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**Question Paper Code : 51006**

B.E./B.Tech. DEGREE EXAMINATIONS, JANUARY 2012.

First Semester

CY 2111 — ENGINEERING CHEMISTRY – I

(Common to all branches (except Marine Engineering))

(Regulations 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between the types of alkalinity and the ions responsible for the types.
2. What is calgon? How does it function in water treatment?
3. Define polymerization.
4. How are FRPs produced?
5. What are the characteristics of adsorption?
6. What do you understand by 'purification by adsorption'?
7. What are fissile and fertile nucleides?
8. What are the applications of lithium batteries?
9. Define refractoriness of a refractory.
10. What are carbon nanotubes?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain EDTA method of determining hardness of water. (10)  
(ii) 50 ml of standard hard water containing 1-mg of pure  $\text{CaCO}_3$  per ml consumed 20 ml of EDTA. 50 ml of a water sample consumed 25 ml of EDTA solution. 50 ml of the same water sample after boiling, filtering etc. consumed 18 ml of EDTA. Calculate the temporary and permanent hardnesses of this water sample. (6)

Or

- (b) (i) Explain the demineralization of water by ion-exchange process. How are exhausted cation and anion exchange resins regenerated? (8)
- (ii) What is reverse osmosis? Explain desalination of water by reverse osmosis method. What are the advantages of RO method? (8)
12. (a) (i) Explain the free radical mechanism involved in the formation of polyethylene. (10)
- (ii) Classify polymers with suitable examples. (6)

Or

- (b) (i) What do you understand by vulcanization of rubber? What are the advantages? Give a representative structural unit of vulcanized rubber. (8)
- (ii) Give the preparation and engineering uses of butyl rubber and SBR. (8)
13. (a) (i) Derive Langmuir adsorption isotherm and discuss the use of this equation in the limiting conditions of very low and high pressures. (8)
- (ii) Define adsorption isotherm. Explain five different types of adsorption isotherms. (8)

Or

- (b) (i) What is the role of adsorbents in catalysis? (8)
- (ii) What is the role of activated carbon in air and water pollution control? (8)
14. (a) (i) Define nuclear fission. Explain its characteristics. (6)
- (ii) What are the main parts of light water nuclear reactor? What is a breeder reactor? (10)

Or

- (b) (i) What are storage batteries? Giving cell reactions explain the construction and working of lead-acid battery. (8)
- (ii) What are fuel cells? Construct a  $\text{H}_2$  -  $\text{O}_2$  fuel cell and explain its working. (8)

15. (a) (i) Explain the steps involved in the manufacture of alumina refractories. (8)
- (ii) Write detailed notes on emery and silicon carbide. (8)

Or

- (b) (i) How is the viscosity index of a lubricant determined? What is its significance? (8)
- (ii) How do graphite and molybdenum sulphide function as lubricants? Explain. (8)
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