TED (15) – 1004

(REVISION — 2015)

Reg. No. ....

Signature ....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 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.   What is hard water ?   Give the reason for hardness.

2.   Give any two physical properties of water.

3.   What is the role of Platinum in contact process for the manufacture of H_2SO_4 ?

4.   Human Blood has a constant P^H of 7.4. How is this maintained ?

5.   What is alloy ?   Why is Carbon added to Iron in the manufacturing of steel ?

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1.   Explain the important features of solid catalyst with suitable examples.

2.   What is bronsted theory of acids and bases ?   Write the conjugate pair of the following.
   (a)   HCl   (b) HNO_3
   (c) NH_3 (d) CH_3COO^-

3.   Write any three important applications of p^H. Calculate the p^H of 0.01M H_2SO_4.

4.   What is CNT ?   Write its important properties.

5.   (a)   What are the disadvantages of using hard water in boiler ?

   (b)   What is sterilisation of water ?   Mention any two methods.

6.   Explain fusion method for the preparation of Brass. Give the composition of Brass.

7.   Write the physical properties of metals.   (5×6 = 30)

[4]

Marks

PART — C

(Maximum marks : 60)

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

Unit — I

III (a) Distinguish between atom and molecule.   5

(b) Give any 4 applications of nanomaterial.   4

(c) What are catalytic promoter and catalytic poison ? Give 2 examples each.   6

Or

IV (a) Give the applications of CNT.   5

(b) Explain any two methods of preparation of CNT.   4

(c) What is homogeneous and heterogeneous catalysis ? Give 2 examples.   6

Unit — II

V (a) What is neutralisátion ? Explain on the basis of Arrhenius theory and Lewis theory.   5

(b) What is ionic product of water ? Give its mathematical statement and value at 25°C.   4

(c) Calculate the Normality and Molarity of

    (i) H_2SO_4 solution containing 4.9 gm of acid in 500ml.
      (At wt of S - 32, H - 1, O - 16)

    (ii) Na_2CO_3 solution containing 5.3gm of base in 500ml.
      (At wt of Na - 23, C-12, O-16)   6

Or

VI (a) What is a buffer solution ? How is it classified, give examples.   5

(b) Calculate the pH of (i) 0.01 M HCl

                  (ii) 0.01 M NaOH   4

(c) What are indicator ? Suggest a suitable indicator for the titration of
    (i) $HCl \times Na_2CO_3$ (ii) $CH_3COOH \times NaOH$. Justify your answer.   6

Unit — III

VII (a) Explain Ion Exchange method for removal of permanent hardness of water.   5

(b) What are the advantages of reverse osmosis in desalination of water ?   4

(c) What is potable water ? What are the characteristics of potable water ?   6

Or

			Marks

VIII (a) What is desalination of water ? Explain desalination by reverse osmosis.   5

    (b) What is temporary hardness ? A solution of $Ca(HCO_3)_2$ is boiled and the residue obtained is filtered off. Is the remaining solution soft water explain your answer.   4

    (c) Draw a flow chart and explain the process of making potable water.   6

Unit — IV

IX (a) What are the purposes of making alloy ?   5

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

    (c) Explain : (i) annealing (ii) Quenching (iii) Tempering and (iv) Nitriding.
How does it affect the properties of steel ?   6

Or

X (a) Impurities in steel changes the physical properties. Give the effect of the following elements in steel.

       (i) P   (ii) S   (iii) N   (iv) O   and   (v) M_n 5

    (b) What are the uses of powder metallurgy ?   4

    (c) Explain powder metallurgy with the different steps involved.   6