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

I B.Tech I Semester Supplementary Examinations, Feb/Mar 2014
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) Apply the concept of solubility product for different types of salts and derive expressions for the same.
   (b) Calculate the solubility of $BaSO_4$ provided, its solubility product is $1.6x10^{-10}$. [8+7]

2. (a) The time of flow for certain volume of water through a viscometer is 120.5 sec. whereas the time of flow for the same volume of acetone is 49.5 sec. The densities of water and acetone at 293K are 9.982 X 10^2Kg.m^{-3} and 7.92 Kg.m^{-3} respectively. If the viscosity of water at 293K is 10.05 Pascal, calculate the viscosity of acetone.
   (b) Explain the uses of dialysis and ultrafiltration in the purification of colloidal solutions. [8+7]

3. Write short notes on the following
   (a) Biosensors
   (b) Ion-selective electrodes
   (c) Basic Principle involved in ^{1}H-NMR Spectroscopy [5+5+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. (a) Explain the determination & importance of Percentage of carbon and Hydrogen in ultimate Analysis
   (b) Discuss the working of bomb calorimeter ? [7+8]

6. (a) Write the different types of fuel cells?
   (b) Write down the characteristics of fuel cells? [8+7]

7. (a) What are Mass defect and Binding energy?

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(b) Explain nuclear stability using Binding energy concept? [8+7]

8. (a) What gases cause enhanced green house effect?

(b) What are its disadvantages? How can it be prevented? [7+8]

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

I B.Tech I Semester Supplementary Examinations, Feb/Mar 2014
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 solubility product and common ion effect.
   (b) What are the applications of solubility product ? [8+7]
2. (a) Discuss on industrial applications of colloids.
   (b) Discuss in detail the manufacture of ethyl alcohol from starch? [8+7]
3. (a) How can you estimate fluoride, chloride and nitrate ions quantitatively using ion-selective electrodes
   (b) Explain Coupling constant in brief. [12+3]
4. (a) Write note on various types of semiconductors
   (b) What is doping? Discuss different doping techniques to prepare semiconductors
   (c) Explain phenomenon of superconductivity [5+7+3]
5. (a) Explain carbonization of coal?
   (b) Differentiate low temperature and High temperature carbonization. [7+8]
6. (a) What is concentration cell? Explain with suitable example Derive the expression for emf of concentration cell?
   (b) Write notes on calomel electrode [10+5]
7. (a) Where are the atomic power stations in India? Mention them.
   (b) Describe the principle and working process of a nuclear power plant. [3+12]
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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Code No: R10104/R10 **Set No. 3**

I B.Tech I Semester Supplementary Examinations, Feb/Mar 2014
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 a semi-permeable membrane? Mention different types with examples.
   (b) What are the advantages, dis- advantages and limitations of reverse osmosis? [8+7]

2. (a) What are the different classes of colloidal systems? Explain with examples
   (b) Write about the important characteristics of enzymes. [8+7]

3. (a) Discuss ion-selective electrodes in detail and outline the interferences during their working.
   (b) What is the significance of Joblonski diagram in photochemistry? [9+6]

4. (a) What are smectic liquid crystals? How are they classified? Mention their salient features
   (b) Outline the various applications of superconductors [10+5]

5. (a) Define Calorific value, Higher (or) Gross calorific value, lower (or) Net calorific value?
   (b) Calculate the gross & net Calorific value of a sample of coal having following composition. C = 80% , H = 7% , O = 3% , S = 3.5% , N = 2.1% , and Ash = 4.4% [8+7]

6. (a) Write a notes on fuel cell
   (b) Discuss the working principle of primary batteries? [7+8]

7. Write short notes on the following:
   (a) Nuclear fission
   (b) Nuclear Fusion
   (c) Nuclear reactor [5+5+5]

8. (a) What is green house effect? Explain.
   (b) How it is useful to mankind? [8+7]

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Code No: R10104/R10 Set No. 4

I B.Tech I Semester Supplementary Examinations, Feb/Mar 2014
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) Write on the differences between osmosis and reverse osmosis
   (b) List out the conditions favorable for the higher yield of ammonia by applying Lechatelier's principle [8+7]
2. (a) Explain the determination of molecular weight of compound by viscosity method?
   (b) Discuss in detail the manufacture of acetic acid. [8+7]
3. (a) How can you interpreting ^{1}H-NMR spectra
   (b) Explain the theory of preparation, manufacturing of electrode and interferences in the determination of Fluoride ion [10+5]
4. (a) Write a detailed note on Chalcogen photoconductors and Defect semiconductors
   (b) Distinguish between p-type and n-type semiconductors [10+5]
5. (a) Explain carbonization of coal?
   (b) Differentiate low temperature and High temperature carbonization. [7+8]
6. (a) Explain the working of Calomel electrode?
   (b) Explain the working of Ag / AgCl electrode? [8+7]
7. (a) Explain the differences between chemical reactions and nuclear reactions.
   (b) What are radioactive isotopes? Discuss the applications of radio active isotopes. [8+7]
8. (a) What are the advantages and disadvantages of solar energy?
   (b) Discuss the principle and working of solar thermal power plant. [7+8]

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