

Code No: 09A1BS03

R09

Set No. 2

I B.Tech Examinations, December -January, 2011-2012

ENGINEERING CHEMISTRY

Common to CE, ME, CHEM, BME, IT, MECT, MEP, AE, BT, AME, ICE,
E.COMPE, MMT, ETM, EIE, CSE, ECE, EEE, MIM, MIE

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Give an account on Arrhenius theory of ionisation.
(b) What are potentiometric titrations? Explain their applications. [7+8]
2. (a) What is polyethylenephthalate? How it is manufactured? Explain its uses in fibre-manufacture.
(b) Write an account of preparation, properties and uses of thiokol rubber. [8+7]
3. (a) Write a short note on the following:-
 - i. Electrodialysis
 - ii. Break-point Chlorination.
(b) Discuss the corrosion in boilers. [5+5+5]
4. Give an account of the analytical applications of colloids. [15]
5. Explain the following with suitable examples
 - (a) Condensed phase rule
 - (b) Pattinson's desilverisation of lead. [8+7]
6. (a) Explain the corrosion of metals and the different types of corrosions.
(b) Give an account of electrochemical theory of corrosion. [6+9]
7. With help of a neat diagram explain the construction and working of Junker's calorimeter for the analysis of gaseous fuels. [15]
8. (a) What is superconductivity and its applications?
(b) Explain the phenomenon of the superconductivity. [7+8]

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1. (a) How are metals protected by impressed current method?
(b) Explain the galvanisation and tinning processes of metals. [6+9]
2. (a) What is Vulcanization? Why is this carried out?
(b) Write a note on polyurethanes.
(c) Discuss the processing and engineering uses of natural rubber. [5+5+5]
3. Explain the following mechanisms with suitable illustrations.
(a) Fluid film lubrication.
(b) Extreme pressure lubrication.
(c) Boundary lubrication. [6+4+5]
4. (a) Write a note on single electrode potential and ion selective electrodes.
(b) Differentiate between reversible and irreversible cells.
(c) Define the term Transport number and explain how is it determined experimentally? [4+4+7]
5. Explain the Tyndal effect by Zsigmondy's ultramicroscope and electron microscope. [15]
6. Give proper explanations for the following statements
(a) The fusion curve of ice has a negative slope whereas the sublimation curve has positive slope in the phase diagram
(b) In lead-silver system, isobaric phase diagrams are studied. [7+8]
7. (a) What are the specifications of potable water?
(b) Write a short notes of break-point chlorination.
(c) Discuss the process of priming and foaming. [4+6+5]
8. Distinguish between the following:
(a) Gross calorific value from net calorific value.
(b) Thermal cracking from catalytic cracking.
(c) Gaseous fuels from liquid fuels. [6+5+4]

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1. (a) Differentiate the dry process from wet process of manufacture of cement.
(b) Give an account of setting and hardening of cement. [8+7]
2. (a) Explain the electrochemical theory of corrosion of metals with special reference to rusting of iron.
(b) Write a note on galvanizing and metal cladding. [8+7]
3. Differentiate the following with suitable illustration
(a) Phase rule from condensed phase rule
(b) Eutectic point from triple point. [7+8]
4. With the help of neat sketches explain the following processes.
(a) Bergeous process for synthesis of petrol.
(b) Fluidbed catalytic cracking. [8+7]
5. (a) Describe the zeolite process for softening of hard water.
(b) Discuss the methods for disinfectaion of water. [8+7]
6. Explain the synthetic methods, properties and applications of the following elastomers:-
(a) Buna-S rubber
(b) Butyl rubber
(c) Thiokol rubber. [5+5+5]
7. Write a detailed account on the following
(a) Quantum dots
(b) Applications of nanotechnology to medicine. [8+7]
8. (a) Describe the experimental method for the determination of the pH of a solution, using quinhydrone electrode.
(b) What are conductometric titrations? Explain their applications. [7+8]

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1. Write the detailed account on the following:
 - (a) Triple point
 - (b) Condensed phase rule. [8+7]
2. (a) Write a brief account on dry corrosion. Explain the factors affecting dry corrosion.
(b) What is cathodic protection? How is it done by using sacrificial anode method? [9+6]
3. (a) What are colloids? How are they classified?
(b) Differentiate the dispersed phase from dispersion medium. [8+7]
4. Give an account of the applications of the following:
 - (a) Refractories.
 - (b) Thermal and electrical insulators.
 - (c) Superconductors.
 - (d) Lubricants. [15]
5. What are the main constituents of coal? How are they analysed? Explain the significance of the different constituents of coal. [15]
6. (a) Explain carbonate and non-carbonate hardness of water. List the various disadvantages of hard water for domestic use.
(b) One liter of water from an under ground reservoir in Nalgonda Town in Andhra Pradesh the following analysis. for its contents:: $\text{Mg}(\text{HCO}_3)_2 = 0.0146$ gms; $\text{Ca}(\text{HCO}_3)_2 = 0.0081$ gms; $\text{MgSO}_4 = 0.0012$ gms; $\text{CaSO}_4 = 0.0136$ gms; $\text{NaCl} = 0.0585$ gms; Organic impurities = 100 mg; Calculate temporary, permanent and total hardness of this sample of water in degree French. [8+7]
7. (a) The specific conductivity of a N/50 solution of NaCl at 30°C is $0.003686 \text{ ohm}^{-1}\text{cm}^{-1}$. If the resistance offered by the solution when placed in a cell is 1,500ohms, calculate Cell constant and Equivalent conductance of solution.
(b) Write a note on hydrogen-oxygen fuel cells. [8+7]

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8. What are conducting polymers? Explain the role of polyacetylenes and polyanilines as conducting polymers. [15]

