

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024****Subject Code:3172904****Date:22-05-2024****Subject Name:Yarn Structure and Fabric Geometry****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Define and establish relation between contraction factor & retraction factor. **03**
 (b) Give classification of yarn. **04**
 (c) Derive an equation Retraction factor, $R_y = \tan^2(\alpha/2)$. **07**

- Q.2** (a) Define term: Poisson ratio and Orthotropic material. **03**
 (b) Define with reference to fabric: i. Isotropic ii. Anisotropic. **04**
 (c) Explain microscopic method for evaluating yarn diameter with suitable diagram. What is Schwarz's constant? **07**

OR

- (c) Derive the equations for Pierce's model for the geometry of Plain woven fabric when "Neither of the yarn is straight nor it is jammed". **07**

- Q.3** (a) Write down list of assumptions made for idealized twist geometry. **03**
 (b) State and define various migration parameters along with expressions. **04**
 (c) Derive equation for twist angle (α) & twist factor(τ), $\tan \alpha = 0.0112 (V_y)^{\frac{1}{2}} \tau$ **07**

OR

- Q.3** (a) Define the terms- Packing factor and yarn twist **03**
 (b) Explain tracer fibre techniques for migration with diagram. **04**
 (c) Write a short note on different ways in which fiber packing occurs in yarns. **07**

- Q.4** (a) Define terms migration and ideal migration. **03**
 (b) Write about disturbing factors which causing deviation from ideal structure. **04**
 (c) Prove that RMS deviation (D) is 0.3 for ideal and perfect migration. **07**

OR

- Q.4** (a) Give limitation of fabric geometrical model. **03**
 (b) Explain the phenomenon of crimp interchange. **04**
 (c) Derive generalized equation for maximum cover (reference standard for K & d/p). **07**

- Q.5** (a) For cotton yarn if $v = 1.1$, warp yarn count is 24's with 54 end/inch and weft cover factor is 9. Find out the cloth cover. **03**
 (b) Explain load extension curve for the fabric with different zones. **04**
 (c) Write brief note on Tensile properties of fabric. **07**

OR

- Q.5** (a) Define and state the importance of young modulus. **03**
 (b) Elaborate load extension curve for the fabric with different zones. **04**
 (c) Explain the geometry of jammed condition for Race track cross-section. **07**
