BT–PS&E–VI(S.S)–04.20–0159 Reg. No. | | | | | | | | |

B

B.Tech. Degree VI Semester Special Supplementary Examination in Polymer Science and Engineering April 2020

PE 1602 CHARACTERISATION AND TESTING METHODS

Time: 3 Hours Maximum Marks: 50

PART A
(Answer *ALL* questions)

(10 × 2 = 20)

I. (a) How will you distinguish inter and intra hydrogen bonding in polymers using IR spectroscopy?

(b) Define specific heat capacity. How is it determined using DSC?

(c) What is dielectric strength? How is it determined? Explain the factors affecting the dielectric strength of polymer materials.

(d) Discuss the determination of carbon content of rubber vulcanisates using thermogravimetric analysis (TGA).

(e) Write notes on MFI determination of polymers. How is it related to molecular weight?

(f) Briefly explain the determination of coefficient of thermal expansion using quartz tube dilatometer.

(g) How will you determine the dielectric constant of polymers? What are the factors affecting dielectric constant?

(h) Briefly explain the procedure for the determination of volatile fatty acid (VFA) for NR latex.

(i) How will you determine the flexural strength of polymer composite by 3 point bending?

(j) Draw a typical rheogram and explain cure time and scorch time.

PART B

(4 × 7½ = 30)

II. Draw a typical heating and cooling DSC thermograms of a polymer and explain the determination of glass transition, melting point and crystallization temperature and crystallinity. (7½)

OR

III. Discuss the principle and procedure used for the determination of: (3 × 2½ = 7½)

(i) Dry rubber content

(ii) Copper content

(iii) Coagulum content

IV. (a) Briefly explain the basic principle of NMR spectroscopy? (4)

(b) How will you determine the tacticity of polypropylene using NMR? (3½)

OR

V. Write short notes on: (3 × 2½ = 7½)

(i) Impact strength

(ii) Creep of vulcanisates

(iii) Resilience of polymers

VI. Discuss the principle and methods used for the quality control test for: (3 × 2½ = 7½)

(i) Latex threads
(ii) Tyres
(iii) Laminates

OR

VII. (a) Explain the use of IR and UV spectroscopy for the determination of ageing of polymers. (4)

(b) Explain the method used for the determination of gel point. (3½)

VIII. Write short notes on the determination of: (3 × 2½ = 7½)

(i) Resistivity
(ii) Thermal conductivity
(iii) Haze

OR

IX. What are the quality tests done for: (3 × 2½ = 7½)

(i) Micro cellular sheet
(ii) Pipes
(iii) Films

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