

Code No: R10104/R10

Set No. 1

I B.Tech I Semester Supplementary Examinations, Oct/Nov 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 Petroleum Technology)
Time: 3 hours Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

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) Write notes on (i) contact catalysis (ii) catalytic poisons (iii) Tyndall effect (iv) electro-osmosis
(b) What are the important applications of colloidal science. [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) State and explain the following (i) Stoichiometric semiconducting materials (ii) Controlled valency semiconducting materials
(b) Write short note on the following (i) COMPACT DISK (ii) PEN DRIVE [7+8]
5. Write a Short note on the following
(a) Fuels
(b) Pulverised coal
(c) classification of fuels [15]
6. (a) Write a short note on calomel electrode?
(b) Distinguish between a galvanic cell and concentration cell? [8+7]
7. Write notes on the following:
(a) Nuclear Stability
(b) Mass Defect
(c) Binding Energy [5+5+5]
8. (a) Explain the advantages and disadvantages of solar energy.

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- (b) What is the difference between green house effect and global warming? How global warming can be prevented by growing plants? [7+8]

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Answer any FIVE Questions
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- Briefly explain how air-conditioning differs from refrigeration.
 - What are the advantages of reverse osmosis process of purifying brackish water? [8+7]
- Explain the following terms. I. Auto-catalysis II. Positive catalyst III. Negative catalyst IV. Catalytic poison
 - What is catalysis? Write down the important characteristics of catalyst. [8+7]
- What is the essential feature of nuclei to show NMR signal?
 - Outline the industrial applications of Chemiluminescence.
 - What are the engineering applications of sensors and bio-sensors? [5+5+5]
- Write an essay on smectic liquid crystals?
 - Explain phenomenon of superconductivity. [10+5]
- Why is peat not considered as an economical fuel.
 - Differentiate between coal and coke. [7+8]
- What is emf. write a note on Redox reactions.
 - What are the differences between oxidation & reduction half reactions? [7+8]
- What is a nuclear fission reaction? Give one example.
 - Write its any six characteristic properties. [8+7]
- Explain the advantages and disadvantages of solar energy.
 - What is the difference between green house effect and global warming? How global warming can be prevented by growing plants? [7+8]

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Set No. 3

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Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Discuss the effect of pressure on the following reactions
 - i. $H_2 + I_2 \rightarrow 2HI$
 - ii. $PCl_5 \rightarrow PCl_3 + Cl_2$
- (b) What are the catalysts used for the production of ammonia and sulphuric acid. [8+7]
2. (a) Define the following terms. I. catalyst II. Co-catalyst III. Negative catalyst
- (b) State and explain homogeneous catalysis with any three examples. [8+7]
3. Explain in brief about the following (i) Fluorescence (ii) Phosphorescence (iii) Chemiluminescence [5+5+5]
4. (a) Write an essay on smectic liquid crystals?
- (b) Explain phenomenon of superconductivity. [10+5]
5. (a) Write a note on Otto Kolbans by-product oven process?
- (b) Mention the Recover of by-products in the above process? [8+7]
6. (a) Write a short note on standard electrode potential?
- (b) Derive Nernst equation for standard electrode potential? [7+8]
7. (a) What is radioactive pollution? Describe different methods of disposal of radioactive wastes.
- (b) How can a nuclear reactor generates its own fuel from non-fissionable material in Breeder reactor? Explain with an example. [8+7]
8. Write notes on the following:
 - (a) Solar Energy
 - (b) Solar Cell
 - (c) Solar Panel [5+5+5]

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Engineering, Automobile Engineering, Mining and Petroleum Technology)
Time: 3 hours Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is a semipermeable membrane? What are the different materials that can be used for semipermeable membranes?
(b) Why there is a decrease in temperature of a real gas when it undergoes expansion through a porous plug? [8+7]
2. (a) Define the term viscosity? What are its units?
(b) Explain the various factors affecting viscosity? [8+7]
3. (a) What are biosensors? Discuss in detail the applications of biosensors in various fields.
(b) Discuss ion-selective electrodes in detail and outline the interferences during their working [8+7]
4. (a) Write an essay on stoichiometric and non stoichiometric semiconductors
(b) Explain the synthesis of YBCO type super conductor [7+8]
5. (a) What are the differences between High calorific value & net calorific values of fuels?
(b) 0.945g of fuel on complete combustion in excess of oxygen increased the temperature of water in a calorimeter from 13.25 to 19.2°C. The mass of water in calorimeter was found to be 1.458g. Calculate the gross calorific value of the fuel, if the water equivalent of calorimeter is 144g. [8+7]
6. (a) Write the different types of fuel cells?
(b) Write down the characteristics of fuel cells? [8+7]
7. (a) Explain how nuclear fission reaction can be a chain reaction.
(b) Distinguish nuclear fission and nuclear fusion reactions. [8+7]
8. (a) What is solar energy? How is it harnessed?
(b) How does solar energy can be converted into electricity? [7+8]
