

(59)

SARDAR PATEL UNIVERSITY

M.Sc. (Polymer Science & Technology), Semester- II Examination-2019

Monday, 18th March, 2019

10:00 A.M. to 1:00 P.M.

PS02CPST21: POLYMER CHARACTERIZATION

Total Marks: 70

- Note: (1) Attempt all questions.
(2) Figures to the right indicate full marks.

Q.1 Write appropriate choice for the following. (08)

- (1) Tensile strength test is ASTM D _____.
(i) 636 (ii) 638 (iii) 785 (iv) 786.
- (2) _____ can affect batch to batch variation in polymerization process.
(i) Temperature (ii) Purity of monomer (iii) Time (iv) All of above.
- (3) _____ factors are considered to measure chemical resistance of polymers.
(i) Branching (ii) Crystalline (iii) Bond length (iv) All of above.
- (4) Volume resistivity = _____.
(i) $\frac{A}{t(R_v)}$ (ii) $\frac{At}{\rho(R_v)}$ (iii) $\frac{A}{t(\pi R_v)}$ (iv) $\frac{At(R_v)}{\omega}$.
- (5) _____ can be used as heating media in softening point measurement techniques.
(i) Glycerol (ii) Paraffin oil (iii) Silicon oil (iv) All of above.
- (6) \overline{M}_w is determined by _____.
(i) GPC (ii) HSMO (iii) VPO (iv) all of above.
- (7) Polytetrafluoroethylene is highly chemical resistant because of _____.
(i) high crystalline structure (ii) lack of branching (iii) strong bond of C-F (iv) all of above.
- (8) Dielectric strength is expressed as _____.
(i) volts per thickness (ii) thickness per volts (iii) volts per temperature (iv) none of above.

Q.2 Attempt any seven of the following (14)

- (1) Explain hot plate method used for determination of melting point.
- (2) Describe Araphoa smoke test.
- (3) Explain different classes of polymers on the basis of inherent flammability.
- (4) Write full name of: (1) ASTM (2) BIS (3) DIN (4) BSI
- (5) Write in brief about test condition and conditioning of polymer test specimen.
- (6) Explain stress – strain plot for the polymer materials having different nature.
- (7) Explain dissipation factor for polymers.
- (8) Enlist requirements of insulating polymers.
- (9) How do thermoplastic polymers resist to sulphide staining? Explain.

Q.3 (a) Define viscosity. Explain how is viscosity average molecular weight (\overline{M}_v) of polymer sample determined by viscometry technique? (06)

- (b) Discuss in detail about static and dynamic equilibrium principle. (06)
- OR**
- (b) Answer following. (06)
1. Neat labeled flow diagram of GPC apparatus.
 2. Sedimentation velocity method.
- Q.4** (a) Describe melt flow index (MFI) test in detail. (06)
- (b) Explain following test methods. (06)
1. Sieve Analysis.
 2. Moisture Analysis.
- OR**
- (b) Explain following. (06)
1. Ring and ball method.
 2. Displacement method.
 3. Apparent density and bulk factor.
- Q.5** (a) What do you mean by hardness test? Discuss in detail about Rockwell, Durometer and Barcol hardness test procedures and also explain factors affecting test results. (06)
- (b) Explain following. (06)
1. Izod impact test.
 2. Factors affecting tensile and flexural strength test.
- OR**
- (b) Write a note on following. (06)
1. Flammability test for flexible polymer.
 2. Ignition temperature determination.
- Q.6** (a) What is arc resistance of thermoplastics material? Explain different test procedure in detail. (06)
- (b) Write a note on environmental stress cracking resistance test. (06)
- OR**
- (b) What is solvent stress cracking resistance of polymers? Explain test procedure with neat labelled diagram. (06)

~~*****~~

(2)