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Total No. of Questions: [11]

Total No. of Printed Pages: 1

M. Tech. Textile (Part-Time) (Semester –3rd)
ADVANCES IN FIBRE PRODUCTION TECHNOLOGIES
Subject Code: MTEXS1201
Paper ID: [22201110]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It carries 16 marks. It consists of 4 questions of 4 marks each.
2. Section B consist of 4 questions of 8 marks each. The student has to attempt any 3 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(4 marks each)

- Q1. Explain the flow instabilities due to shear in the melt spinning and how different factors affect these flow instabilities
- Q2. Why monomer purity is important in case of the step growth polymerization reaction.
- Q3. Explain the different zone of melt extruder with neat sketch
- Q4. Discuss the drawing and heat setting of manmade fibre production.

Section – B

(8 marks each)

- Q5. How the quenching is carried out in the case of the melt-spinning process explain the role of various design of the quenching chamber
- Q6. A polymer melt having density of 1.38 g/cm^3 , is being spun through spinneret of 1000 holes. The mass throughput rate and take-up speed are 300 g/min and 300 m/min, respectively.
- (a) The nominal denier of the filament is?
- (b) The above as spun filament subjected to two stages drawing with a draw ratio of 1.5 and 2.0. the resultant denier of fibre would be? **(2×4 = 8 marks)**
- Q7. Define the acrylic and modacrylic. What types of co-monomer are added during the acrylic fibre formation? How do these co-monomers affect the properties of fibre?
- Q8. Describe the advancements in the production of microfibrils and nanofibrils. How are they produced, and what are their unique properties? Discuss their applications in industries.

Section – C

(10 marks each)

- Q9. In the case of the viscose fibre manufacturing process explain the following steps with their importance
- (a) Steeping (b) Ageing (c) Xanthation (d) Ripening **(4×2.5 = 10 marks)**
- Q10. (a) Discuss the chemistry of polymerization of polyester (PET) with different routes. What are the economical advantages of TPA routes over DMT routes?
- (b) Discuss the chemistry of polymerization of Nylon 6 and Nylon 66. **(2×5 = 10 marks)**
- Q11. Write a short note on
- a) Discuss the role of zinc in the spinning bath of viscose fibre and how it affects the morphological structure of the fibre
- b) How the viscosity of Newtonian and non-Newtonian fluid depends on shear rate?

- c) How orientation and crystallinity influence the fibre properties?
- d) Listed the difference between dry, wet and melt spinning process **(4×2.5 = 10 marks)**