Subject Code: R13204/R13 **Set No - 1**

I B. Tech II Semester Regular/Supply Examinations July - 2015

ENGINEERING CHEMISTRY

(Common to ECE, EEE, EIE, Bio-Tech, E Com.E, Agri. E)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**

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PART-A

1. (a) What are the requirements for a potable water.
   (b) Differentiate between tinning and galvanizing.
   (c) Explain the function of gypsum in cement.
   (d) How is Thiokol prepared?
   (e) Write short notes on (i) concentration cell (ii) Natural gas

[4+4+3+3+8]

PART-B

2. (a) Explain with a neat sketch, cold lime soda process of softening of water
   (b) Write the charging and discharging reactions occurring in a lead acid storage battery.
   (c) Discuss the theory of dry corrosion.

[6+5+5]

3. (a) Write notes on sterilization and disinfection of water
   (b) What are the drawbacks of natural rubber? How can they be improved?
   (c) What are the advantages of gaseous fuels over liquid and solid fuels?

[5+6+5]

4. (a) Define ion-selective electrodes. Explain working of fluoride ion-selective electrode.
   (b) Explain the applications of liquid crystals.
   (c) Discuss reverse osmosis and its advantages.

[6+5+5]

5. (a) Discuss electroplating and electroless plating on metals
   (b) Discuss the construction of galvanic cell with a neat figure.
   (c) Discuss the preparation and properties of PE.

[6+5+5]

6. (a) What is cracking. Discuss any one catalytic cracking method for synthesis of petrol.
   (b) Write notes on cathodic protection
   (c) Describe any one method for green synthesis.

[6+5+5]

7. (a) What are nanoparticles. Explain the properties of carbon nanoparticles.
   (b) Calculate the HCV and LCV of coal having the following composition: C= 82%, H= 5%, S = 1.5%, N = 1% and remaining ash. Assume latent heat of steam.
   (c) Discuss the types of polymerization with examples.

[6+5+5]

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Subject Code: R13204/R13 **Set No - 2**

I B. Tech II Semester Regular/Supply Examinations July - 2015

ENGINEERING CHEMISTRY

(Common to ECE, EEE, EIE, Bio-Tech, E Com.E, Agri. E)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**

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PART-A

1. (a) Discuss hardness, temporary hardness and permanent hardness of water.
   (b) Explain Pilling-Bedworth rule
   (c) Write notes on biodegradable polymers.
   (d) Discuss (i) electrochemical series (ii) vulcanization (iii) Fullerenes

[3+4+6+9]

PART-B

2. (a) With a help of neat sketch, explain zeolite process of softening of water.
   (b) Explain the applications of Kohlraush Law
   (c) What are the various constituents of paints and discuss their functions.

[6+5+5]

3. (a) Discuss break-point chlorination of water.
   (b) Explain extrusion and injection moulding techniques for fabrication of plastics.
   (c) Discuss proximate analysis of coal

[5+6+5]

4. (a) What are fuel cells. Discuss the construction of H_2-O_2 fuel cell.
   (b) Discuss the need of green chemistry.
   (c) Write notes on caustic embrittlement and boiler corrosion.

[6+5+5]

5. (a) Discuss electrochemical theory of corrosion.
   (b) Write notes on potentiometric titrations.
   (c) Discuss stereo-specific polymers

[6+5+5]

6. (a) A fuel has the following analysis. Calculate the minimum weight of air required for combustion of 1 kg of this fuel. C - 80%; H - 5%; O - 1%; S – 1.5% rest is nitrogen and ash. Also find the HCV and LCV for the above fuel. Assume latent heat of condensation of steam.
   (b) Write notes on hot dipping and cladding.
   (c) Discuss photovoltaic cells

[6+5+5]

7. (a) Write notes on fiber reinforced plastics.
   (b) Discuss the preparation and applications of styrene butadiene rubber.
   (c) Discuss fluid bed catalytic cracking method for synthesis of petrol.

