TED (15) – 2004

(REVISION – 2015)

Reg. No. .....

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SECOND SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY — APRIL, 2017

ENGINEERING CHEMISTRY – II

(Common to all branches except DCP & CABM)

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

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

1. Why are Bohr's orbit called energy levels ?
2. What are strong and weak electrolytes ?
3. Name one synthetic polymer which is an amide and give its monomer.
4. Name two gases which are responsible for green house effect.
5. Which type of metal can be used in cathodic protection of iron against rusting ?

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. (a) Write any three differences between ionic and covalent compounds.
   (b) What is hydrogen bonding ? Illustrate with an example. (3+3= 6)
2. (a) State Faraday's second law of electrolysis and give its mathematical expression.
   (b) What is rust ? List the conditions of rusting. (3+3= 6)
3. (a) What is the uniqueness of carbon atom ?
   (b) What is condensation polymerization ? Give one example. (3+3= 6)
4. (a) Write the constituents of the following gaseous fuels.
   (i) Blue gas (ii) Producer gas (iii) Gobar gas
   (b) Write one effect each for the following air pollutants.
   (i) CO (ii) NO_2 (iii) SO_2 (3+3= 6)

Marks

5. (a) What is electroplating and any two purposes of electroplating ?

   (b) List any three merits of Bohr model of atom. (3+3= 6)

6. (a) Distinguish between orbit and orbital.

   (b) Write the principle and azimuthal quantum numbers of the following orbitals.

   (i) 5*d* (ii) 4*s* (iii) 4*f* (3+3= 6)

7. (a) Write the monomers of the following polymers.

   (i) Nylon6 (ii) Buna-S (iii) Bakelite

   (b) Give a brief description about photochemical smog. (3+3= 6)

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) State Heisenberg's uncertainty principle. The uncertainty in the position and velocity of a particle are 0.1m and 5.27×10^{-24} ms^{-1} respectively. Calculate the mass of the particle. ($h = 6.625 \times 10^{-34}$ $kgm^2 s^{-1}$) 6

(b) State octet rule. Show how octet rule is followed in the formation of oxygen and nitrogen molecules. 5

(c) Draw the shape of *s*, p_x, p_y and p_z orbitals. 4

OR

IV (a) Write de Broglie relationship and explain the terms. Calculate the wavelength of a body of mass 10^{-7} kg moving with a velocity of 10 ms^{-1}. ($h = 6.625 \times 10^{-34}$ $kgm^2 s^{-1}$) 6

(b) State Pauli's exclusion principle. The ground state electronic configuration listed here are incorrect. Explain what mistakes have been made in each and write the correct electronic configuration.

(i) A1 – $1s^2, 2s^2, 2p^4, 3s^2, 3p^3$

(ii) B – $1s^2, 2s^2, 2p^5$

(iii) F – $1s^2, 2s^2, 2p^6$ 5

(c) What is a dative bond ? Give two examples. 4

UNIT — II

V (a) Write down the cell reaction, cell notation and compute e.m.f. : A strip of Ni dipped in Ni^{2+} ions solution and a strip of Ag dipped in a solution of Ag^+ ions are combined to form a cell. Given $E^0Ni^{2+}/Ni = -0.24V$, $E^0Ag^+/Ag = 0.799V$. 6

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

(c) Explain the chemistry behind rusting of iron. 4

OR

Marks

VI (a) Certain galvanic cells are designed to convert chemical energy directly to electrical energy :

(i) Name the above type of galvanic cells and one example for it

(ii) Represent the reaction taking place at the electrodes and net cell reaction of the above cell

(iii) Mention any two applications of the above cell. 6

(b) What is anodising and mention any two purposes of it ? 5

(c) List any four methods to control corrosion. 4

UNIT — III

VII (a) Distinguish between thermoplastics and thermosetting plastics. Give two examples for each. 6

(b) What are refractories ? How is it classified ? Give one example for each. 5

(c) Write two tests to distinguish between saturated and unsaturated organic compounds. 4

OR

VIII (a) Distinguish between homopolymers and copolymers with two examples for each. 6

(b) What is vulcanization ? List any three properties of vulcanized rubber. 5

(c) What is an optical fibre ? Give three uses of it. 4

UNIT — IV

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

(b) What is acid rain and give any three consequences of it ? 5

(c) What are the basic aims of green chemistry ? 4

OR

X (a) Define calorific value of a fuel. List any four qualities of a good fuel. 6

(b) Compare solid, liquid and gaseous fuels. 5

(c) What are pollutants ? How are they classified ? Give two examples. 4