

TED (15) 1004 A
(Revision-2015)

A20-00012

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, APRIL-2020

ENGINEERING CHEMISTRY-I

[Maximum marks: 75]

(Time: 2.15 Hours)

PART – A

(Answer any *three* questions in one or two sentences. Each question carries 2 marks)

- I. (1). Define atomic number and mass number.
(2). What is the basic principle of volumetric analysis.
(3). What is the advantages of Chlorine in Purification of water.
(4). Give composition of Bronze and Solder.
(5). Define heat treatment of steel. (3 x 2 = 6)

PART – B

(Answer any *four* of the following questions. Each question carries 6 marks)

- II. (1). What are nanomaterials? Give any five applications of nanomaterials.
(2). Define pH. Calculate the pH of 0.01 M HCl and 0.05 M H₂SO₄ solutions.
(3). Give the reason for temporary hardness of water. Explain two methods of removal of temporary hardness of water.
(4). What is the role of indicator in volumetric analysis? Which indicator is used in the following titration? Justify your answer.
(a). Nitric acid x Potassium carbonate and (b). Oxalic acid x Potassium Hydroxide.
(5). Explain break point chlorination and desalination of sea water.
(6). Write down the composition, melting point and malleability of cast iron, wrought iron and steel.
(7). Explain the terms with one example for each.
(i). positive catalyst. (ii). Negative catalyst (iii). Promoter. (4 x 6= 24)

PART – C

(Answer *any of the three units* from the following. Each question carries 15 marks)

UNIT –I

- III. (a). Write any five differences between atom and molecule. (5)
(b). Explain the terms with example. (i). activity. (ii). Selectivity. (5)
(c). Explain any two method of preparation of carbon nano tubes. (5)

OR

- IV. (a). (i). Write absolute charge and mass of fundamental particles. (3)
(ii). Calculate the number of protons, electrons and neutrons of ${}_6\text{C}^{12}$ and ${}_{11}\text{Na}^{23}$. (2)
(b). Explain homogeneous and heterogeneous catalysis with example. (5)
(c). Explain any three properties and applications of carbon nano tubes. (5)

UNIT-II

- V. (a). What are the applications of pH. (5)
(b). Calculate equivalent weights of the following compounds.
(i). H_2SO_4 (ii). $\text{Ca}(\text{OH})_2$ (Atomic weight of S = 32 and Ca = 40) (5)
(c). Calculate the molarity of KOH solution prepared by dissolving 2.88 g of KOH in 500ml of water (Atomic weight of K = 39). (5)

OR

- VI. (a). What is the relationship between pH and pOH. Calculate the pH of 0.01 M NaOH solution. (5)
(b). Explain Arrhenius and Bronsted Lowry concept of acids and bases with examples. (5)
(c). Explain acidic and basic buffers with example. (5)

UNIT-III

- VII. (a). What is the cause of permanent hardness of water? How it can be removed. (5)
(b). What are the characteristics of potable water. (5)
(c). Explain the role of bleaching powder and ozone in the purification of water. (5)

OR

- VIII. (a). Write any five physical properties of water. (5)
(b). Briefly explain the steps involved in the preparation of potable water. (5)
(c). Write any five disadvantages of hard water. (5)

UNIT-IV

- IX. (a). Write any five physical properties of metals. (5)
(b). Write any three advantages and limitations of powder metallurgy. (5)
(c). Explain fusion method of preparation of alloy with diagram. (5)

OR

- X. (a). Briefly explain the steps involved in the powder metallurgy process. (5)
(b). Explain tempering and nitriding. (5)
(c). What is an alloy? Explain any four purposes of making alloy. (5)