[6+5+5]

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Subject Code: R13204/R13 **Set No - 3**

I B. Tech II Semester Regular/Supply Examinations July - 2015

ENGINEERING CHEMISTRY

(Common to ECE, EEE, EIE, Bio-Tech, E Com.E, Agri. E)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**

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PART-A

1. (a) Define specific and equivalent conductances of an electrolyte and mention their units.
   (b) Discuss applications of Thiokol.
   (c) Write notes on
   (i) single and multi-walled CNTs (ii) Octane and cetane number
   (iii) electroplating (iv) anionic and cationic ion exchangers

[3+3+16]

PART-B

2. (a) Discuss the various types of boiler troubles and how they can be minimized.
   (b) Write notes on conductometric titrations.
   (c) Explain electrochemical theory of corrosion.

[6+5+5]

3. (a) Discuss the principle and procedure for estimation of hardness of water.
   (b) Explain the physical and mechanical properties of polymers.
   (c) Discuss fixed bed catalytic cracking method for synthesis of petrol.

[5+6+5]

4. (a) Derive Nernst equation.
   (b) Write notes on green house effect.
   (c) Explain with neat sketch, electrodialysis method for desalination of water.

[6+5+5]

5. (a) Explain sacrificial anodic and impressed current cathodic protection method of corrosion.
   (b) Discuss the construction and working of glass electrode.
   (c) Discuss the preparation and properties of PVC.

[6+5+5]

6. (a) The percentage composition of a sample of anthracite coal is C = 87; H= 5.5; O= 4; N = 2; S = 0.5 and remainder is ash. Estimate the minimum weight of air required for combustion of 1 Kg of this fuel and the composition of the dry products of combustion by volume if 50% excess air is supplied.
   (b) Explain galvanization and tinning methods for protection of iron from corrosion.
   (c) Discuss the applications of green synthesis.

[6+5+5]

7. (a) Discuss the various reactions occurring during setting and hardening of cement.
   (b) Explain compression and transfer moulding techniques for fabrication of plastics.
   (c) Discuss refining of petroleum.

[6+5+5]

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Subject Code: R13204/R13 **Set No - 4**

I B. Tech II Semester Regular/Supply Examinations July - 2015

ENGINEERING CHEMISTRY

(Common to ECE, EEE, EIE, Bio-Tech, E Com.E, Agri. E)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**

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PART-A

1. (a) Calculate the emf of the following cell at 25^0C using Nernst equation. $Zn_{(s)}$ / Zn^{2+} (0.2 M) // Ag^{+} (0.002M) / $Ag_{(s)}$. The standard emf of the cell is 1.49 V
   (b) Discuss the effect of pH, humidity and temperature on rate of corrosion
   (c) Write notes on (i) p-type conducting polymers (ii) knocking (iii) boiler corrosion

[5+5+12]

PART-B

2. (a) Describe hot lime soda process. How is this process advantageous over cold lime soda process?
   (b) Write notes on concentration cells.
   (c) Discuss any two methods of application of surface coatings on metals.

[6+5+5]

3. (a) Discuss priming and foaming. How are they minimized?
   (b) Discuss compounding of plastics.
   (c) A fuel has the following analysis. C - 76%; H - 9%; O - 2%; S - 1% rest is nitrogen and ash. Find the HCV and LCV for the above fuel. Assume latent heat of condensation of steam.

[5+6+5]

4. (a) What are secondary batteries. Give one example and write down the chemical reactions occurring at anode and cathode in the cell.
   (b) Write notes on turbine deposits.
   (c) Discuss on deterioration of cement concrete.

[6+5+5]

5. (a) Explain how proper designing of material helps in corrosion control.
   (b) Explain single electrode potential.
   (c) Differentiate between thermoplastics and thermosetting plastics.

[6+5+5]

6. (a) Discuss breifly the working of Orsat apparatus for estimation of flue gases.
   (b) Write notes on (i) Impressed current cathodic method (ii) Electroless plating
   (c) Explain about solar reflectors.

[6+5+5]

7. (a) Discuss any four applications of liquid crystals and carbon nanotubes.
   (b) Discuss the preparation and properties of Bakelite.
   (c) Write notes on LPG and CNG.

[6+5+5]

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