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

A24 - 0007250

Reg.No………………
Signature……………

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL - 2024

ENGINEERING CHEMISTRY - I

(Maximum Marks:100) (Time: 3 Hours)

PART - A
(Maximum Mark : 10)

Marks

I. Answer **all** the questions in one or two sentences. Each question carries 2 marks.

1. Write two properties of carbon nano tube.
2. Define quenching. Give any one property of quenched steel.
3. Define buffer solution with one example.
4. Give the composition of
   a) Brass b) Solder
5. Name any two salts which produce permanent hardness.

(5 x 2 = 10)

PART - B
(Maximum Mark: 30)

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

1. a) Give Arrhenius concept of acid and base with one example for each. (3)
   b) 0.365 gram HC1 was dissolved in 100ml of the solution. Calculate pH of the solution. (3)
2. a) Explain Clark's method for the removal of temporary hardness. (3)
   b) Draw the flow chart for the production of potable water in municipal supply. (3)
3. a) Name two methods of synthesis of carbon nano tube, and explain any one. (3)
   b) Give a brief note on the charge and mass of fundamental particles. (3)
4. a) Write three purposes of alloying. (3)
   b) What is meant by sintering in powder metallurgy. (3)

5. a) Define equivalent weight of a base. Calculate the equivalent weight of $Ca(OH)_2$. (3)

b) Distinguish between standard solution and normal solution. (3)

6. a) What is meant by sterilization of water? Give the sterilizing action of bleaching powder. (3)

b) Distinguish between temporary hardness and permanent hardness. (3)

7. a) Write three physical properties of metals. (3)

b) Mention any three impurities in steel and write their effect on properties of steel. (3)

(5 x 6 = 30)

PART – C

(Maximum Mark: 60)

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

UNIT - I

III a) Distinguish between homogeneous catalysis and heterogeneous catalysis with one example each. (5)

b) What are carbon nano tubes. Write three applications of carbon nanotube. (5)

c) Define atomic number and mass number. Give the number of electrons, protons and neutrons present in $_{17}CI^{35}$ and $_{1}H^{1}$. (5)

OR

IV. a) What are nano materials. Write four applications of nano materials. (5)

b) Explain the terms 'catalytic promotor' and 'catalytic poison' with one example for each. (5)

c) Define atom. Why it is electrically neutral. Give three differences between atom and molecule. (5)

UNIT – II

V. a) Explain Lewis concept of acid and base. Classify the following into Lewis acids and bases, i) CI^- ii) BF_3 iii) Ni^{2+} iv) NH_3 (5)

b) Calculate the pH and pOH of NaOH solution obtained by dissolving 0.02gram NaOH in 500ml solution. (5)

c) What are indicators. Write the indicator used in the following titrations

i) CH_3COOH x NaOH ii) H_2SO_4 x K_2CO_3 iii) HNO_3 x KOH (5)

OR

VI. a) Explain conjugate acid-base pair with one example and find out the conjugate acid and conjugate base of i) H_2O ii) HSO_4^- (5)

b) Calculate the normality of H_2SO_4 solution containing 2.45 gram of the acid in 500 ml solution. Find out the volume of this solution which reacts with 20ml of 0.2N NaOH solution. (5)

c) Define pH of the solution. Write three applications of pH. (5)

UNIT – III

VII. a) What is meant by desalination of water. How is it done using reverse osmosis, Explain with the help of diagram. (5)

b) Explain ion-exchange method for the removal of hardness. (5)

c) Explain any three disadvantages and two advantages of hard water. (5)

OR

VIII. a) What is meant by potable water? Give any four characteristics of it. (5)

b) Distinguish between soft water and hard water. (5)

c) Explain i) coagulation and ii) filtration in water treatment. (5)

UNIT – IV

IX. a) What is meant by heat treatment? Explain i) annealing ii) tempering of steel. (5)

b) Define alloy and explain with figure 'Fusion method' for the preparation of alloys. (5)

c) Give three advantages and two limitations of powder metallurgy. (5)

OR

X. a) Explain the following steps involved in powder metallurgy

i) Blending ii) Compacting. (5)

b) What is meant by powder metallurgy. Give any three applications of powder metallurgy. (5)

c) Give the composition of cast iron, wrought iron and steel. Compare cast iron and wrought iron giving any two properties. (5)

(4 x 15 = 60)

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