Code No: R10104/R10 **Set No. 1**

I B.Tech I Semester Regular Examinations, February 2013
ENGINEERING CHEMISTRY-I
(Common to Civil Engineering, Electrical & Electronics Engineering, Mechanical Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Chemical Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Information Technology, Electronics & Computer Engineering, Aeronautical Engineering, Automobile Engineering, Mining and Petroliem Technology)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) State the law of chemical equilibrium. How can it be derived on thermodynamic considerations?
   (b) What are various types of semi permeable membranes used in reverse osmosis process and what are their limitations? [8+7]
2. (a) How temperature, pressure and impurities influence the viscosity
   (b) Explain how viscosity method is useful to determine the molecular weight of polymers. [8+7]
3. (a) What is meant by interference and what are the interferences observed during working with ion selective electrodes.
   (b) Discuss important differences between photochemical and thermo chemical reactions? [8+7]
4. (a) What is super conductivity? Explain the phenomenon of super conductivity? Discuss its applications
   (b) Write any four differences between p-type and n-type semiconductors. [8+7]
5. (a)What are energy sources?
   (b)Write a short note on
   (i) Conventional energy sources (ii)Non conventional energy sources [7+8]
6. (a)Write a short note on batteries
   (b)Discuss the working principle of primary batteries? [7+8]
7. (a) Explain origin of solar energy and stellar energy.
   (b) Explain the principles and reactions in Atom bomb and Hydrogen bomb. [7+8]
8. (a) Write notes on photo voltaic power plant.
   (b) Write about solar thermal power plant. [8+7]

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Code No: R10104/R10 **Set No. 2**

I B.Tech I Semester Regular Examinations, February 2013
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Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What is Joule Thomson coefficient and why it is zero for an ideal gas?
   (b) What is meant by solubility product of a sparingly soluble salt? How is solubility product determined by conductivity measurements? [8+7]
2. (a) What are enzyme reactions? Explain with examples.
   (b) Write a short note on promoters and inhibitors. [8+7]
3. (a) Predict the number signal in ^{1}H-NMR spectrum for the following compounds (i) CH_3CH_2OH (ii) CH_3CH_2Cl (iii) CH_3-O-CH_3
   (b) State and explain Beers-Lamberts law [9+6]
4. (a) What is storage device? Explain primary and secondary storage devices.
   (b) What are thermo tropic, lyotropic liquid crystals? Explain [9+6]
5. (a) Explain the following terms?
   (i)Condensor (ii) Cooling towers
   (b) Explain the following terms?
   (i)super heater (ii)Reheater (iii)Air preheater [7+8]
6. (a) Explain the construction and working of Dry or laclanche cell?
   (b) Distinguish between a cell and a battery. Give the classification of working of cells with examples? [8+7]
7. (a) Discuss the importance of binding energy curve in the release of nuclear energy.
   (b) Calculate the binding energy of deutron nucleus, given that mass of neutron = 1.0087 amu, mass of proton = 1.0078 amu and mass of deutron nucleus = 2.0141 amu. (Ans: 2.22 Mev) [8+7]
8. (a) Write about non-concentrating and concentrating solar collectors.
   (b) How green house effect is useful to mankind. [8+7]

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Code No: R10104/R10 **Set No. 3**

I B.Tech I Semester Regular Examinations, February 2013
ENGINEERING CHEMISTRY-I
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Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What is solubility product of a salt? Explain with an example how the solubility of an ionic substance can be found if its solubility product value is known.
   (b) What is Joule Thomson effect? Derive the expression for J T coefficient. [8+7]
2. (a) What are Protective colloids and what is their significance?
   (b) Write a short note on colloidal solution and micelles. [8+7]
3. (a) What are the important differences between Fluorescence and Phosphorescence?
   (b) Write short note on ion selective electrode
   (c) Discuss the engineering applications of NMR spectroscopy. [6+4+5]
4. (a) Explain the working mechanism of LCD.
   (b) Superconductors are powerful engineering devices. How can you justify it?
   (c) Discuss various chemical components used in storage devices? Explain primary and secondary storage devices. [5+5+5]
5. (a) Write a note on Otto Hoffmans by – product oven process?
   (b) Mention the Recovery of bye – products in the above process? [8+7]
6. (a) What is emf. write a note on Redox reactions.
   (b) What are the differences between oxidation & reduction half reactions? [7+8]
7. Complete the following equations and identify *X, Y, Z, Q* and *R*. [5x3=15]
   (a) ${}^{24}_{11}Na \rightarrow X + {}_{-1}^{0}e$ (b) ${}^{24}_{11}Na + {}^{0}_{1}n \rightarrow {}^{14}Y + {}^{1}_{1}Z$
   (c) ${}^{27}_{14}Si \rightarrow {}^{27}_{13}Q + {}_{+1}^{0}e$ (d) $R + {}^{4}_{2}He \rightarrow {}^{13}_{7}N + {}^{1}_{0}n$ (e) ${}^{30}_{15}P \rightarrow {}^{30}_{14}Si + ...$
8. (a) What is solar energy? How is it harnessed?
   (b) How does solar energy can be converted into electricity? [7+8]

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Code No: R10104/R10 **Set No. 4**

I B.Tech I Semester Regular Examinations, February 2013
ENGINEERING CHEMISTRY-I
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Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the terms osmosis and reverse osmosis.
   (b) Describe the process of desalination using the principle of reverse osmosis. [8+7]
2. (a) What are Protective colloids and what is their significance?
   (b) Write a short note on colloidal solution and micelles. [8+7]
3. (a) What are the important differences between Fluorescence and Phosphorescence?
   (b) Write short note on ion selective electrode
   (c) Discuss the engineering applications of NMR spectroscopy. [6+4+5]
4. (a) Explain the principle of photocopying process by using selenium photoconductor
   (b) What are the important features of
   (i) Stoichiometric semiconducting materials and
   (ii)Controlled valency semiconducting materials? [7+8]
5. Write a short note on the following
   (a)Calorific value (b)Gross calorific value (c)Net calorific value. [15]
6. Derive Nernst's equation for single electrode potential and explain the terms involved in it. Write its applications [15]
7. (a) What is conversion factor? How does it determine the self maintenance of a nuclear reactor? How fissionable U^{235} is obtained?
   (b) Describe the various disposal methods of nuclear wastes. [8+7]
8. (a) Define solar constant. Give its value on the upper atmosphere and on the lower atmosphere.
   (b) How are solar energy devices are classified? Explain.
   (c) What is the use of plane mirror of a box type of solar cooker? [5+5+5]

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