

TED (15/19) -1004
(Revision- 2015/19)

A21-07052

Reg.No.....
Signature.

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – APRIL -2021.

ENGINEERING CHEMISTRY-I

(Maximum Marks : 75)

[Time : 2.15 hours]

PART-A

Marks

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

1. What is a carbon nanotube? Mention two varieties of CNTs.
2. Define buffer capacity.
3. What is an alloy? Give the composition of solder.
4. Name the compounds that cause permanent hardness.
5. Define atomic number and mass number.

(3x2=6)

PART - B

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

1. Calculate the normality of solution prepared by dissolving 2g of NaOH in 1000 ml of water. What is its molarity?
2. What are the important properties of CNTs?
3. Write any 4 applications of pH.
4. Briefly describe homogeneous and heterogeneous catalyst.
5. Write the properties of potable water.
6. Discuss the physical properties of metals.
7. Distinguish between soft water and hard water.

[4x6 =24]

PART - C

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

UNIT I

- III** (a) Distinguish between atom and molecule. (5)
- (b) Calculate the number of electrons, protons and neutrons of the following elements. (4)
- ${}_{7}\text{N}^{14}$, ${}_{6}\text{C}^{12}$, ${}_{1}\text{H}^3$, ${}_{8}\text{O}^{16}$
- (c) Give four applications of carbon nano tubes. (6)

OR

- IV** (a) Explain the application of nanomaterials. (4)
- (b) Discuss the terms with one example.
(i) catalytic poison (ii) catalytic promoters
(iii) positive catalyst (iv) negative catalyst
- (c) Discuss the three methods of synthesis of carbon nanotube. (6)

UNIT- II

- V** (a) Define buffer solutions. Explain acidic and basic buffers with 1 example each. (7)
- (b) What is ionic product of water? Give mathematical expression? (4)
- (c) What are the indicators used in the following titrations? (4)
- | | | | | | | |
|----------------------------------|---|--------------------------|--|----------------|---|-------------------------|
| $\text{H}_2\text{C}_2\text{O}_4$ | X | NaOH | | HCl | X | KOH |
| H_2SO_4 | X | Na_2CO_3 | | HNO_3 | X | K_2CO_3 |

OR

- VI.** (a) Find out the volume of 0.2 M HNO_3 required to neutralize 20ml of 0.1M KOH. (5)
- (b) Discuss the Lowry Bronsted concept and Arrhenius theory of acids and bases. (6)
- (c) What is the basic principle of volumetric analysis. (4)

UNIT- III

- VII** (a) Explain the steps involved in the making of potable water. (6)
- (b) Explain reverse osmosis with diagrams. (5)
- (c) Write two methods for the removal of temporary hardness of water. (4)

OR

- VIII** (a) Explain the different sterilization methods employed in the production of potable water. (9)
- (b) What is permanent hardness of water? How it can be removed? (6)

UNIT – IV

- IX** (a) Explain the terms (i) Annealing (ii) Quenching (iii) Tempering (iv) Nitriding. (6)
- (b) What are the uses of powder metallurgy? (4)
- (c) What are the purpose of making alloy. (5)

OR

- X** (a) Give the effect of impurities in the physical properties of steel. (5)
- (b) What are the components of bronze and duralumin? (4)
- (c) Explain the different steps involved in powder metallurgy. (6)
