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TED (15) –1004

(REVISION — 2015)

Reg. No..............................

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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

[47]

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

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