

SARDAR PATEL UNIVERSITY**M.Sc. (Polymer Science & Technology), Semester- II Examination-2016****Monday, 4th April, 2016****10:30 a.m. to 1:30 p.m.****PS02CPST08: Polymer Characterization****Note:** (1) Attempt all questions.

(2) Figures to the right indicate full marks.

Total Marks: 70**Q.1** Write appropriate choice for the following. (8)

- (1) Rockwell hardness test is ASTM D _____.
(i) 785 (ii) 780 (iii) 815 (iv) 786.
- (2) Sinker is used in _____ method.
(i) displacement (ii) sink & float (iii) Water absorption (iv) MFI
- (3) Mark - Houwink equation (η) = _____.
(i) $K\bar{M}^a$ (ii) \bar{M}^a (iii) $\frac{K}{a}\bar{M}$ (iv) $Ka\bar{M}$
- (4) Test results of plastic materials are influenced by _____.
(i) specimen preparation (ii) moulding parameters (iii) preconditioning
(iv) All .
- (5) Bromo compounds are used as _____.
(i) plasticizer (ii) filler (iii) flame initiator (iv) flame retardant.
- (6) Standard laboratory testing conditions are _____ temperature and relative humidity.
(i) $23^0 \pm 2^0$, $50 \pm 5\%$ (ii) $33^0 \pm 2^0$, $50 \pm 5\%$ (iii) $23^0 \pm 2^0$, $50 \pm 0.5\%$
(iv) $23^0 \pm 0.5^0$, $50 \pm 5\%$.
- (7) Volume resistance of polymer is the resistance through _____ of the polymer.
(i) body (ii) surface (iii) terminals (iv) none of above
- (8) Kofler method can be use for the measurement of _____.
(i) glass transition temperature (ii) softening point (iii) melting point
(iv) none of above

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

- (1) Explain importance of material characterization test for thermoplastics.
- (2) Why test conditions and conditioning of samples are important during characterization of polymer?
- (3) Explain measurement procedure and calculation for pyknometer method.
- (4) Explain cryoscopy technique used for number average molecular weight determination.

- (5) Describe dissipation factor in electrical properties of polymer.
- (6) Explain different precautions required during viscosity average molecular weight measurement.
- (7) Write down flammability test for self supporting polymer samples.
- (8) Explain stress – strain plot for the different nature polymeric materials.
- (9) How hardness is measured by durometer hardness tester? Explain.

- Q.3** (a) Explain in detail about high speed membrane osmometry. (6)
- (b) Describe in detail method used for Z – average molecular weight of polymer. (6)

OR

- (b) Write a note on vapour phase osmometry. (6)
- Q.4** (a) Discuss in detail density gradient test for thermoplastic polymer. (6)
- (b) Explain following test methods. (6)
1. Ring and ball method
 2. Heat deflection temperature.

OR

- (b) Explain following test methods. (6)
1. Particle size test.
 2. Shrinkage determination test.
- Q.5** (a) Explain flexural property of polymers. Write a detail procedure for the measurement of flexural property with factors affecting the test results. (6)
- (b) Discuss following. (6)
1. Smoke density test.
 2. Falling weight impact test.

OR

- (b) What do you mean by flammability test? Explain various class of polymer based on flammability. Describe in detail low oxygen index (LOI) test. (6)
- Q.6** (a) Explain the importance of chemical properties in polymer testing. Discuss in detail about solvent stress cracking resistance test. (6)
- (b) Write a note on following. (6)
1. Dielectric strength test.
 2. Volume and surface resistivity test.

OR

- (b) Give an account on stain resistance test for thermoplastic polymer. (6)
