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14CHE12/22

**First/Second Semester B.E. Degree Examination, June/July 2015**
**Engineering Chemistry**

Time: 3 hrs.

Max. Marks: 46

Note: Answer FIVE questions, selecting  
ONE full question from each part.

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**PART—A**

- 1 a. Explain the construction and working of glass electrode. (05 Marks)
- b. Give the construction of calomel electrode. Justify that it is a reversible electrode. (05 Marks)
- c. Discuss the construction and working of Li — MnO<sub>2</sub> battery. G.t." (05 Marks)
- d. What are fuel cells? How is it different from galvanic cell? Aletibn any two advantages of fuel cell. (05 Marks)

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- Define reference electrode. Explain the measurement of standard electrode potential using Calomel electrode. (05 Marks)
- b. A cell is obtained by combining two Cd electrodes immersed in cadmium sulphate solutions of 0.1M and 0.5M at 25°C. Give the cell representation, cell reaction and calculate EMF of the cell. (05 Marks)
- c. Describe the construction and working of — Air battery. (05 Marks)
- d. Explain the construction and working of methanol — oxygen fuel cell. Mention any two applications. (05 Marks)

**PART—B**

- 3 A. What is stress corrosion? Explain stress corrosion in boilers due to alkali with chemical reactions. (05 Marks)
- How does the following factor affect the rate of corrosion?  
i) Nature of corrosion product. ii) Temperature ii) pH. (05 Marks)
- c. Explain the following factors influencing rate of electro — deposit.  
i) current ii) metal ion concentration iii) throwing power. (05 Marks)
- d. Explain the process of electroplating of chromium for engineering applications. Indicate the reasons for not employing chromium as anode. (05 Marks)
- 4 a. What is cathodic protection? Explain sacrificial anodic method and impressed current method. (05 Marks)
- Explain the electro chemical theory of corrosion by taking iron as an example. (05 Marks)
- Write a short note on  
i) polarisation ii) Decomposition potential (05 Marks)
- d. Explain the process of electroless plating of copper on PCB. (05 Marks)

**PART — C**

- 5 a. On burning 1.15g of a coal sample in a bomb calorimeter, the temperature of 3.5kg of water in the calorimeter increased from 26.5°C to 28.5°C. Water equivalent of calorimeter is 325g. Specific heat of water 4.187kJ/kg°C. Latent heat of steam = 587 Cal/g. If the fuel contains 4% hydrogen, calculate gross and net calorific values. (05 Marks)

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- b. Explain synthesis of petrol by Fischer Tropseh process. (05 Marks)
- c. Discuss the construction and working of a photovoltaic cell. (05 Marks)
- d. Explain the production of solar grade silicon by Union — Carbide process. (05 Mats)

6 a. Define octane number. Explain reformation of petrol with equations.

- b. What is biodiesel? How is it prepared? What are the advantages? (1 marks)
- c. What is doping? Explain doping of Si by diffusion Technique. ("). 5 Marks)
- d. Explain the designing of PV cells — Module, panel and Array. PV.# (05 Marks)

### PART —13

- 7 a. Explain the radical mechanism of polymerisation taking vinylz +pride as a monomer. (06 Marks)
- b. Differentiate addition and condensation polymerisation. (04 Marks)
- c. Give the synthesis reaction of Teflon and polycarbonate. \$ 3 (04 Marks)
- d. Discuss the synthesis, properties and applications of epo in. (06 Marks)

S a. Explain the following structure property relationship \*polymers.

- i) Crystallinity ii) Elasticity iii) Plaltiodefonnation. (06 Marks)
- b. Explain the following factors influencing the TI, ' (04 Marks)
- i) Flexibility ii) Branching and cross linking (04 Marks)
- c. Explain the synthesis of carbon fibre. (04 Marks)
- d. What is conducting polymer? Explain, the mechanism of conduction in polyaniline and give the applications. (06 Marks)

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### PART —E

- a. What is boiler feed wat xplain the priming and foaming in boilers. (05 Marks)
- b. Define COD. Disco Experimental determination of COD of waste water. (05 Marks)
- c. What is nano ma,te\_vial? Discuss the synthesis of nano material by gas condensation and precipitation methods. (05 Marks)
- d. Write a note:Zift carbon nano tubes. (05 Marks)

- 10 a. Expl e activated sludge treatment of sewage water. (05 Marks)
- b. the Desalination of sea water by reverse osmosis. (05 Marks)
- c. 1q) ain the synthesis of nanomaterials by hydro thermal process. (05 Marks)
- d. rite a note on Dendrimers. (05 Marks)

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