

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

ENGINEERING CHEMISTRY - II

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

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

1. Bohr's orbits are also known as stationary states. Why ?
2. Write two examples each for weak electrolytes and non-electrolytes.
3. List any two advantages of optical fibres.
4. How can we reduce the rate of global warming of atmosphere ?
5. Define the terms Pollution and Pollutant.

(5 × 2 = 10)

PART — B

(Maximum marks : 30)

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

1. (a) Explain the concept of quantum numbers needed to specify an electron in an atom.
- (b) Sodium chloride is a bad conductor in the solid state. Why ? (4 + 2 = 6)
2. (a) What are the factors which favour rusting of iron ?
- (b) What is a secondary cell ? Give two examples. (4 + 2 = 6)
3. (a) Bakelite & PVC are two commonly used polymers. Write the monomers of the polymers and any two uses of the polymers.
- (b) What is catenation ? Give two elements which show maximum catenation. (4 + 2 = 6)
4. (a) What is cracking ? Write two advantages of catalytic cracking.
- (b) Write two harmful effects of acid rain. (4 + 2 = 6)
5. (a) What are multiple covalent bonds ? Give two examples.
- (b) Which orbital is non - directional ? (4 + 2 = 6)

6. (a) Define the following terms :

(i) Functional group (ii) Isomerism

(b) List two techniques used in green chemistry to minimize pollution.

(4+2 = 6)

7. (a) What are fuel cells ? Write two advantages of fuel cells. (4+2 = 6)
 (b) Can we store Copper Sulphate solution in a Zinc vessel. Give suitable explanation.

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Write the de Broglie relation for a material particle. Calculate the de Broglie wavelength for an electron moving with a velocity of 10^7ms^{-1} .

$$h = 6.625 \times 10^{-34} \text{kgm}^2\text{s}^{-1}, m = 9.1 \times 10^{-31} \text{kg}$$

- (b) State Hund's rule of maximum multiplicity. Illustrate it using two examples.
 (c) List three merits and two demerits of Bohr model of atom.

OR

IV (a) State Aufbau principle. Write the electronic configuration of Na (Z = 11) and K (Z = 19).

(b) Define an orbital. Draw the shape of s, p_x, p_y, and p_z orbital.

(c) What are the main postulates of Bohr's theory of atoms ?

UNIT — II

V (a) Distinguish between electronic and electrolytic conduction.

(b) A galvanic cell reaction is given below.



Write the cell notation, reactions at the electrodes and compute e. m. f.

$$(\text{Given } E^0 \text{Ni}^{2+}/\text{Ni} = -0.25 \text{V}, E^0 \text{Zn}^{2+}/\text{Zn} = -0.76 \text{V})$$

(c) What is corrosion ? How are underground iron pipes protected from corrosion ?

OR

VI (a) Write any five applications of electrolysis.

(b) Distinguish between electrolytic cell and galvanic cell.

(c) Explain electrochemical theory of corrosion.

Marks

VII (a) Distinguish between organic and inorganic compounds.

(b) What are refractories ? How are they classified ? Give one example for each.

(c) State the significance of the numbers in the polymer names - Nylon 6:6 and Nylon 6. Write the monomers of Nylon 6:6 and Nylon 6.

OR

VIII (a) Distinguish between saturated and unsaturated compounds with one example for each.

(b) Write the monomer present in natural rubber. How will you make natural rubber hard ? Write two advantages of this process.

(c) Describe the uniqueness of Carbon atom.

UNIT — IV

IX (a) What are the qualities of a good fuel ?

(b) Explain the following :

(i) Green House Effect (ii) Acid Rain

(c) What is green chemistry ? Mention three principles of green chemistry.

OR

X (a) Define calorific value of a fuel. What do you mean by gross and net calorific values ?

(b) Write the constituents of Natural gas and Gobar gas and mention any two uses of Natural gas.

(c) How are fuels classified based on the physical state ? Compare them

UNIT — III

Marks