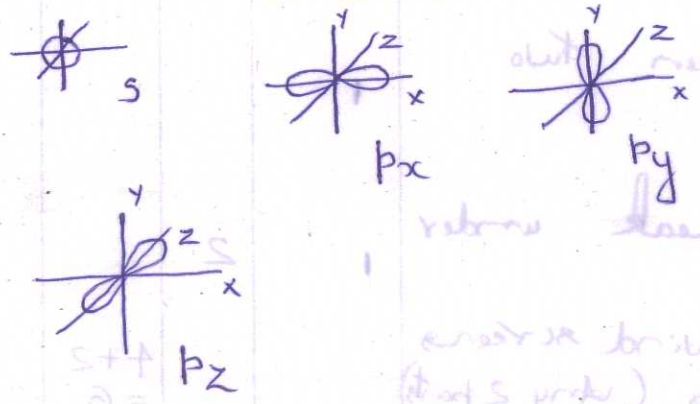
VERSION - A

# SCHEME OF EVALUATION

Revision : 2015 Course Code : TED(15) 2004

Course Title: ENGINEERING CHEMISTRY - II

| Qn: No. | Scoring indicators | Split up score | Sub Total | Total |
|---|---|---|---|---|
| | **Part A** | | | |
| I | | | | |
| 1. | Statement | 2 | 2 | |
| 2. | Coating of Zn on Fe or steel | 2 | 2 | |
| 3. | In a secondary cell, the chemical reactions can be reversed. It can be recharged and can be used again and again (any one point) | 1 | | |
| | eg: Lead storage battery (any 1 example) | 1 | 2 | |
| 4. | Communications, optic sensor, light guides, illumination (any two) | 1+1 | 2 | |
| 5. | Troposphere, stratosphere, Mesosphere, and Thermosphere | ½+½ +½+½ | 2 | |
| | | | | 5x2=10 |
| II | **Part B** | | | |
| 1(a) |   | 1+1+1+1 | 4 | |

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| (b) | $O_8 \rightarrow 1s^2\ 2s^2\ 2p^4$ | 1 | | |
| | $Cl_{17} \rightarrow 1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$ | 1 | 2 | 4+2=6 |
| 2(a) | Faraday's I Law statement | 2 | | |
| | Faraday's II Law statement | 2 | 4 | |
| (b) | Wet corrosion - Occurs in presence of moisture, formation of anodic and cathodic areas | 1 | | |
| | Dry corrosion - Occurs by the direct chemical action of gases with metal | 1 | 2 | 4+2=6 |
| 3(a) | Amine $\rightarrow R-NH_2$ | 1 | | |
| | aldehyde $\rightarrow R-CHO$ | 1 | | |
| | alcohol $\rightarrow R-OH$ | 1 | 4 | |
| | ether $\rightarrow R-O-R$ | 1 | | |
| (b) | Plastic in between two glass sheets | 1 | | |
| | Glass does not break under ordinary impact | 1 | 2 | |
| | Used for making wind screens of automobiles, aeroplanes (any 2 points) | | | 4+2 = 6. |

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| 4 (a) | pH of rainwater below 5.6. | | | |
| | Due to the dissolution of acidic gases like $SO_2$ and $NO_2$ | 2 | 4 | |
| | Any 2 consequences (damage to vegetation, Corrosion, attack marble etc) | 2 | | |
| (b) | Definition | 2 | 2 | 4+2 = 6. |
| 5 (a) | A salt bridge is an inverted U tube that contains an electrolyte in the semisolid form and connects the two half cells in a galvanic cell | 2 | | |
| | | | 4 | |
| | Any two functions | 2 | | |
| (b) | Definition EMF of a cell = $E_{Cathode} - E_{Anode}$ | 2 | 2 | 4+2 = 6. |
| 6 (a) | 2p | | | |
| | $n = 2$ $l = 1$ $m = -1, 0, +1$ $s = \pm 1/2$ | 1+1+1+1 | 4 | |
| (b) | Weak bond between H atom of one molecule and F, O or N atom of another molecule. | 1 | 2 | |
| | eg: HF, $H_2O$ (Any one eg) | 1 | | 4+2=6 |

