

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

ENGINEERING CHEMISTRY-II

[Maximum Marks: 100]

[Time: 3 Hours]

PART-A

[Maximum marks: 10]

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

1. How many electrons can be accommodated in the 3rd shell of an atom?
2. Copper sulphate is not stored in iron vessels. Why?
3. What are secondary cells? Give an example.
4. What are copolymers? Give one example.
5. List two problems that arise due to ozone layer depletion.

[5x2=10]

PART-B

[Maximum marks: 30]

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

1. (a) State Pauli's exclusion principle. Illustrate with an example. [4]
(b) Which subshell gets occupied first by an electron: 3d or 4s? Name the rule behind this. [2]
2. (a) What is a coordinate bond? Give an example. [4]
(b) H₂O is a liquid while H₂S is a gas. Give reason? [2]
3. (a) Write the electrode reactions of a H₂-O₂ fuel cell. [4]
(b) What is meant by anodising? [2]
4. (a) List any 4 environmental factors that affect rate of corrosion. [4]
(b) State Faraday's first law of electrolysis. [2]
5. (a) What are homopolymers and copolymers? Give an example each. [4]
(b) What is catenation? [2]
6. (a) What are functional groups? Give the functional group present in aldehydes and ketones. [4]
(b) Which is the monomer of Teflon? Give one use of Teflon. [2]
7. (a) What is Greenhouse effect? What are its major causes? [4]
(b) Name two gases responsible for Greenhouse effect. [2]

[5 x 6 = 30]

PART-C

[Maximum marks: 60]

[Answer *one* full question from each unit. Each full question carries 15 marks]

UNIT-I

- III. (a) Write the subshell wise electronic configuration of Aluminium ($Z=13$) [4]
& Argon ($Z=18$).
- (b) Differentiate an orbit from an orbital. [6]
- (c) State Heisenberg's Uncertainty principle. The uncertainty in position [5]
and velocity of the particle are 0.1 nm and $5.2 \times 10^{-24} \text{ ms}^{-1}$
respectively. Calculate its mass (Take $h=6.6 \times 10^{-34} \text{ Js}$).

OR

- IV. (a) State and illustrate octet rule with suitable examples. Give two [4]
examples for molecules that violate octet rule but are still stable.
- (b) What is an ionic bond. Explain the formation of ionic bond in CaO . [6]
- (c) State whether the following statements are true or false. [5]
- (i) The melting points of ionic compounds are usually high.
- (ii) NH_3 is a covalent compound.
- (iii) Chlorine is more electronegative than Fluorine.
- (iv) $3s$ electron in Na has the Quantum No. $n=3, l=2, m=1, s = \frac{1}{2}$
- (v) The shape of an orbital is described by the angular momentum quantum number .

UNIT-II

- V. (a) What is a Daniel Cell? Represent it diagrammatically. Give the half- [5]
cell reactions at the anode and cathode.
- (b) List any five characteristics of electrolytic conductors. [5]
- (c) What is an electrochemical series? What is its use? [5]

OR

- VI. (a) What is Cathodic Protection and Sacrificial Protection? [5]
- (b) What are inert electrodes and active electrodes? [5]
- (c) Distinguish strong electrolytes from weak electrolytes. Give an [5]
example for each.

UNIT-III

- VII. (a) List any four properties expected for refractory materials. [4]
(b) Give a brief account of any two synthetic rubbers. Give its uses. [6]
(c) Which is/are the monomer units in Nylon 6 and Nylon 66. Draw their polymeric structure. [5]

OR

- VIII. (a) Organic compounds exhibit isomerism. Substantiate this statement using any two examples. [4]
(b) What are thermosetting plastics? Give 2 examples. Thermosetting plastics cannot be recycled. Why? [6]
(c) Explain briefly on borosilicate glass, giving due importance to its composition and uses. [5]

UNIT-IV

- IX. (a) List any five qualities of an ideal fuel. [5]
(b) What is air pollution? Give a brief account of gaseous air pollutants. [5]
(c) What is acid rain? How is it caused? What are its consequences? [5]

OR

- X. (a) Briefly explain about Photochemical smog. [5]
(b) List any 5 principles of Green Chemistry [5]
(c) What is meant by Cracking? What are the two types of cracking? [5]
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