbon nanotubes?

PART B — (5 × 16 = 80 marks)

11. (a) (i) How is hardness of water determined by EDTA method? (8)

(ii) Explain with a sketch, the various steps involved in the treatment of water for domestic purpose. (8)

Or

(b) (i) What is reverse osmosis? How is sea water purified using this technique. (10)

(ii) Write short notes on carbonate and phosphate conditioning methods. (6)

12. (a) (i) Write the mechanism of free radical polymerization. What are the monomers which can be polymerized by free radical polymerization. (10)

(ii) Write the differences between thermoplastics and thermosetting plastics. (6)

Or

(b) (i) Write the Preparation and uses of the following polymers.

(1) Polycarbonate

(2) Teflon (8)

(ii) How are polymer matrix composits and fibre reinforced plastics made? (8)

13. (a) (i) Write a note on the different types of adsorption isotherms. (6)

(ii) Derive the langmuir adsorption isotherm and interpret it. (10)

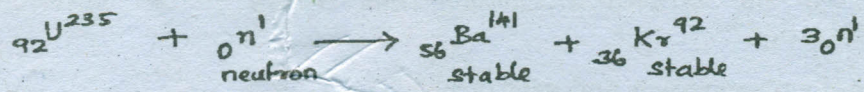
Or

(b) (i) Explain the various factors influencing adsorption. (8)

(ii) Interpret the Freundlich's isotherm. (8)

14. (a) (i) Give a brief account on breeder reactors. (10)

(ii) Calculate the energy released in the nuclear fission reaction.



Given that, mass of proton = 1.00878 amu and mass of neutron = 1.009 amu. (6)

Or

(b) (i) Describe the construction and Working of Lead–Acid or Ni-Cd batteries. Give tips for proper charging, discharging and maintenance of these batteries. (10)

(ii) Write the principle of Working of any one type of fuel cell. (6)

15. (a) (i) What are refractories? How are they classified? Give essential requirements of good refractory material. (8)

(ii) Write notes on solid lubricants. (8)

Or

(b) (i) With neat sketch, explain the mechanism of lubrication. (8)

(ii) How are carbon nanotubes prepared? Describe any two methods? (8)
