

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY—MARCH, 2014

APPLIED SCIENCE-I (Chemistry)

(Common except DCP and CABM)

[Time : 1½ hours

(Maximum marks : 50)

PART—A

(Maximum marks : 4)

Marks

- I Answer the following questions in one or two sentences. Each question carries 2 marks.
- (a) Define Normality.
- (b) Give reason for the hardness of water. (2×2=4)

PART—B

(Maximum marks : 16)

(Answer any two full questions. Each question carries 8 marks)

- II (a) The concentration of glucose (C₆H₁₂O₆) in normal blood is approximately 90 mg. per 100 ml. What is the molarity of the glucose? 4
- (b) What are radicals? Give two examples. 4
- III (a) Explain redox reaction with an example. 4
- (b) Draw a flow chart for the production of potable water for municipal supply. 4
- IV (a) Explain the disadvantages of hardwater. 4
- (b) What are the applications of carbon nanotubes? 4
- (2×8=16)

PART—C

(Maximum marks : 30)

(Answer one full question from each unit. Each question carries 15 marks.)

UNIT—I

- V (a) Balance the following equations :
- (i) $\text{NH}_3 + \text{Cl}_2 \rightarrow \text{N}_2\text{H}_4 + \text{NH}_4\text{Cl}$
- (ii) $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$ 4
- (b) Write down the molecular formula of following compounds :
- (i) Calcium sulphate (iii) Potassium carbonate
- (ii) Ammonium phosphate (iv) Magnesium nitrate 4

(c) (i) Calculate the pH of an aqueous ammonia solution that has an OH^- concentration of 1.9×10^{-3} M.

(ii) Calculate the pH of a 0.025M HNO_3 solution.

(d) Explain neutralization reaction with an example.

OR

VI (a) Classify the following as Lewis acid and Lewis base.
 H_2O , Al^{3+} , Cl^- , NH_3 , Fe^{2+} , OH^- , BF_3 , Na^+ .

(b) Calculate the molecular weight of following compounds :

(i) $\text{C}_{12}\text{H}_{22}\text{O}_{11}$

(iii) Fe_2O_3

(ii) H_2SO_4

(iv) $\text{C}_4\text{H}_8\text{O}_2$

(c) A bottle of 12.0 N hydrochloric acid has only 35.7 ml left in it. What will the HCl concentration be if the solution is diluted to 250.0 ml?

(d) Define ionic product of water. Write its expression.

UNIT—II

VII (a) List the properties of carbon nanotube.

(b) What is sterilization of water? Mention the different methods of sterilization of water.

(c) Explain chemical vapour deposition method for the synthesis of carbon nanotube.

(d) Explain different types of filtration used in water treatment.

OR

VIII (a) What are the characteristics of potable water?

(b) Explain ion exchange method.

(c) What are the applications of nanomaterials in medicine?

(d) Explain High pressure carbon monoxide deposition method for the synthesis of carbon nanotube.