TED (15) – 2004

(REVISION — 2015)

Reg. No.....

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2017

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. State Pauli's exclusion principle.
2. What is galvanization ?
3. What is the effect of temperature on the electrical conduction of metals and electrolytes ?
4. Identify the functional groups in the following molecules.

   (i) CH_3-CH_2-$COOCH_3$ (ii) CH_3-CH_2-CH_2-NH_2
5. Give two examples of a nuclear fuel. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. (a) Explain hydrogen bonding with an example.

   (b) Write the equation to calculate the wavelength of matter waves and explain the terms. (4+2=6)

2. (a) Reduction potentials of Zn and Ag electrodes are -0.76 V and 0.80 V respectively:

   (i) Compute the e.m.f. if a cell is constructed using these electrodes.

   (ii) Which metal displaces the other from its solution? Give reason.

   (b) Mention any two differences between electroplating and anodising. (4+2=6)

Marks

3. (a) Distinguish between saturated and unsaturated organic compounds with one example.

   (b) What is safety glass ? (4+2=6)

4. (a) Distinguish between classical smog and photochemical smog.

   (b) Mention any two applications of green chemistry in day to day life. (4+2=6)

5. (a) State Aufbau principle and write the electronic configuration of fluorine and argon.

   (b) Draw the shapes of s and p_x orbitals. (4+2= 6)

6. (a) What is a salt bridge ? What are its functions ?

   (b) Give two examples each for primary cells and secondary cells. (4+2= 6)

7. (a) What is natural rubber ? How can you modify the properties of natural rubber.

   (b) What are refractories ? (4+2= 6)

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Give the postulates of Bohr's model of atom. 6

(b) State Octet rule. Explain how it is followed in NaC1 molecule. 5

(c) Write the possible values of n, l, m, and s for an electron in $3p$ orbital. 4

OR

IV (a) State Heisenberg's uncertainty principle. Calculate the uncertainty in the velocity of an electron if the uncertainty in position is 10^{-10} m. ($h = 6.625 \times 10^{-34} kgm^2 s^{-1}$, $m_e = 9.1 \times 10^{-31} kg$). 6

(b) Differentiate between an orbit and an orbital. 5

(c) State Hund's rule. Show that the presence of three unpaired electrons in nitrogen is in accordance with Hund's rule. 4

UNIT — II

V (a) Explain the working of H_2- O_2 fuel cell with the help of a labelled diagram. Write the reactions involved. 6

(b) What is electrochemical series ? Give any three applications of electrochemical series. 5

(c) Explain electrochemical theory of corrosion. 4

OR

Marks

VI (a) Define electrolysis. Explain the electrolysis of aqueous Sodium Chloride. 6

(b) State Faraday's laws of electrolysis and give their mathematical expression. 5

(c) Distinguish between chemical and electrochemical corrosion. 4

UNIT — III

VII (a) Write short notes on :

(i) catenation (ii) tetracovalency (iii) isomerism 6

(b) Distinguish between thermoplastics and thermosetting plastics. Give one example for each. 5

(c) Mention any four advantages of optical fibres over conventional copper cables. 4

OR

VIII (a) How polymers classified, based on the type of polymerization ? Explain with one example each. 6

(b) Mention any five differences between organic and inorganic compounds. 5

(c) Give any two synthetic rubbers and their monomers. 4

UNIT — IV

IX (a) Explain cracking with an example and give two advantages of catalytic cracking over thermal cracking. 6

(b) What is soil pollution? What are its major causes and effects ? 5

(c) Compare solid, liquid and gaseous fuels. 4

OR

X (a) How is ozone produced in the stratosphere ? How is it depleted and give its consequences. 6

(b) List any five characteristics of a good fuel. 5

(c) What is water pollution ? Write three important sources of water pollutants. 4
