

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – NOVEMBER -2020.

ENGINEERING CHEMISTRY-II

(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. Write the electronic configurations of Na ($Z = 11$) and Ca ($Z = 20$).
2. Write the principal and azimuthal quantum numbers of 4f orbital.
3. Classify the following as strong and weak electrolytes.

HCl, CH₃COOH, NH₄OH, NaOH.

4. List any two advantages of optical fibre.
5. Name any two acids present in acid rain.

(
(3x2=6)

PART - B

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

1. (a) Write two important advantages of Bohr model of atom.
(b) Draw the shapes of P_x, P_y, P_z atomic orbitals. (3+3 = 6)
2. (a) Explain the formation of a chemical bond using octet rule.
(b) Explain ionic bonding in CaF₂. (3+3 = 6)
3. (a) State Faradays first law of electrolysis and explain the concept of electrochemical equivalent.
(b) Explain the working of a Daniel cell with cell reactions taking place at anode and cathode. (3+3 = 6)
4. (a) Find the emf of the following cell.
$$\text{Cu (s) / Cu}^{2+} \text{ (aq) // Ag}^+ \text{ (aq) / Ag (s)}$$
$$[E^0 \text{ Cu}^{2+}/\text{Cu} = + 0.34 \text{ V and } E^0 \text{ Ag}^{2+}/\text{Ag} = + 0.84 \text{ V}]$$

(b) Explain the reactions when
 1. Iron nail is dipped in copper sulphate solution.
 2. Copper wire added to silver nitrate solution. (3+3 = 6)

5. (a) Write two tests to detect unsaturation in an organic compound.
 (b) Write any three properties that makes carbon atom unique. (3+3 = 6)
6. (a) Write the monomers of the following
 i) TEFLON ii) PVC iii) Natural rubber.
 (b) Explain addition polymerisation and condensation polymerisation with one example for each. (3+3 = 6)
7. (a) Explain the following
 i) Water gas ii) Producer gas.
 (b) Write the importance of nuclear fuels with examples. (3+3 = 6)
- (4x6=24)

PART - C

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

UNIT -1

- III (a) State the important postulates of Bohr's model of atom. 5
 (b) Calculate deBroglie wavelength of a ball of mass 0.1 Kg moving with a velocity 10 ms^{-1} ?
 ($h = 6.626 \times 10^{-34} \text{ Kg m}^2 \text{ s}^{-1}$) 5
 (c) The uncertainty in position and velocity of a particle are 10^{-8} m and 10^4 ms^{-1} respectively. Find the mass of the particle. ($h = 6.626 \times 10^{-34} \text{ Kg m}^2 \text{ s}^{-1}$) 5

OR

- IV (a) Explain a covalent bond. Explain the multiple covalent bonding in O_2 and N_2 molecules. 5
 (b) What is a coordinate bond? Explain coordinate bond formation in NH_4^+ and H_3O^+ ions. 5
 (c) Define hydrogen bond. Explain the formation of hydrogen bond in H_2O and NH_3 molecules. 5

UNIT -II

- V (a) Explain how materials are classified based upon electrical conduction? Give one example for each. 5
 (b) Write the reaction taking place at anode and cathode during the electrolysis of aqueous and molten NaCl. 5
 (c) Write any five applications of electrolysis. 5

OR

- VI (a) List any five methods for the prevention of corrosion. 5
 (b) Explain the working of a fuel cell using Hydrogen-Oxygen fuel cell as an example. Write any two advantages of fuel cells. 5
 (c) What is corrosion? Explain the electrochemical theory of rusting of iron. 5

UNIT- III

- VII (a) Distinguish between organic and inorganic compounds. 5
(b) What are refractories ? Write the general properties of refractories. 5
(c) What is glass ? Explain the different types of glass. 5

OR

- VIII (a) Distinguish between homopolymers and copolymers with two examples for each. 5
(b) Write the difference between thermoplastic and thermosetting plastics. Give one example for each. 5
(c) What is vulcanisation? Write any two merits of vulcanised rubber. 5

UNIT-IV

- IX (a) Write any five characteristics of a good fuel. 5
(b) What is cracking? Distinguish between thermal and catalytic cracking. 5
(c) Write a note on liquid fuels. 5

OR

- X (a) Explain how acid rain is formed. What are the consequences of it? 5
(b) Explain 1) Green House effect. 2) Ozone depletion 5
(c) Explain the concept of Green Chemistry. Write any two applications of it. 5
