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RM-7901

B. E. IV (Sem. VIII) (T.T.) Examination

May / June – 2010

Yarn Structure & Fabric Geometry

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 4 (Sem. 8) (T.T.)**

Name of the Subject :

☛ **Yarn Structure & Fabric Geometry**

☛Subject Code No. : **7 9 0 1** ☛Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Answers to the **two** sections must be written in **separate** answer books.

(3) Figures to the **right** indicate full marks.

(4) Tie **two** sections **separately**.

SECTION I

1 (a) **Do as directed :**

i. Warp cover factor and weft cover factor is sensitive to the yarn numbering system. (State true or false) **[01]**

ii. Permeability of fabric is large or small will depend upon its _____. **[01]**

iii. Give the definition of the crimp. **[01]**

iv. If warp contains 2000 ends, find the length of the warp to make 5 pounds, if count of the warp is 30's cotton count. **[02]**

(b) Derive fabric pore area in porosity. **[04]**

(c) Derive the value of SDF in worsted system. **[04]**

(d) Derive the equations for Pierce's geometry of plain weave where **"neither of the yarn is straight nor it is jammed".** **[07]**

2.(a) What is actual fractional coverage? Derive the relationship between two measures of cover. **[08]**

(b) Establish and derive the relationship between crimp **c**, yarn shrinkage s_y and cloth shrinkage s_c. **[07]**

OR

2 (a) Derive all the equations related to weight in denier system. **[08]**

(b) Derive $Kc = K_1 / K_0 + K_2 / K_0 - (K_1 / K_0 * K_2 / K_0)$ **[07]**

3. Attempt **any three** of the following: [15]

i. Hamilton's constant for fabric tightness

ii. Direct and indirect effect of application of tensile load

iii. Fabric density and specific volume

iv. Effect of finishing process on crimp

SECTION II

4 (a) **State whether true or false:** [03]

i. The open-end spun yarns tend to be more uniform in appearance than ring-spun yarns.

ii. In stretch yarns, the packing density of the filaments is very low.

iii. Twist affects hairiness of yarns.

(b) What do you mean by Fibre Orientation? [02]

(c) What is meant by Ellipticity? [02]

(d) Define: Twist. [03]

(e) Derive the equation: $\tan \alpha = 0.0112\ V_y^{1/2}\ \tau$ [05]

(f) With a neat figure discuss the zonal distribution curve for Roving yarns. [05]

5.(a) Derive: Retraction factor $R_y = \tan^2 (\alpha/2)$. [10]

(b) Find the value of Surface Twist Angle for staple yarn with : [05]

T M = 4.6

$V_y = 1.38$

OR

5 (a) Give the reasons for differential migration. [05]

(b) Hamilton geometry gave the following data: [05]

i. **Major diameter = 320 µ**

ii. Minor diameter = **240 µ**

iii. Ne = **26 Tex**

iv. Fibre Specific Volume = **0.7cm^3/gm**

Estimate V_y/V_f.

(c) Find diameter in micron of a polyester filament yarn of **150D** with fibre density of **1.38 gm/cc**. [05]

6. Attempt **any three** of the following: [15]

i. Tracer fibre technique.

ii. Open packing of circular fibres.

iii. Schwarz constant.

iv. Measurements made by Hearle and Gupta to correct for asymmetry.