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Question Paper Code : 11006

B.E./B.Tech. DEGREE EXAMINATION, JUNE 2011.

Common to all B.E./B.Tech. (Except Marine Engineering)

Second Semester

183202 — ENGINEERING CHEMISTRY — II

(Regulation 2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is an ion selective electrode?
2. What is the significance of electrochemical series? Mention any two uses.
3. State Pilling Bedworth rule. Name two metals in which the specific volumes of their oxides are greater than that of the metals.
4. What is rust? What is its chemical formula?
5. Define cetane number. Mention the cetane number of two hydrocarbons.
6. Mention any two advantages of LPG over other gaseous fuels.
7. Distinguish between annealing and hardening.
8. State the condensed phase rule and its uses.
9. What are the limitations of Beer Lambert's law?
10. What are chromophores? Give an example.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the Nernst equation for single electrode potential. (8)
- (ii) The standard reduction potential of Cu is 0.34 V and the concentration of Cu^{2+} ion is 0.015 M. Find (8)
- (1) Reduction electrode potential of Cu;
- (2) Free energy change of electrode reaction.

Or

- (b) (i) Explain the following electrodes with a neat diagram, representation, electrode potential, electrode reactions, demerits and merits. (8)
- (1) SHE (Standard Hydrogen Electrode)
- (2) Calomel Electrode
- (ii) What is the principle of acid base conductometric titration? Draw and explain the strong acid-strong base conductometric titration briefly with a suitable example. (8)
12. (a) (i) Distinguish between chemical and electrochemical corrosion. (8)
- (ii) Explain any two types of corrosion briefly. (8)

Or

- (b) (i) State and also explain the various factors that influence the rate of corrosion. (8)
- (ii) Discuss the different methods of corrosion control in brief and explain any one method of cathodic protection in detail, with a suitable diagram. (8)
13. (a) (i) How do you analyse the coal? What are the factors to be considered to analyse the coal? What are the advantages of ultimate analysis over proximate analysis of coal? (8)
- (ii) Discuss the principle, construction and working of an Orsat apparatus. (8)

Or

- (b) (i) What is synthetic petrol? Discuss the method of preparation of synthetic petrol by Bergius process. (8)
- (ii) What is cracking? What are its types? Explain the moving bed catalytic cracking process in detail. (8)

14. (a) (i) Explain the simple eutectic system of Pb-Ag with a neat diagram. (8)
(ii) What are alloy steels? Why there is a need for alloying steels? What are its applications? (8)

Or

- (b) (i) Explain the phase diagram of water system in detail. (8)
(ii) What are non-ferrous alloys? Write the composition, properties and uses of various varieties of brass and bronze. (8)

15. (a) Write a note on the following:

- (i) UV Visible spectrophotometer (8)
(ii) Estimation of Ni by AAS. (8)

Or

- (b) Write a note on the following:

- (c) IR Spectroscopy (8)
(d) Flame Photometry. (8)