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SARDAR PATEL UNIVERSITY

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M.Sc. (1st Semester) Surface Coating Technology Examination (CBCS), November 2012

PS01CSCT01: Chemistry and Technology of Oils and Polymer Science

Time: 10:30 am to 1:30 pm

Thursday, 29th November 2012

Total Marks: 70

- Q.1 Choose the correct answer from the followings:
- Q.1.1 Botanical name of Linseed Oil is
- (a) *Linum usitatissimum*. (b) *Licania Rigida*. 1
(c) *Aleurities fordii* (d) *Gadus Morrhu*.
- Q.1.2 Which of the fatty acid is present in a major proportion in Tung Oil? 1
(a) Ricinoleic Acid (b) Elaosteric Acid
(c) Linoleic Acid (d) Lauric Acid
- Q.1.3 Teflon polymer was invented by Scientist _____ 1
(a) E I Dupont (b) Roy J Plunkett (c) Roy Dupont (d) E H Farmer
- Q.1.4 Only _____ monomers can be polymerized by Suspension polymerization. 1
(a) Water Soluble (b) Water Insoluble (c) Solvent Soluble (d) None of these.
- Q.1.5 _____ are also used in the polymer industry for the purpose of arresting the polymerization beyond a certain conversion to achieve uniform product. 1
(a) Short stops (b) Chain Transfer Agent
(c) Initiator (d) Retarders
- Q.1.6 _____ is used as an initiator in Cationic polymerization 1
(a) Per sulfates (b) $TiCl_4$
(c) KOH (d) Alkali Metal Amides
- Q.1.7 $\overline{M}_w / \overline{M}_n$ values for synthetic polymers obtained by Polycondensation polymerization techniques is _____ 1
(a) 1.5 to 2 (b) < 1.5
(c) 2-3 (d) 2-5
- Q.1.8 Every polymer has a _____ for its DP below which the polymer does not possess any strength and exist as a friable powder or as liquid resin. 1
(a) Threshold value (b) Radius of Gyration
(c) Hydrodynamic Volume (d) None of these.

Q.2 Attempt any Seven Questions:

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- (a) Define Iodine Value and how it is determined?
- (b) Explain the method for measuring Hexabromide value.
- (c) Write the uses of *dimerised fatty acid* and explain how it is manufactured.
- (d) Explain the mechanism of drying of a drying oil using suitable drier.
- (e) Hydroquinone is added with certain monomer.
- (f) Free radical polymerization process is possible only below the ceiling temperature.
- (g) What is Living Polymerization?
- (h) Polymer's molecular weight is expressed in terms of average value.
- (i) Polymers are always Polydisperse.

Q.3 a Write the working principle of falling sphere viscometer method with a neat diagram and derive equation for viscosity. 6

Q.3 b State the source of Soya bean and Castor oil and explain method of extraction of oils from each. Compare these oils with regard to their color, acid value, iodine value and saponification value. 6

Or

Q.3 b What are triglycerides? Give its structure illustrated by E H Farmer. Explain the factors affecting its properties. 6

Q.4 a Write the manufacturing and mechanism of Urethane Oil along with its properties and uses. 6

Q.4 b List the physical and chemical characteristic properties of drying oils and explain each property in brief. 6

Or

Q.4 b Write about the manufacture of *Stand oil* and give in detail about its properties and uses. 6

Q.5 a Discuss in detail about Emulsion Polymerization technique of a vinyl monomer along with its advantages and disadvantages. 6

Q.5 b Give the salient features of Free-radical, Cationic and Anionic Polymerization reactions. 6

Or

Q.5 b Write a note on Half life of a Initiator and its effect of solvent and pressure. 6

Q.6 a Discuss the kinetic aspects of free radical chain polymerization of vinyl monomer and show that overall polymerization rate is proportional to the first power of monomer concentration and also to the square root of the initiator concentration. 6

Q.6 b Define reactivity ratio r_1 and r_2 . Derive the different conditions of r_1 and r_2 and predict the nature of co-polymer formed. 6

Or

Q.6 b (1) What is chain transfer reaction? Discuss about various chain transfer reactions? 3

(2) Explain the number average and weight average concept of molecular weight of polymeric material. 3

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