Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–II EXAMINATION – SUMMER 2015

Subject Code: 2722502 **Date: 30/05/2015**

Subject Name: Theory of Yarn Manufacture

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 Discuss the effect of different spinning stages on fibre orientation and quality of sliver and yarn. **14**

Q.2 **(a)** Why one should study the behavior of floating fibre during drafting? Also derive the equation of foster theory of perfect drafting at draw frame. **07**

(b) Compare yarn structure, yarn appearance and tenacity of ring, rotor and DREF3 spinning system. **07**

OR

(b) Discuss the effect of negative air pressure at air exhaust point through the perforated cylinder on DREF3 yarn properties. **07**

Q.3 Calculate difference in theoretical and nominal twist, and fibre flux in resultant yarn from the given data: fibre length ï 30mm, fibre fineness ï 1.1dtex, yarn count ï 18s Ne, sliver linear density ï 3.9 Ktex, opening roller speed ï 10,000, opening roller diameter ï 3ò, rotor radius ï 18mm, yarn withdrawal rate ï 200m/min. **14**

OR

Q.3 **(a)** Fibre length distribution at front roller of a draw frame is as fallows: **09**

Length of fibre in cms (I)	5	4	3	2	1	Total
No. of fibres (frequency)	14	16	11	9	5	55

If force required withdrawing single fibre from bundle is 4gm and there is 400 fibres emerging from front roller and draft employed is 13. Calculate drafting force required to draft the material.

(b) Derive equation for traveler speed. **05**

Calculate the traveler speed with the following:

Package radius ï 2cms

Spindle speed ï 12000 r.p.m

T.P.I - 20

Q.4 **(a)** Derive an equation of yarn tension at any radius ŕrâ **07**

(b) What is scratch combing? How fibres are accumulated behind top comb? **07**

OR

Q.4 **(a)** Define air drag force at ring frame. Derive yarn drag force derivation at ring frame. **07**

(b) Define and derive comber fractionation efficiency. **07**

Q.5 **(a)** Define the terms: fibre overlap index, fibre straightness index, carding force, drawing force, mean fibre position. **10**

	(b)	Express relationship between fibre length, rotor diameter and rotor speed.	**04**

OR

Q.5	**(a)**	Define and discuss: ñbipartite structure of rotor yarn, fibre extent, fibre migration in rotor spinning system.	**10**
	(b)	Which characteristics explain fibre orientation?	**04**

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