INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

III SEMESTER B.S. DEGREE EXAMINATION – OCT. / NOV. 2017

SUBJECT:TECHNICAL CHEMISTRY-II (CH 233)

(BRANCH:CHEMICAL ENGINEERING)

Wednesday, 8 November 2017

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE full Questions.**
- ✓ **Missing data, if any, may be suitably assumed**

1A. i. Distinguish between the reforming and cracking. Explain four methods of reforming, giving the main reactions involved in it.

ii. Explain the viscosity method to determine molecular weight of polymer. Write any four differences between number average molecular weight and weight average molecular weight.

1B. i. What are the requirements of a substance to be an antibiotic? With relevant structure explain the activities and uses of chloramphenicol.

ii. Give reason for the following;

a) PVC is tougher and stronger than polyethene.

b) Thermal control is very difficult in bulk polymerization technique.

(10+10 =20Marks)

2A. i. Discuss the effect of structure of polymer on the following properties;

a)Tensile strength b) Chemical resistance c) Elasticity.

ii. Calculate the number average and weight average molecular weight of a polymer, polyethylene from the following data. Repeat unit is – CH_2-CH_2- DP= 100, 25%; DP= 300, 15% and D.P= 250, 60% and find the PI.

2B. i. Give the synthesis of the following drugs:

a) Sulphapyridine b) Sulphathiazole

ii. Explain the free radical mechanism for polymerization of acrylonitrile (CH_2=CHCN).

(10+10 =20Marks)

3A.i. How is phenol-formaldehyde resin prepared? Mention any two properties and uses.

ii. What is starch? Discuss the structure of amylose and amylopectin.

3B. i. Explain the following giving two advantages and disadvantages of each.

b) Bulk polymerization b) Emulsion polymerization.

ii. Give the synthetic route for the following from petroleum products:

a) Vinyl chloride b) Isopropanol

(10+10 =20Marks)

4A. i. Discuss the hydrogenation of oil. How is the catalyst required for the process obtained? Write the hydrogenation reaction of glyceryl trioleate.

ii. What are the differences between soaps and detergents? Explain in detail the mechanism of cleansing of soap.

4B. i. Explain the fixed-bed catalytic cracking process. What are the advantages of catalytic cracking?

ii. Write the acid catalyzed reaction of hydrolysis of penicillin. Write the molecular formulae and structural formulae of penicillin.

(10+10 =20Marks)

5A.i. Give the chemical composition, properties and any two applications of the following:

a) polyurethane rubber b) Silicone rubber

ii. Describe with a neat sketch, the process of compression moulding. How does it compare with injection moulding.

5B. i. Explain in detail the extraction of oils and fats from natural products.

ii. Explain the classification of polymers based on end form of use, origin and method of polymerisation. Give examples for each type.

(10+10 =20Marks)

6A. i. Distinguish between the following;

a. Addition and condensation polymerization
b. Number average and weight average molecular mass of polymer.
c. Natural rubber and synthetic rubber.

ii. Explain the process of Hand lay-up technique with a neat diagram. Write any two applications.

6B. i. What are biopolymers? Discuss the structure of protein.

ii. Account for the following;

a) Brine or solid salt is added during manufacture of soap by boiling process.
b) Cellulose has high melting point.

(10+10 =20Marks)

7A.i. Define copolymersation. Explain the copolymerisation equation and reactivity ratio.

ii. With a neat flow sheet diagram and the explain the continuous saponification process for the manufacture of soaps.

7B. i. Give reasons for the following;

a) Structural differences take place on hardening of oil.
b) Teflon has higher chemical resistance.
c) Lower the saponification value of the oil, higher will be the fatty acid content.

ii. Define Iodine number of oil. How is it experimentally determined?

(10+10 =20Marks)

8A.i. What are antibiotics? Give the structure and properties of quinine.

ii. Discuss the preparation, properties and uses of the following;

a) Nitro cellulose b) Cellulose Xanthate

8B. i. Discuss the following reactions as applied to oils and fats.

a) Hydrogenolysis b) Methanolysis c) Hydrolysis

ii. Explain in detail stereo regular polymers.

(10+10 =20Marks)