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C–14–A/AA/BM/CHST/AEI/FW/MET/MNG/IT/TT/PKG/PPT–104

4004

BOARD DIPLOMA EXAMINATION, (C–14)

APRIL/MAY—2015

FIRST YEAR (COMMON) EXAMINATION

ENGINEERING CHEMISTRY AND
ENVIRONMENTAL STUDIES

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Draw the shapes of *p*- and *d*-orbitals.

2. Define oxidation and reduction with one example each.

3. Define mole. Calculate the number of moles present in 90 gram of H_2O.

4. What is conjugate acid-base pair? Give an example.

5. Define standard electrode potential and emf.

6. What is osmosis? Give an example.

7. Give the preparation method and uses of *(a)* Teflon, and *(b)* PVC.

8. What are the characteristics of a good fuel?

9. Write a short note on acid rain.

10. Define producers, consumers and decomposers.

PART—B

10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. *(a)* Write about electronic theory of valency. 5

(b) What is electronic configuration? Explain Aufbau principle and Hund's rule. 5

12. *(a)* What is molarity? Calculate molarity of 500 ml NaOH solution containing 6 gram of NaOH. (At. Wts. : Na–23; O–16; H–1) 5

(b) Write about Lewis theory of acids and bases. What are its limitations? 5

13. *(a)* Define the terms *(i)* ore, *(ii)* mineral, *(iii)* slag, *(iv)* gangue, and *(v)* flux. 5

(b) What is levigation? 3

(c) What is an alloy? What are the advantages of alloying? Give examples. 2

14. *(a)* Distinguish between electrolytic cell and galvanic cell. 3

(b) What is electrolysis? Explain electrolysis of fused NaCl. 4

(c) The standard reduction potentials of zinc electrode and copper electrode are –0·76 V and +0·34 V respectively. Find the standard e.m.f. of the following cell : 3

$$Zn \mid Zn^{2} \ (1\ M) \parallel Cu^{2} \ (1\ M) \mid Cu$$

15. *(a)* What is electrochemical theory of corrosion? Explain the formation of stress cell. 5

(b) What is cathodic protection? Explain the sacrificial anode method of preventing corrosion. 5

16. *(a)* Describe ion-exchange method to soften hard water. 7

(b) Differentiate between temporary hardness and permanent hardness. 3

17. *(a)* Define plastics. What are the characteristics of plastics? 5

(b) What is vulcanization? Explain the process. 5

18. *(a)* What is air pollution? What are the causes of air pollution? 5

(b) Write notes on *(i)* depletion of ozone layer, and *(ii)* greenhouse effect. 5

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