TED (15) –1004

Reg. No.....

(REVISION — 2015)

Signature .....

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/ TECHNOLOGY — OCTOBER/NOVEMBER, 2016

ENGINEERING CHEMISTRY - I

(Common for all programmes except DCP)

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer all questions in one or two sentences. Each question carries 2 marks.

1. Define nano chemistry. Give any two examples for nano sized materials.
2. Define homogeneous catalysis with one example.
3. What is sterilization ? Mention any two sterilization methods.
4. Explain the concept of conjugate acid base pair with example.
5. What is powder metallurgy ? (5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer *any five* questions from the following. Each question carries 6 marks.

1. (a) Mention any four applications of nano materials. 2
   (b) What are carbon nano tubes and what are the different varieties of CNTs ? 4
2. (a) Name the catalysts and catalytic promoter used in Haber's process and contact process. 4
   (b) Explain negative catalysis with two examples. 2
3. (a) Define equivalent weight of acid and base. Calculate of equivalent weight Fe $(OH)_3$ and H_3PO_4. 4
   (b) Define Buffer solutions with examples. 2
4. (a) What are the treatment process used to make potable water ? 4
   (b) Mention any two characteristics of potable water. 2

Marks

5. Mention the composition and uses of the following alloys.
   (i) Brass (ii) Bronze (iii) Solder 6

6. (a) Give the causes for the temporary hardness and permanent hardness of water. 3
   (b) Explain the ion exchange method for the removal of permanent hardness of water. 3

7. What is the choice of indicator in the following titrations and why ?
   (i) $H_2C_2O_4 \times KOH$ (ii) $HCl \times K_2CO_3$ (iii) $HNO_3 \times NaOH$ 6

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Write a note on catalysis. 4
   (b) Explain the methods for the synthesis of carbon nano tubes. 4
   (c) Distinguish between atom and molecule. 4
   (d) Calculate the number of electrons, protons and neutrons of the following elements.
   (i) $_8O^{16}$ (ii) $_{12}Mg^{24}$ (iii) $_1H^1$ 3

OR

IV (a) Write a note on application for carbon nanotubes in medical field. 4
   (b) Name any three fundamental particles of matter and their characteristics. 3
   (c) Write a note on carbon nano tubes. 4
   (d) Explain influence of promoter and poison in the rate of a reaction. 4

UNIT — II

V (a) Write a note on buffer solutions. 4
   (b) Write a note on acid base theories. 3
   (c) Write a note on Industrial applications of P^H value. 4
   (d) A solution is prepared by dissolving 0.4g NaOH in 2 L of water. What is the P^H of the resulting solution ? 4

OR

VI (a) Briefly explain the neutralization reaction according to Arrhenius concept and Lewis concept. 4
   (b) Calculate the P^H values of the following
   (i) 0.0002 M $Ba(OH)_2$ (ii) 0.002 M acetic acid 4
   (c) Briefly explain the concept of self-ionization of water. 3
   (d) 25ml of potassium hydroxide solution was neutralized by 30 mL of hydrochloric acid of normality 0.01. Find the normality of potassium hydroxide solution . 4

Marks

UNIT — III

VII (a) Distinguish between temporary hardness and permanent hardness. 3

(b) Explain the process involved to make potable water in municipal supply of drinking water with the help of block diagram. 4

(c) Briefly explain the disadvantages of hard water in industrial usage. 4

(d) What is meant by reverse osmosis ? Mention any two advantageous. 4

OR

VIII (a) Distinguish between soft water and hard water. 4

(b) What are the chemical changes occur in the sterilization of water by bleaching powder ? 3

(c) List the characteristics of potable water. 4

(d) Limitations of hard water in using domestic use. 4

UNIT — IV

IX (a) Mention any four physical properties of metals. 4

(b) Briefly explain the methods for the preparation of alloys. 3

(c) What are the advantageous of using powder metallurgy ? 4

(d) Briefly explain the effects of impurities in steel. 4

OR

X (a) What is alloy ? Explain the purposes of making alloys. 4

(b) Explain the steps involved in powder metallurgy. 4

(c) Explain the limitations of powder metallurgy. 3

(d) Explain the terms :

(i) Annealing (ii) Quenching

(iii) Tempering (iv) Nitriding 4
