Roll No. ..... Total No. of Pages : 2

BT6/M11 8678

Theory of Yarn Structure

Paper : TT-302

Time : Three Hours] [Maximum Marks : 100

Note :— Attempt **FIVE** questions in all, selecting at least **ONE** question from each section.

SECTION—A

1. (a) Derive an equation for yarn diameter in terms of yarn tax and yarn density. 10

   (b) On twisting a multifilament yarn, the linear density is to be increased by a gactor 1·20. If the yarn diameter is 240 micron, determine twist per meter of the filament yarn. 10

2. (a) What is open packing and close packng ? Briefly discuss the ideal close packing in yarn including the effects of having a core more than one fibre. 10

   (b) A yarn having open-packed structure has five numbers of layers. Find the following in units of given fibre radius :

   (i) Respective layer radius.

   (ii) Yarn radius.

   (iii) Maximum number of fibres that may be accommodated in respective layer.

   (iv) Gap, if any, in respective layer.

   (v) Total number of fibres in the yarn cross-section. 10

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SECTION—B

3. (a) How do various parameters affect the migratory behaviour in a staple spun blended yarn as well as in a multifilament yarn ? 10

   (b) Discuss different forms of twisting in detail. 10

4. Define various parameters used to characterize fibre migration both in unitary as well as blended yarn. 20

SECTION—C

5. (a) Give an analysis for extension of continuous filament yarn at large extension, assuming uniform contraction of yarn. 10

   (b) The strain to break a multifilament yarn was found to be 4·0. The twist angle before and after the strain was 50·2° and 39·6° respectively. On observation, it was found that the lateral strain has occurred. Determine the percentage of lateral strain. 10

6. What is catastrophic and non-catastrophic break ? Discuss the mechanism of yarn breakage with diagram. 20

SECTION—D

7. Show geometrically and also determine an analytical expression revealing how strength of a blended yarn varies with blend composition. 20

8. How is spinnability of textile fibre related to end breakage rate ? Discuss in the light of different spinning systems. 20

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