Subject Code: R10104/R10 | Set No - 1 |

I B.Tech I Semester Supplementary Examinations Nov./Dec. - 2015

ENGINEERING CHEMISTRY – I

(Common to All Branches)

Time: 3 hours   **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
✳ ✳ ✳ ✳ ✳

1. (a) What is osmosis? How is reverse osmosis used for desalination of water
   (b) How is concept of solubility product utilized in qualitative analysis
   [7+8]

2. (a) Discuss the manufacture of Ethyl alcohol from molasses by fermentation process
   (b) Explain the action of catalyst in terms of activation energy
   [8+7]

3. (a) What do you understand by ^{1}HNMR.Give its applications in engineering
   (b) Explain briefly florescence and phosphorescence
   [7+8]

4. (a) What are liquid crystals? Discuss their properties and applications
   (b) Explain semi conductivity in non stoichiometric oxide crystals
   [8+7]

5. (a) What is the significance of ultimate analysis of coal
   (b) Explain the working of thermal power station
   [8+7]

6. (a) Derive Nernst's equation for single electrode potential and explain the terms involved in it. Write its applications
   (b) Write a short note on fuel cell. How is it different from battery
   [8+7]

7. (a) Give any two differences between nuclear fission and nuclear fusion
   (b) Differentiate binding energy and bond energy
   [8+7]

8. (a) Explain how solar energy can be converted to electricity
   (b) What do you understand by green house effect?
   [8+7]

*****

Subject Code: R10104/R10

I B.Tech I Semester Supplementary Examinations Nov./Dec. - 2015
ENGINEERING CHEMISTRY – I
(Common to All Branches)

Time: 3 hours   **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
✳ ✳ ✳ ✳ ✳

1. (a) Explain the law of mass action and the Lechatelier principle. Apply them to the manufacture of sulphuric acid.
   (b) Comment on the statement; the entropy of the universe is always increasing''
   (c) Why does the self ionisation of water increase on dissolution of a salt and decreases with the dissolution of an acid or base

   [8+4+3]

2. (a) Write a note on homogeneous catalyst and heterogeneous catalyst
   (b) What are the factors that influence the Viscosity of a liquid?

   [7+8]

3. (a) Explain briefly florescence and phosphorescence
   (b) Explain in respect of NMR spectroscopy:
      (i) Chemical shift
      (ii) spin–spin interaction

   [7+8]

4. (a) What are liquid crystals? And mention the main characteristics of nematic, smectic and cholesteric liquid crystals
   (b) Write a note on super conductors

   [8+7]

5. (a) What is the significance of the results of ultimate analysis of coal
   (b) Describe how the calorific value of a solid fuel is determined by bomb calorimeter

   [7+8]

6. (a) Explain the working principle of methanol-oxygen fuel cell with reactions
   (b) What is concentration cell? Explain with example and derive the equation for emf of concentration cell without transference

   [7+8]

7. (a) What are the sources of nuclear fuels? Explain nuclear fusion Process
   (b) Write a note on binding energy and bond energy

   [9+6]

8. (a) Write the working principle of solar water heater
   (b) How is global warming taking place? What are its effects? Suggest ways to prevent global warming.

   [7+8]

*****

Subject Code: R10104/R10

Set No - 3

I B.Tech I Semester Supplementary Examinations Nov./Dec. - 2015
ENGINEERING CHEMISTRY – I
(Common to All Branches)
Time: 3 hours   **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
✳ ✳ ✳ ✳ ✳

1. (a) Explain the Lechtelier's principle with respect to the manufacture of sulphuric acid
   (b) Define Joul Thomson coffienfient and factors on which it is dependent
   [8+7]

2. (a) Explain briefly applications of colloids in science
   (b) Write down the catalyst conditions and chemical reactions involved in each of following industrial process
   (i) Haber's process (ii) contact's process (iii) oswalts's process (iv) Bosch process
   [7+8]

3. (a) Write a note on (i) Beer-Lambert law (ii) biosensors
   (b) What type of nuclei will give NMR spectra? Give two any examples of each type
   [8+7]

4. (a) Explain intrinsic and extrinsic semiconductors
   (b) Explain the working of CD drive
   (c) Write a note on superconductor
   [8+4+3]

5. (a) Describe on brief the manufacture of metallurgical coke by otto Hoffmann's oven method
   (b) Why a good fuel must have low ash content
   (c) How is nitrogen determined in solid fuel.
   [8+3+4]

6. (a) Explain the construction and functioning of a Daniel cell
   (b) Define fuel cell. Explain the construction and working of H_2O_2-fuel cell
   [7+8]

7. (a) Explain the essential parts of a nuclear reactor
   (b) Write a note on nuclear fission
   (c) Write a short note on binding energy
   [7+4+4]

8. (a) Write a note on greenhouse effect
   (b) Write briefly about photo voltaic cell
   [7+8]

✳✳✳✳✳

Subject Code: R10104/R10

Set No - 4

I B.Tech I Semester Supplementary Examinations Nov./Dec. - 2015
ENGINEERING CHEMISTRY – I
(Common to All Branches)

Time: 3 hours   Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks
✶ ✶ ✶ ✶ ✶

1. (a) Chemical equilibrium is also called dynamic equilibrium. Explain the statement
   (b) Write a note on joul- Thomson effect
   (c) What is osmosis and reverse osmosis

                                                                            [5+6+4]

2. (a) Explain the action of promoters in catalysis
   (b) Mention conditions favourable for fermentation
   (c) Derive an expression for the coefficient of viscosity of a gas using the kinetic theory of gases

                                                                            [6+5+4]

3. (a) State and explain the Einstein –Stark law of photo chemical equivalence.
   (b) Describe the principle of NMR spectroscopy

                                                                            [7+8]

4. (a) What are liquid crystals? How do they differ from crystalline state and liquid state?
   (b) What are intrinsic semiconductors? Explain the conduction in n- type and p-type semiconductors

                                                                            [7+8]

5. (a) Explain the determination of net calorific value of coal from the data of ultimate analysis
   (b) Explain proximate analysis of coal? How is it carried out? What is significance?

                                                                            [8+7]

6. (a) Explain the emf method for determination of a pH of a solution
   (b) How does fuel cell differ from a galvanic cell.
   (c) What is standard electrode potential? Give its importance

                                                                            [7+4+4]

7. (a) Differentiate between chemical fuel and nuclear fuel
   (b) Explain briefly nuclear fission and nuclear fusion

                                                                            [7+8]

8. (a) Explain How solar energy can be converted to electricity
   (b) Give a brief note on green house concept
   (c) Explain working principle of solar heater

                                                                            [5+5+5]

✶✶✶✶✶

Page 1 of 1