

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2023

Subject Code: 3172904

Date: 08-12-2023

Subject Name: Yarn Structure and Fabric Geometry

Time: 10:30 AM TO 01:00 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.

		MARKS
Q.1	(a) Enlist the pertinent physical characteristics that are influenced by twist.	03
	(b) Calculate out Contraction factor, C_y for Twist angle (α) = 30° .	04
	(c) Describe Coil winding method for measuring yarn dimensions.	07
Q.2	(a) Discuss purpose of twist in multifilament yarns.	03
	(b) With neat diagram discuss the two effects governing strength –twist relationship.	04
	(c) Enlist the postulates characterizing the assumptions underlying the idealized helical yarn geometry model.	07
	OR	
	(c) Derive the equation $\tan \alpha = 0.0112 \sqrt{V_y^{1/2} \tau}$.	07
Q.3	(a) Calculate the gap in 3 rd layer in Open packing of circular fibres.	03
	(b) Enlist the concentrating factors that operate in determining real yarn structures.	04
	(c) With the help of neat diagram explain in detail Twist Contraction.	07
	OR	
Q.3	(a) Calculate total number of fibres in 7 th layer in Hexagonal Close packing of circular fibres.	03
	(b) Enlist the disturbing factors that operate in determining real yarn structures.	04
	(c) Define Migration. Enlist the factors influencing the migration of fibres.	07
Q.4	(a) What is importance of fabric density and specific volume? How it is calculated?	03
	(b) Derive the equations for Fabric Pore area & fabric Pore volume in fabric porosity.	04
	(c) Derive the equations for the Peirce's geometry of General case with neat sketch when "Neither of the Yarn is Straight, nor it is Jammed".	07
	OR	
Q.4	(a) Only Write the formulae to find out warp & weft cover factor in direct & Indirect system.	03
	(b) Explain crimp interchanging phenomena.	04
	(c) Derive the equations related to cover factor of square jammed fabric.	07
Q.5	(a) Explain the terms work of rupture & Work factor related to fabric	03
	(b) Explain direct & Indirect effect produced by the application of Tensile load to the fabric. (Geometrical changes during extension of fabric)	04

(c) Derive all the equations related to fabric cover. **07**

OR

Q.5 (a) Enlist different Tensile Properties of fabric. **03**

(b) Derive the equations for maximum cover (Reference standard) for K & d/p. **04**

(c) Give the definition of following Terms: Anisotropy, isotropy, orthotropic material. **07**
