TED (15) – 1004

(REVISION — 2015)

Reg. No. .....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019

ENGINEERING CHEMISTRY - I

[*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 materials. Give two examples.
2. Define alloys. Give two examples.
3. Explain conjugate acid - base pair. Give one example.
4. Define powder metallurgy.
5. List any four physical properties of water. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. (a) Explain positive and negative catalyst with one example for each.
   (b) Define atomic number and mass number.
2. (a) Write any four applications of carbon nano tubes.
   (b) Calculate the pH of 0.002M H_2SO_4.
3. (a) What is hard water ? Give the reason for temporary hardness of water.
   (b) Define pH scale. Write its mathematical expression.
4. (a) What is reverse osmosis ? Write any two advantages.
   (b) Define :
   (i) Basicity of acid (ii) Acidity of base
5. (a) What is an indicator ? What are the indicators used in the following titrations ?
   (i) HNO_3 × NaOH (ii) CH_3COOH × KOH
   (b) Hard water cannot be used for washing purposes. Give reason.

Marks

6. (a) Define the term 'sterilization' of water. Mention any two methods used for sterilization.

   (b) Write any two applications of nano materials.

7. (a) Explain the preparation of alloys by Fusion method with the help of a diagram.

   (b) Give the composition of the following :

   (i) Brass (ii) Bronze $(5 \times 6 = 30)$

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Explain any two methods for the synthesis of carbon nanotubes. 4

(b) Explain homogeneous and heterogeneous catalysis with one example for each. 4

(c) Give any four properties of carbon nanotubes. 4

(d) Give three differences between atom and molecule. 3

OR

IV (a) Give the names of the three important fundamental particles present in atom. Write their absolute charge and mass. 4

(b) What are called carbon nano tubes ? Explain the different types of carbon nanotubes. 4

(c) Explain the terms catalytic promoter and catalytic poison with one example each. 4

(d) Calculate the number of protons, neutron and electrons present in the following atoms.

(i) $^{24}_{12}Mg$ (ii) $^{12}_{6}C$ (iii) $^{23}_{11}Na$ 3

UNIT — II

V (a) What are buffer solutions ? How are they classified ? Write one example for each type. 4

(b) Explain Arrhenious theory and Lewis theory of acids and bases with one example for each. 4

(c) Write any four applications of P^H. 4

(d) 20 ml of KOH solution was neutralized by 30ml of HCl solution of normality 0.01. Find the normality of KOH. (K=39, O=16, H=1). 3

OR

Marks

VI (a) Explain Lowry bronsted concept of acids and bases with one example for each. 4

(b) Calculate the pH of 0.001M NaOH solution. 4

(c) Define ionic product of water. Give its mathematical statement. 4

(d) Explain the following terms :

(i) Standard solution (ii) End point (iii) Titration 3

UNIT — III

VII (a) Explain ion exchange method for the removal of permanent hardness of water. 4

(b) Give any four characteristics of potable water. 4

(c) Explain the desalination of seawater using reverse osmosis. 4

(d) Distinguish between hard and soft water. 3

OR

VIII (a) Explain with the help of a block diagram the different steps involved in the purification of water. 4

(b) Distinguish between temporary and permanent hardness of water. 4

(c) Explain the disadvantages of hard water. 4

(d) Explain any one method for the removal of temporary hardness of water. 3

UNIT — IV

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

(b) Explain the following methods of heat treatments of steel.

(i) Annealing (ii) Quenching

(iii) Tempering (iv) Nitriding 4

(c) Explain the effects of any two impurities on the properties of steel. 4

(d) Give any three uses of powder metallurgy. 3

OR

X (a) Explain the steps involved in powder metallurgy. 4

(b) Give any four purposes of making alloys. 4

(c) Give any two advantages and any two limitations of powder metallurgy. 4

(d) Give a comparison of cast iron and wrought iron with respect to three physical properties. 3