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| 7 (a) | Any four differences between thermoplastics and thermosetting plastics | 4 | 4 | |
| (b) | Self linking property of an element | 2 | 2 | 4+2 = 6. |
| | **Part C** | | | |
| III (a) | Statement - All material particles such as electron, proton etc. possess wave nature as well as particle nature | 2 | | |
| | $\lambda = \frac{h}{mv}$ | 1 | 5 | |
| | $v = \frac{h}{m\lambda} = \frac{6.63 \times 10^{-34}}{9.1 \times 10^{-31} \times 5 \times 10^{-9}}$ | 1 | | |
| | $= 1.457 \times 10^{5}$ m/s | 1 | | |
| (b) | Merits (any 2) | 1+1 | | |
| | Demerits (any 3) | 1+1+1 | 5 | |
| (c) | Explanation of formation of Ionic bond with example (NaCl, $CaF_2$ any one) | 2½ | | |

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| | Explanation of covalent bond with any one example | $2\frac{1}{2}$ | 5 | 5+5+5 = 15. |
| IV | | | | |
| (a) | Any 4 differences between orbit and orbital | 5 | 5 | |
| (b) | Definition of octet rule | 2 | | |
| | Illustration using NaCl | 3 | 5 | |
| (c) | Definition of quantum numbers | 2 | | |
| | 4 types – $n$, $l$, $m$ and $s$ | 1 | | |
| | Significance of $n$, $l$, $m$ and $s$ values | $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$ | 5 | |
| | | | | 5+5+5 = 15 |
| V(a) | Any 4 differences between metallic and electrolytic conductors | 5 | 5 | |
| (b) | Definition of electrolysis | 2 | | |
| | Electrolysis of aq. NaCl | | | |
| | Anode $H^+ + 1e^- \rightarrow H$; $H + H \rightarrow H_2$ | $1\frac{1}{2}$ | 5 | |
| | Cathode $Cl^- \rightarrow Cl + 1e^-$; $2Cl \rightarrow Cl_2$ | $1\frac{1}{2}$ | | |

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| (c) | Explanation of any two methods like cathodic protection, Barrier protection. | $2\frac{1}{2}+2\frac{1}{2}$ | 5 | 5+5+5 = 15. |
| VI (a) | Labelled diagram | 2 | | |
| | Explanation (Electrodes, Electrolytes) | 1 | | |
| | Anode reaction ($Zn \rightarrow Zn^{2+} + 2e^-$) | 1 | 5 | |
| | Cathode reaction ($Cu^{2+} + 2e^- \rightarrow Cu$) | 1 | | |
| | or Overall reaction | | | |
| (b) | Any 4 differences between electroplating and anodizing | 5 | 5 | |
| (c) | Explanation | 3 | | |
| | Anode reaction | 1 | 5 | |
| | Cathode reaction | 1 | | |
| | | | | 5+5+5 = 15. |
| VII (a) | Any 4 differences between Saturated and unsaturated compounds | 5 | 5 | |
| (b) | Vulcanization is the process of heating rubber with S at 373 - 415 K in presence of ZnO (definition) | 1 | | |

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| | 5 forms Cross links | 1 | 5 | |
| | Any 3 advantages | 3 | | |
| (c) | Any 5 characteristics of refractories | 5 | 5 | 5+5+5 = 15. |
| VIII (a) | Any 4 differences between organic and inorganic compounds | 5 | 5 | |
| (b) | Classification – Addition polymerization explanation | 1½ | | |
| | eg: polythene, Buna-S (Any 1) | 1 | 1½+1+1½+1 = 5 | |
| | – Condensation polymerisation (explanation) | 1½ | | |
| | eg: Nylon-6,6, Bakelite | 1 | | |
| (c) | Nylon-6,6 → Adipic acid + Hexamethylene diamine | 1 | 5 | |
| | Buna-S → 1,3-Butadiene + Styrene | 1 | | |
| | Teflon → tetrafluoroethene | 1 | | |
| | PVC → Vinyl chloride | 1 | | |
| | Bakelite → Phenol + formaldehyde | 1 | | 5+5+5 = 15 |
| IX (a) | Ozone depletion (explanation) | 2 | 5 | |
| | Any 3 Consequences | 3 | | |

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| (b) | Any 5 qualities of a good fuel | 5 | 5 | |
| (c) | Any 4 differences between classical smog and photochemical smog | 5 | 5 | 5+5+5 = 15 |
| X | | | | |
| (a) | Any 3 comparison | 5 | 5 | |
| (b) | Definition of green house effect | 2 | | |
| | Any 3 consequences | 3 | 5 | |
| (c) | Definition of soil pollution | 2 | | |
| | Any 3 remedial measures | 3 | 5 | |
| | | | | 5+5+5 = 15 |