

MANIPAL INSTITUTE OF TECHNOLOGY MANIPAL UNIVERSITY



I SEMESTER B.E DEGREE MAKE UP EXAMINATION JAN 2009

SUBJECT: ENGG. CHEMISTRY. (CHM 101/102) DATE: 01-01-2009

Time: 3 Hrs]

[Max. Marks: 50

Note: Answer any **FIVE** full questions.

1. A Give reason for the following:

i) Electrode potential of calomel electrode varies inversely with the strength of KCl solution.

ii) Potentiometer is preferred to voltmeter for the accurate measurement of e.m.f of the galvanic cell.

- B i) Define and derive mathematical expression for Mn and Mw.
 - ii) With an example distinguish between an elastomer and a fiber.
- C i) Explain with a neat diagram fluidized catalytic cracking. What are its merits?
 ii) 0.945g of a solid fuel on complete combustion in excess of oxygen increased the temperature of water in a calorimeter from 13.25°C to 19.2°C. The mass of water in calorimeter was found to be 1458g. Water equivalent of calorimeter and the stirrer was 456g. Calculate the gross calorific value and net calorific value if the fuel contains 8% of hydrogen, (Latent heat of condensation of steam is 586cal /g)

[2+4+4=10M].

- 2. A Give reason for the following:
 i) Secondary reaction do not contribute towards e.m.f of dry / Leclanche cell.
 ii) Lead storage cell should neither be over charged nor kept in partially discharged condition.
- B i) Write an explanatory note on anodic and cathodic inhibitors which are used in corrosion control

ii) With a suitable example, explain the functions of salt bridge in a galvanic cell.

C. i) What is meant by electroless plating? Discuss the various methods applied for the activation of the surface in electroless plating.ii) Write the method of preparation and any two important uses of nylon 6,6 and

SBR.

[2+4+4=10M]

- 3. A Give reason for the following:
 - i) Rate of corrosion of metal is more in aerated acid solution.
 - ii) Continuous current supply is needed for anodic protection of metals.
 - B i) Explain the development of potential in a glass electrode and derive an expression for glass electrode potential.

ii) The potential of hydrogen gas electrode in a solution of acid of unknown strength is 0.34V at 298K as measured against SHE. Calculate the pH of the solution.

C i) Explain the mechanism of petroleum knocking. How can it be prevented?
 ii) Explain suspension polymerization technique. In what aspects it is different from emulsion polymerization?

[2+4+4=10M]

4. A Give reason for the following:i) Higher the volatile matter and ash content, lower will be the calorific value of a chemical fuel.

ii) Steam and air are passed alternatively in the production of water gas.

B i) Give the schematic representation of Ni-Cad cell. Write the electrode reactions and cell reaction taking place during the discharge of the cell.

ii) List any four important requirements of fuel cell. Write any two merits and two demerits of the same.

C i) With relevant equations explain caustic embrittlement.

ii) Define glass transition temperature. With appropriate structure, explain the reason for observed variation in Tg values, in case of polyethylene, polyvinyl chloride and polystyrene.

[2+4+4=10M]

5.A Give reason for the following:i) Separation of the ions from the mixture can be done with the knowledge of decomposition potential

ii) Complexing agent is sometimes added to the electrolytic bath for a good electrodeposit.

B i) Justify: e.m.f of a galvanic cell is always positive. The e.m.f of a galvanic cell

Cd/CdCl₂ 2.5 H₂O // AgCl/Ag is 0.7653V at 25°C, and 0.6915V at 0°C. Calculate enthalpy change and entropy change for the reaction at 25° C.

- ii) Explain following properties of the polymer with reference to the structure: Plastic deformation and Chemical resistance
- C. i) Explain ultimate analysis of coal for the determination of carbon and hydrogen.
 ii) 1.56g of coal was Kjeldalised and NH₃ thus evolved was absorbed in 50ml 0.1
 N sulphuric acid. After absorption the excess acid required 6.25ml of 0.1N NaOH for exact neutralization. 2.60g of coal on quantitative analysis gave 0.1755g of BaSO₄. Calculate % Nitrogen and % sulphur in the coal sample.

[2+4+4=10M]

- 6.A Give reason for the following:i) E.m.f of a concentration cell decreases with time and eventually becomes zero.ii) Part of a nail inside the wood undergoes corrosion easily.
- B. i) Explain the effect of following factors on the rate of corrosion: Anode area to cathode area ratio and Temperature.
 - ii) Define tacticity. Explain this with respect to the structure of polypropylene.
- C. i) Explain the origin of single electrode potential.ii) Explain the galvanization process. Why should not the galvanized articles be used for storing food stuffs.

[2+4+4=10M]

http://www.howtoexam.com

How