N19-00115

TED (15) – 1004

(REVISION — 2015)

Reg. No. .....

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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)

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 neutralisation ? 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 HC1
(ii) 0.01 M NaOH 4

(c) What are indicator ? Suggest a suitable indicator for the titration of
(i) HCl × Na_2CO_3 (ii) CH_3COOH × 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