TED (15) – 1004

(REVISION — 2015)

Reg. No. ....

Signature ....

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/ TECHNOLOGY — APRIL, 2017

ENGINEERING CHEMISTRY - I

(Common to all Diploma Programmes except DCP)

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

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

1. What are nanomaterials ? Give two examples.

2. What is heterogeneous catalysis ? Write one example.

3. What are conjugate pairs ? Give one example.

4. List any four physical properties of water.

5. What is amalgum ?

$(5 \times 2 = 10)$

PART — B

(Maximum marks : 30)

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

1. Calculate the equivalent weight of (a) $NaHCO_3$ and (b) Na_2CO_3.

2. Calculate the molarity of solution prepared by dissolving 2g of NaOH in 500ml of water.   What is its normality ?

3. Differentiate between atoms and molecules.

4. What is temporary hardness of water ? How it can be removed ?

5. What are carbon nanotubes ? How they are classified ? Explain.

6. What is bleaching powder ? How it sterilizes water ?

7. What are alloys ? Explain fusion method for the preparation of alloys. $(5 \times 6 = 30)$

[244]

Marks

PART — C

(Maximum marks : 60)

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

Unit — I

III (a) Explain any three methods employed for the synthesis of carbon nanotubes.   6

    (b) What are the different properties and applications of carbon nanotubes ?   6

    (c) What is catalysis ? Give two examples.   3

Or

IV (a) What are the applications of nanomaterials ?   5

    (b) Explain heterogeneous catalysis with two specific examples.   5

    (c) Explain the classification of nanomaterials.   5

Unit — II

V (a) Using Lewis concept of acids and bases explain the formation of NH_4^+ and H_3O^+ ions.   5

    (b) Find out the volume of 0.2M HCl required to neutralize 20ml of 0.1M NaOH.   5

    (c) Explain the ionic product of water with necessary equations. What is its value ?   5

Or

VI (a) Calculate the P^H of 0.001M NaOH solution.   6

    (b) What are the buffer solutions ? Explain the types of buffer with examples.   6

    (c) List any three applications of P^H ?   3

Unit — III

VII (a) Explain the steps involved in the making potable water with the help of flow chart.   6

    (b) Differentiate between hard and soft water.   3

    (c) Explain ion exchange method used for the removal of hardness with equations.   6

Or

VIII (a) Explain reverse osmosis with necessary diagrams.   6

    (b) Explain the different sterilization methods employed in the production of potable water.   6

    (c) What are the characteristics of potable water ?   3

Marks

UNIT — IV

IX (a) Explain the terms :

(i) Annealing (ii) Quenching (iii) Tempering (iv) Nitriding   6

(b) Explain the various steps involved in powder metallurgy.   6

(c) What are the major purposes of making alloys ?   3

OR

X (a) Write down the advantages, disadvantages and applications of powder metallurgy.   8

(b) What are the components of (i) Bronze and (ii) Duralumin ?   4

(c) Write down any three physical properties of metals.   3

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