Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2722502 **Date: 27/05/2016**

Subject Name: Theory of Yarn Manufacture

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 Calculate the no. of fibres in yarn cross section from following data:- **14**

Fibre length ï 27mm
Fibre fineness -1.3dtex
Yarn count ï 12s Ne
Sliver linear density ï 3.5ktex
Opening roller speed ï 11,500 rpm
Opening roller radius ï 1.20ò
Rotor speed ï 120000 rpm
Rotor diameter ï 34mm
Yarn withdrawal rate ï 200 m/min

Q.2 (a) How the fibres acceleration behind top comb at comber affect noil, short fibre and long fibre breakages? **07**

(b) Define: fibre extent, fibre migration, spinning co-efficient, scratch combing and ñbipartite structureò **07**

OR

(b) Explain hook fibre integration in to yarn in rotor spinning. **07**

Q.3 (a) Discuss the effect of helix angle and spinning triangle on migration frequency and migration factor of compact and ring spun yarn. **07**

(b) In detail explain characteristics fibre orientation **07**

OR

Q.3 (a) What is drafting force and carding force in relation with fibre orientation? **07**

(b) Discuss the influence of hook direction in sliver and roving structure on fibre orientation and quality of yarn. **07**

Q.4 (a) Fibre length distribution at front roller of a draw frame is as follows: **09**

Length of fibre in cms (l)	5	4	3	2	1	Total
No. of fibres (frequency)	22	25	20	18	15	100

If force required withdrawing single fibre from bundle is 4gm and there is 4000 fibres emerging from back roller and draft employed is 13. Calculate drafting force required to draft the material.

(b) Derive equation for traveler speed at ring frame. **05**

OR

Q.4 (a) Derive an equation of yarn tension at any radius ŕô **10**

(b) Define scratch combing. **04**

Q.5	**(a)**	Compare tenacity, hairiness, load elongation curve and structure of ring, rotor and friction spun yarn.	**07**
	(b)	What is ideal drafting? Derive the equation of foster theory of perfect drafting at draw frame.	**07**

OR

Q.5	**(a)**	Explain the effect of negative air pressure at air exhaust point through the perforated cylinder on DREF3 yarn properties.	**05**
	(b)	Explain the requirement of yarn tension at ring frame zone wise.	**09**

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