

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 amalgam ?

(5 × 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)  $\text{NaHCO}_3$  and (b)  $\text{Na}_2\text{CO}_3$ .
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 × 6 = 30)

## 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  $\text{NH}_4^+$  and  $\text{H}_3\text{O}^+$  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  $\text{P}^{\text{H}}$  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  $\text{P}^{\text{H}}$  ? 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

## UNIT — IV

Marks

- 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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