Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2722508 **Date: 24/05/2016**

Subject Name: Theory of Fabric Structure

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.**

Q.1	**(a)**	Derive an equation assuming race-tracked cross-section for the jammed fabric condition.	**07**
	(b)	1 Determine the square sett of a fabric having 85% of maximum cover factor if 2 up 2 down 1 up 2 down weave is woven using 2/50s Ne cotton yarn. 2. Define following terms with reference to tensile properties of fabric: (i) Poisson Ratio (ii) Isotropic (iii) Anisotropic (iv) Orthotropic	**07**
Q.2	**(a)**	Derive equations for any three special cases based on the geometrical model of woven fabric as given by Peirce.	**07**
	(b)	With reference to KES-F measurement system, enlist fabric tensile, shear, bending and compressional parameters.	**07**
		OR	
	(b)	What is FAST system for fabric objective measurement? Write briefly on ways in which fabric thickness, shear rigidity, bending rigidity and formability are expressed using FAST system.	**07**
Q.3	**(a)**	Derive an equation to find force required to bend the yarn in form of elastic at the time of weaving.	**10**
	(b)	Find extension and contraction % for fabric if PPI = 44, EPI = 60, c_1 = 4.5 % and c_2 = 12%	**04**
		OR	
Q.3	**(a)**	Calculate ratio of major to minor axis of a yarn from following data(Assume race-tracked cross-section) P_1 = 208 mills P_2 = 170 mills c_1 = 7.1 % c_2 = 12.5 % Ne = 24.3s	**07**
	(b)	Write briefly on local deformation phenomena during woven fabric uniaxial tensile loading.	**07**
Q.4		Derive an equation for geometrical changes during extension of cloth assuming that the yarn length remains constant. Also derive equation for change in pick spacing when the yarn length remains constant.	**14**
		OR	
Q.4		Critically discuss the model (containing frictional and elastic elements) to illustrate shear behavior of the fabric. Also describe the apparatus used by Trealor for measurement of shear parameters.	**14**
Q.5		Derive an equation for cloth modulus for a fabric under the action of large load in biaxial direction neglecting the internal energy changes.(Case –I)	**14**
		OR	
Q.5		Derive an equation for total strain energy required for uniaxial loading of set cloth considering internal energy changes.	**14**

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