[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2125)

15235

B. Tech 6th Semester Examination

Theory of Textile Structure (OS)

TE-6004

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all. Selecting one question from each of the section A, B, C, D. Section E is compulsory.

SECTION - A

1. (a) Define ideal migration. Explain the tracer fibre technique for observing the migration behaviour of the yarn. How the radial fibre position is represented in this method? (10)

   (b) Describe basic forms of packing in yarns. Discuss various factors that assist and resist close packing. (10)

2. What is Idealized helical yarn geometry? Prove that the yarns of different counts, but same twist factor will be geometrically similar. (20)

SECTION - B

3. Describe the traditional view and modified qualitative approach by Hearle and El-sheikh for spun yarn breakage. (20)

4. (a) Derive the following expression for tensile extension of continuous filament yarns.

   $\varepsilon_f = \varepsilon_y \cos^2\theta$

   Explain the significance of this relationship also. (10)

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   (b) Describe the breakage behavior of continuous filament yarns. (10)

SECTION - C

5. Calculate the geometrical parameters l_1, l_2, p_1, p_2, Q_1, Q_2, h_1, h_2 of a plain woven fabric with following particulars: EPI-40, PPI-30, yarn count-20 tex, C_1-8%, C_2-12%. Also calculate the fractional cover and weight of the fabric (g/m^2). Examine whether the fabric has reached jammed state or not. (20)

6. (a) Derive the Poisson's ratio of fabric in crimp interchange region. (10)

   (b) What is the race track geometry and how it is different from circular one? (10)

SECTION - D

7. Explain the structure of ring, rotor, air jet and friction spun yarns. Describe the effect of their structure on their properties. (20)

8. (a) Describe the Humburger's theory for change in yarn tenacity with respect to change in blend composition. (10)

   (b) Write a short note on fabric objective measurement. (10)

SECTION - E

9. (a) What is the role of torsional rigidity of fibres during spinning of yarns?

   (b) What is the effect of gauge length on yarn strength?

   (c) State the assumptions of pierce geometrical model of woven fabrics.

(d) What is packing coefficient? Give the value of packing coefficient for ideal yarn.

(e) Describe the concept of crimp interchange in woven fabrics?

(f) Explain the concept of similar cloth.

(g) Define fabric cover. State its significance

(h) Why idealized helical yarn geometry is not possible in practice?

(i) Packing density of ring spun yarn is low at the axis of the yarn. Why?

(j) What type of migration is expected in cotton-polyester blended spun yarn? (2×10=20)