

B.E./ B.TECH DEGREE EXAMINATIONS, MAY/JUNE 2014

(Regulations 2009)

First Semester

COMMON TO ALL BRANCHES

CHY101: Engineering Chemistry

Time: Three Hours**Maximum Marks:****100****Answer all the Questions****PART A (10 x 1 = 10 Marks)**

- The tendency of an electrode to lose electrons is called as
 - reduction potential
 - redox potential
 - oxidation potential
 - neutral potential
- Conductivity of a solution is directly proportional to
 - dilution
 - number of ions
 - current density
 - volume of the solution
- The source of energy of the sun is
 - Natural radioactivity
 - Nuclear fission
 - Nuclear fusion
 - Combustion of hydrogen
- Lithium battery produces a cell voltage of
 - 2.0V
 - 2.5V
 - 3.0V
 - 1.5V
- _____ is an example of extensive property of a system.
 - viscosity
 - mass
 - temperature
 - pressure
- The First law of thermodynamics is commonly known as,
 - Principle of conservation of mass
 - Principle of conservation of momentum
 - Principle of conservation of energy
 - Principle of conservation of heat
- In the adsorption of oxalic acid on activated charcoal, the activated charcoal is known as
 - adsorber
 - adsorbent
 - absorber
 - adsorbate
- The adsorption of solids, from a solution is called
 - Chemical adsorption
 - Physical adsorption
 - Positive adsorption
 - Negative adsorption

- If the excited molecules re-emit the radiation almost instantaneously, it is called _____.
 - phosphorescence
 - Fluorescence
 - photoluminescence
 - refraction
- The finger print region lies between
 - 1400-700 cm^{-1}
 - 2400-600 cm^{-1}
 - 4000-1430 cm^{-1}
 - 700-400 cm^{-1}

PART B (10 x 2 = 20 Marks)

- What is electromotive series? What is its significance?
- Give suitable reason for the following: A salt bridge is used in the construction of electrochemical cell.
- What are the functions of control rods in a nuclear reactor?
- What are reversible cells? Give examples.
- Define an isothermal process.
- What is an entropy.
- What is chromatography?
- Mention some important characteristics of adsorption.
- State different modes of vibration are possible for benzene molecule?
- What are the types of various electronic transitions involved in organic molecules?

PART C (5 x 14 = 70 Marks)

- (i) Derive Nernst equation. Give its applications. (7)
 - (ii) What is the principle underlying conductometric titration? Explain strong acid & strong base titrations conductometrically. (7)

(OR)

- (i) Write notes on (i) overvoltage and (ii) Decomposition potential. (7)
 - (ii) State Kohlrausch's law of independent migration of ions and explain its applications. (7)
- (i) Describe the construction of lead-acid battery and explain the reactions occurring during charging and discharging. (7)
 - (ii) Explain $\text{H}_2\text{-O}_2$ fuel cell. Mention its applications. (7)

(OR)

- b) (i) Explain the construction and working of Nickel Cadmium battery. (7)
(ii) What is a nuclear reactor? Describe the components of light water nuclear power plant with a suitable block diagram. (7)
23. a) (i) Derive Van't Hoff isotherm. (8)
(ii) Derive an expression for entropy change of an ideal gas at constant temperature. (6)
- (OR)**
- b) (i) Derive Gibb's Helmholtz equation and discuss its applications. (8)
(ii) What are the limitations of first law of thermodynamics? Explain how second law of thermodynamics overcomes these limitations. (6)
24. a) (i) Discuss the factors which influence adsorption of a gas on a solid. (7)
(ii) Explain in detailed adsorption chromatography. (7)
- (OR)**
- b) (i) Derive Langmuir adsorption isotherm and mention its merits and demerits. (7)
(ii) Explain the role of adsorption in catalytic reactions. (7)
25. a) (i) Explain briefly the principle, instrumentation and estimation of sodium by flame photometry. (7)
(ii) What are the applications of IR spectrum in different fields? (7)
- (OR)**
- b) (i) Explain the various components and the working of UV – Visible spectrophotometer. (7)
(ii) Explain the principle, and estimation of Iron by colorimetry. (7)
