

M.Sc. (1st Semester) Surface Coating Technology Examination (CBCS), October 2016

PS01CSCT01: Chemistry and Technology of Oils and Polymer Science

Time: 10:00 am to 1:00 pm

Saturday, 22nd October 2016

Total Marks: 70

Choose the correct answer from the following

- Q.1. 1 The analysis of fatty acid methyl esters (FAMES) is a very important in triglyceride and are often detected in laboratory with routine _____ method. (1)
(a) FTIR (b) GPC (c) GC/MS (d) DSC
- Q.1. 2 At 20°C Castor oil has a viscosity of about _____ poise (1)
(a) 1.0 (b) 0.5 (c) 10 (d) 1000
- Q.1. 3 _____ viscometer is used in coatings and ink industries based on accurate measurement and suitability for Newtonian systems only? (1)
(a) Hole Orifice (b) Bubble (c) Rotating Disk (d) Falling sphere.
- Q.1. 4 Striking difference between the behavior of a Polymer and that of low molecular weight compound concerns their _____. (1)
(a) Boiling Point (b) Freezing Point (c) Solubility Pattern (d) None of these.
- Q.1. 5 An M_w/M_n value for synthetic polymers obtained by free radical chain polymerization with precise temperature control is _____. (1)
(a) 1.5 - 2.0 (b) 2.0 - 5.0 (c) 2.0 - 3.0 (d) 10.0 - 20.0
- Q.1. 6 Anionic polymerization technique is useful to prepare _____ copolymer. (1)
(a) Alternate (b) Block (c) Random (d) Graft
- Q.1. 7 The highest concentration, wherein all the molecules are in dispersed state beyond which only micelle formation is possible is known as _____. (1)
(a) CMC (b) PVC (c) CPVC (d) HEC
- Q.1. 8 Cryoscopy technique is use to measure _____ average molecular weight. (1)
(a) Weight (b) Number (c) Viscosity (d) Sedimentation Velocity

Q.2 **Attempt any Seven Questions:**

(14)

- (a) Write the Structural formulae of Elaosteric Acid, Ricinoleic Acid, Linolenic Acid & Oleic Acid.
- (b) Explain the method for measuring Hydroxyl value with chemical reaction.
- (c) The free radical attack on the monomer initiating polymerization is an exothermic process whereas free-radical formation by initiator decomposition is an endothermic process.
- (d) Justify the statement that "RCO being non-drying oil can be converted to drying oil".
- (e) What are initiators and inhibitors? Give its example.
- (f) Distinguish between Anionic and Cationic polymerization techniques.
- (g) Explain Hydrodynamic Volume of the polymer molecule in solution under flow.
- (h) In Molecular weight determining techniques, measurement should be done below 1.0 g/dl

concentration, Explain.

(j) Static Equilibrium osmometers have become obsolete now a day.

Q.3 a State the source of *Castor* and *Safflower* and explain method of extraction of oils from each. (6)
Compare these oils with regard to their Color, Specific gravity, R.I, Acid value, Iodine value and Saponification value.

Q.3 b Write about the manufacture of Blown oil and Boiled oil along with its properties and uses. (6)

OR

Q.3 a Explain the chemistry of drying process for conjugated oil system. How driers do affect the drying process. (6)

Q.3 b List the physical and chemical characteristic properties of drying oils and explain each physical property in brief. (6)

Q.4 a Write the working principle of *falling sphere viscometer* method with a neat diagram and derive the equation. (6)

Q.4 b Write the manufacturing and mechanism of DCO along with its properties and uses. (6)

OR

Q.4 a Write the working principle of Efflux and Bubble viscometer method with a neat diagram and derive the equation. (6)

Q.4 b How is Acrylated oil produced? State their properties and uses (6)

Q.5 a Discuss in detail about Melt and Solution Polycondensation Polymerization technique along with its advantages and disadvantages. (6)

Q.5 b With a neat sketch diagram discuss in detail about "All in One" and "Drip feed" solution Polymerization technique of a vinyl monomer. (6)

OR

Q.5 a Distinguish between the Chain Polymerization and Step-Growth Polymerization. (6)

Q.5 b Explain the concept of Polydispersibility and its significance. (6)

Q.6 a Explain the number average and weight average concept of molecular weight of polymeric material. (6)

Q.6 b Draw neat diagram of Ubbelohde Suspended Level Viscometer (USLV) and writes its advantages as compared to Ostwald viscometer. (6)

OR

Q.6 a Discuss in detail about End Group analysis of the molecular weight determination technique. (6)

Q.6 b Elaborate Gel Permeation Chromatography technique used for molecular weight determination of polymer. (6)