Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II • EXAMINATION – SUMMER 2017

Subject Code: 2722508 **Date:25/05/2017**

Subject Name: Theory of Fabric Structures

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.**

Q.1	**(a)**	Derive an equation to find force required to bend the yarn in the form of elastica at the time of weaving.	**11**
	(b)	In order to produce fabric faster, calculate the count of the weft yarn to be used if the picks per inch are to be reduced from 96 to 84 using 60^s Ne yarn.	**03**
Q.2	**(a)**	A woven fabric has following particulars: EPI = 48 PPI = 56 C_1 = 4.5% C_2 = 14% Check whether jamming will occur when stretched in weft direction. Also find the extension% and contraction % after stretching.	**07**
	(b)	What are the principles of shear measurement using KES and FAST system? Compare two systems with reference to various parameters related to shear measurement.	**07**
		OR	
	(b)	Write a short note on Stress-Strain characteristics of fabrics produced from yarns spun by different spinning system. Also write in short on fabric constraints on its constituent yarns.	**07**
Q.3	**(a)**	Write shortly on identifying local deformation phenomenon during woven fabric uniaxial tensile loading.	**11**
	(b)	Using following details find crimp in warp direction after application of load(C_1'): EPI = 48 PPI = 60 C_1 = 8% C_2 = 6% C_2' = 11.0%	**04**
		OR	
Q.3	**(a)**	Derive equations for any three special cases based on the geometrical model of woven fabric as given by Peirce.	**07**
	(b)	Derive an equation assuming race-tracked cross-section for the jammed fabric condition.	**07**
		OR	
Q.4	**(a)**	Derive an equation for cloth modulus for a fabric under the action of large load in biaxial direction neglecting the internal energy changes.	**10**
	(b)	Find the crimp in warp yarn for a fabric having following details: EPI = 54 PPI = 60 $Ne_1 = 40^s$ $Ne_2 = 36^s$ C_2 = 5.62%	**04**
		OR	
Q.4	**(a)**	Write on theory of simple buckling. Also provide equations of forces acting in simple buckling of fabric considering it as an elastic material.	**07**
	(b)	Write a short note on drape as a physical and measurable quantity.	**07**
Q.5	**(a)**	Derive an equation for Poisson Ratio for the fabric with reference to geometric changes during the extension of cloth.	**10**
	(b)	Determine the square sett of a fabric having 90% of maximum cover factor value for a 5 thread weft satin fabric woven with 50^s Ne cotton yarn.	**04**
		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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