



N19-00115

TED (15) – 1004

Reg. No. ....

(REVISION — 2015)

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)

## 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)  $\text{H}_2\text{SO}_4$  solution containing 4.9 gm of acid in 500ml.  
 (At wt of S - 32, H - 1, O - 16)  
 (ii)  $\text{Na}_2\text{CO}_3$  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)  $\text{HCl} \times \text{Na}_2\text{CO}_3$  (ii)  $\text{CH}_3\text{COOH} \times \text{NaOH}$ . 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 $\text{Ca}(\text{HCO}_3)_2$ 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

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|--|---|
| 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.<br>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.<br>(i) P      (ii) S      (iii) N      (iv) O      and      (v) $\text{M}_n$ | 5 |
| (b) What are the uses of powder metallurgy ?  | 4 |
| (c) Explain powder metallurgy with the different steps involved.  | 6 |