S1 - ME, PL, AR

TED (10) – 1003 B

(REVISION — 2010)

Reg. No. .....

Signature .....

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/ TECHNOLOGY— MARCH, 2015

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.

1. Define valency and calculate the valency of 'A' in AX_3 provided 'X' is a monovalent anion.
2. Give reason for the constant p^H of blood. (2×2=4)

PART—B

(Maximum marks : 16)

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

II (a) Explain the removal of permanent hardness by ion-exchange resins.

(b) Give any four applications of carbon nanotubes.

III (a) Calculate the amount of water to be added to a 100ml of 1N HCl solution to make it into 0.1N.

(b) Define ionic product of water and give the expression.

IV (a) Classify the following as lewis acids and bases :

(i) $AlCl_3$ (ii) CO_2 (iii) OH (iv) SIF_4.

(b) Explain the term radical and give two examples.

(2×8=16)

Marks

PART—C

(Maximum marks : 30)

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

UNIT—I

V (a) Calculate the weight of iron which will be converted into its magnetic oxide (Fe_3O_4) by the action of 9g of steam. ($3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$) (At. wt of Fe = 56) 4

(b) Write down the redox reaction in a Daniel cell, and give the oxidant and reductant. 4

(c) Give the reason for : the pH of 10^{-8} M HCl is < 7. 4

(d) Define :

(i) Standard solution in an acid base titration (ii) pH range of indicators. 3

OR

VI (a) Balance the following equation $AI_4C_3 + H_2O \rightarrow AI(OH)_3 + CH_4$. 3

(b) Define oxidation number and find out oxidation number of 'S' in :
(i) SO_4^{2-} (ii) SO_2 . 4

(c) What are the different types of buffer solutions ? 4

(d) 50mL of NaOH solution was neutralised by 40mL of an acid of normality 0.5. Find the normality of the base. 4

UNIT—II

VII (a) What does it mean by sterilization of water, mention different methods of sterilization ? 4

(b) What are the classification of nano materials ? 4

(c) Give disadvantages of hard water. 4

(d) Define nano materials and give two examples. 3

OR

VIII (a) Explain the high pressure carbon monoxide deposition method. 4

(b) Differentiate between hard water and soft water. 4

(c) Write a note on coagulation. 3

(d) What are the medicinal applications of carbon nano tubes. 4