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(17) **SARDAR PATEL UNIVERSITY**

**M.Sc. (Polymer Science & Technology), Semester- II Examination-2015**

**Saturday, 18<sup>th</sup> April, 2015**

**10:30 a.m. to 1:30 p.m.**

**PS02CPST08: 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. **(8)**

- (1) The ratio of shear stress to the rate of shear of fluid is known as \_\_\_\_\_.  
(1) viscosity (2) fluidity (3) poise (4) stress
- (2) Sinker is used in \_\_\_\_\_ method.  
(1) displacement (2) sink & float (3) Water absorption (4) MFI
- (3) In GPC column free volume between the beads known as \_\_\_\_\_ volume.  
(1) pore (2) void (3) free (4) void & pore.
- (4) LVDT is component of \_\_\_\_\_.  
(i) DMA (ii) DTA (iii) TMA (iv) DMA & TMA.
- (5) Methanol / benzyl alcohol used in the \_\_\_\_\_ density range.  
(1) 0.80 – 0.92 (2) 0.79 – 1.00 (3) 1.60 – 2.89 (4) 0.79 – 0.90
- (6) Rhodium based thermocouple used to measured temperature up to \_\_\_\_\_ °C in TGA instrument.  
(1) 1750 (2) 2000 (3) 3000 (4) 1200
- (7) \_\_\_\_\_ is a group of technique in which physical property of a substance is measured as function of temperature..  
(1) TGA (2) Thermal method (3) DSC (4) TMA.
- (8) As thickness of specimen increases, the oxygen index \_\_\_\_\_.  
(1) increases (2) decreases (3) not affected (4) contain constant value.

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

- (1) Why smoke tests are important? Describe smoke density test.
- (2) Discuss sink & float method.
- (3) What are the basic requirements for an insulator?
- (4) Explain ebulliometry technique used for number average molecular weight determination.
- (5) Explain various factors affecting dielectric strength test results.

- (6) Explain different precautions required during viscosity average molecular weight measurement.
- (7) Explain the principle of thermo gravimetric analysis (TGA).
- (8) Define: (1) Modulus of elasticity (2) Yield point.
- (9) Define melting and softening point.

- Q.3** (a) Explain in detail about dynamic equilibrium principle. (6)  
(b) Explain principle of GPC. Discuss in detailed about GPC apparatus. (6)

**OR**

- (b) Write a note on ultracentrifugation technique used for average molecular weight determination. (6)
- Q.4** (a) Discuss in detail melt flow index test for thermoplastic polymer. (6)  
(b) Explain following test methods. (6)
1. Displacement method.
  2. Capillary method

**OR**

- (b) Discuss principle of DSC. Explain instrumentation of Heat Flux DSC. (6)
- Q.5** (a) Explain tensile property of polymers. Write a detail procedure for the measurement of tensile property with factors affecting the test results. (6)  
(b) Discuss following. (6)
1. Izod Impact Test.
  2. Durometer Hardness Test.

**OR**

- (b) Explain flexural properties of plastics. Write a detail procedure for the measurement of flexural properties of plastics. (6)
- Q.6** (a) Explain the importance of chemical properties in polymer testing. Discuss in detail about Environmental stress cracking resistance test. (6)  
(b) Write a note on following. (6)
1. Oxygen index test.
  2. Arc resistance test.

**OR**

- (b) Give an account on stain resistance of plastics. (6)

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