1067

Unique Paper Code : 6092013501
Name of the Paper : Fibre Science
Name of the Course: B.Sc. (H) Polymer Science (UGCF mode)
Semester: V
Duration: 2 Hours
Maximum Marks : 60

Instruction for candidates

(a) Write your Roll No. on the top immediately on receipt of this question paper.
(b) Attempt **Four** questions in all.
(c) Question **No. 1** is compulsory
(d) Draw a neat and labelled diagram wherever necessary.

Q.1.

i. Between a 9 Denier fully drawn circular polyester fibre and a 9 denier fully drawn circular polypropylene fibre which one is thicker? Justify your answer. Why surface treatment of carbon fibres is required? Explain
ii. Discuss significance of tensile force on fibre during melt spinning
iii. Illustrate Degree of order and molecular extent in fibres.
iv. Distinguish primary cellulose acetate fibre and secondary cellulose acetate fibre
v. Illustrate Spin-stretch during coagulation in wet spinning (3 × 5 = 15)

Q.2.

a) Discuss properties and applications of PAN fibres.
b) If you have a polymer that can be spun by both melt spinning and wet spinning. And you want to prepare a high-performance fibre. Which spinning process you will choose and why?
a) How would you prepare of high tenacity and high wet modulus rayon.? Also illustrate their properties (5,5,5)

Q.3.

a) Compare and contrast the formation mechanisms of PAN-based carbon fibres and pitch-based carbon fibres. Explain how these differences affect the properties and applications of the resulting fibres.
b) Compare the formation mechanisms and resulting properties of Rockwool, and Glass fibres.
c) Why cotton fibres gain strength when wet? And which features of cotton fibre contribute to its relatively easy dyeability despite its high crystallinity?
d) Explain swelling of fibres. (5,4,3,3)

Q.4

a) Explain mechanical properties of nylons.
b) Give detailed classification of fibres.
c) Discuss gross structure of wool (5,5,5)

Q.5

a) What is fineness of fibre? Illustrate direct weighing method for its determination.
b) Discuss physical properties of cotton fibres
c) Describe the key steps involved in the manufacturing process of Basalt fibres and discuss how the processing parameters can influence the properties of the final fibres. (5,5,5)