

This question paper contains 3 printed pages]

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S. No. of Question Paper : 1499

Unique Paper Code : 1141701

F-7

Name of the Paper : Fiber Manufacturing Technology

Name of the Course : B.Tech. Polymer Science

Semester : VII

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all.

Question No. 1 is compulsory.

Draw neat and labeled diagram wherever necessary.

1. (a) Define the term Denier and Tenacity.
- (b) Illustrate key elements of polyester filament yarn melt-spinning machine.
- (c) Why fiber is stronger than its own polymer ?
- (d) Explain Spinning speed, spin line stress and melt orientation.
- (e) Explain disadvantages of wet spinning. Also mention advantages of Dry Jet wet spinning.

P.T.O.

- (f) Melting followed by mixing offers advantage in DEG and DMT mixing in PET production. Justify.
- (g) Define quenching chamber flow system with suitable diagram in Nylon66 Melt spinning.
- (h) Explain the relation between tenacity ratios and draw ratio of vinyl fiber.
- (i) Write down the Steeping process of viscose rayon manufacturing. $3 \times 9 = 27$
2. (a) Give the spinning conditions of cellulose acetate and cellulose triacetate fiber.
- (b) Describe the preparation of PAN dope.
- (c) Write the uses of Kevlar fiber. $5 + 4 + 3 = 12$
3. (a) Explain in detail about the various components present in a melt spinning unit.
- (b) What are the physical and chemical changes taking place during Xanthation ?
- (c) Give the advantages of man-made fibers over natural fibers. $5 + 4 + 3 = 12$
4. (a) How is viscous rayon spun ? Write the details of processing with suitable diagram.
- (b) Explain particle nucleation and radical absorption during aqueous dispersion polymerization of acrylonitrile.
- (c) Discuss the properties of PET fiber. $5 + 4 + 3 = 12$

5. (a) Discuss the following :

(i) Development of Nylon-6 fibre structure along the spinning line.

(ii) Primary and secondary variables for melt spinning.

(b) Discuss solution spinning with suitable examples.

(c) Compare the properties of nylon, polyester and silk fiber.

5+4+3=12

6. Write notes on any *three* :

3×4=12

(i) Stretch Fiber

(ii) Texturising

(iii) Post spinning operations

(iv) Olefin fiber.