



TED (15) – 2004

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Signature

SECOND SEMESTER DIPLOMA EXAMINATION IN
ENGINEERING/TECHNOLOGY — OCTOBER, 2016

ENGINEERING CHEMISTRY – II

(Common to all branches except DCP and 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. Arrange the following orbitals in the order of their increasing energies.
 $3s, 3d, 4s$ and $4p$
2. Define electrochemical equivalent of a substance.
3. Identify the functional groups in the following molecules.
(i) $\text{CH}_3\text{-CO-CH}_2\text{-CH}_3$ (ii) $\text{CH}_3\text{-CHO}$
4. Name any two acids present in acid rain.
5. Give two examples for anti-rust solutions. (5×2 = 10)

PART— B

(Maximum marks : 30)

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

1. (a) What information about an electron does each of the four sets of quantum numbers (n, l, m and s) provide ?
(b) Draw the formation of a coordinate bond using any one example. (4+2=6)
2. (a) State Faraday's laws of electrolysis.
(b) Conductivity of 1M nitric acid is greater than 1M oxalic acid. Why ? (4+2=6)
3. (a) What are refractories and how are they classified based on their physical nature ? Give one example for each.
(b) How are polymers classified based upon origin ? Give one example for each. (4+2=6)
4. (a) List four characteristics of a good fuel.
(b) Define the term pollution and pollutant. (4+2=6)



Marks

5. (a) Draw the shapes of s , p_x , p_y and p_z orbitals.
(b) Which of the following orbital configuration is wrong? Justify.
- (i) $2p_x^1 p_y^1 p_z^1$ (ii) $2p_x^2 p_y^1 p_z^0$
(iii) $2p_x^1 p_y^1 p_z^0$ (iv) $2p_x^0 p_y^1 p_z^1$ (4+2=6)
6. (a) Explain the reactions taking place when
(i) Zn rod is dipped in dil. H_2SO_4
(ii) Zn rod is dipped in $CuSO_4$ solution
(b) An electrochemical cell is constructed using Zn ($E^0 Zn^{2+} / Zn = -0.76V$) and cobalt ($E^0 Co^{2+} / Co = -0.28V$). Calculate the e.m.f. of the cell. (4+2=6)
7. (a) Distinguish between natural and synthetic rubber.
(b) Give two tests for unsaturation. (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) Explain the formation of ionic bond and covalent bond using, one example each. 6
(b) Write the possible values of n , l , m and s for an electron present in the 4th orbit. 5
(c) Calculate de Broglie wavelength of an electron moving with a velocity of $7.286 \times 10^4 \text{ ms}^{-1}$ ($h = 6.626 \times 10^{-34} \text{ kgm}^2\text{s}^{-1}$, $m_e = 9.1 \times 10^{-31} \text{ kg}$). 4

OR

- IV (a) Mention the important postulates of Bohr's model of an atom. 6
(b) State Heisenberg's uncertainty principle. The uncertainty in position and velocity of a particle are 0.1m and $5.27 \times 10^{-24} \text{ ms}^{-1}$ respectively. Calculate the mass of the particle. ($h = 6.626 \times 10^{-34} \text{ kgm}^2\text{s}^{-1}$) 5
(c) Define the term electronegativity and which is the most electronegative element? Which type of bond is usually formed between two elements of almost same electronegativity? 4

UNIT — II

- V (a) How are materials classified based upon electrical conduction? Give two examples for each. 6
(b) Write the electrode reactions taking place during the electrolysis of molten and aqueous NaCl. Which of this process gives NaOH as the byproduct? 5
(c) Explain electrochemical theory of corrosion. 4

OR



	Marks
VI (a) Write the conditions and mechanism of rusting of iron.	6
(b) $Al/Al^{3+}/Sn/Sn^{2+}$ represents a galvanic cell.	
(i) Which is the anode and which is the cathode ?	
(ii) Write the electrode and net cell reactions.	
(iii) What is the direction of current flow ?	5
(c) Distinguish between electronic and ionic conductors.	4

UNIT – III

VII (a) Define thermoplastics and thermosetting plastics. Give two examples for each.	6
(b) What are glasses ? Mention any four of its properties and four varieties.	5
(c) Comment on the catenation and isomerism phenomena generally observed in organic compounds.	4

OR

VIII (a) Crude rubber is not generally used as an engineering material.	
(i) List any four limitations of crude rubber.	
(ii) Name the process to modify crude rubber and explain the process.	
(iii) What is ebonite ?	6
(b) What are optical fibres ? Mention any two of its applications and two advantages.	5
(c) Write any four differences between organic and inorganic compounds.	4

UNIT – IV

IX (a) Explain cracking with an example. Distinguish between thermal and catalytic cracking.	6
(b) What is green chemistry ? Write any three practical applications of green chemistry in day-to-day life.	5
(c) What is meant by ozone umbrella ? How does depletion in ozone layer affect the environment ?	4

OR

X (a) Define calorific value of a fuel and give its unit. Calorific value of producer gas is much lower than water gas. Why ?	6
(b) What are the major causes of soil pollution and how can we control it ?	5
(c) (i) Arrange the different layers of the atmosphere in accordance with their distance from the earth's surface.	
(ii) List any two disastrous incidents of environmental pollution.	4



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