Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–II • EXAMINATION – SUMMER • 2014

Subject Code: 1722502 **Date: 03-12-2014**

Subject Name: Theory of Yarn Manufacturing

Time: 02:30 pm - 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 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
Also calculate yarn arm rotational speed, theoretical twist and nominal twist.

Q.2 **(a)** Which fibres are known as floating fibres? Derive the equation of force to draft the fibres at draw frame. **07**

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

OR

(b) With an equation make understand tension in yarn at any radius at ring frame. **07**

Q.3 **(a)** Derive an equation for traveler speed at ring frame. **07**

Calculate the traveler speed at start and end of the doff from the following:
Package diameter at start ï 1.5cms
Package diameter at start ï 6cms
Spindle speed ï 13000 r.p.m
T.P.I - 22

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

OR

Q.3 **(a)** Which factors affects number of turns in spinning zone? Explain it. **07**

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

Q.4 Compare forces involved, tenacity, hairiness, load elongation curve and structure of ring, rotor and friction spun yarn. **14**

OR

Q.4 Elaborately discuss different principles involved in making fasciated yarns. Also explain working in brief of fasciated spinning process. **14**

Q.5 **(a)** Discuss the influence of hook direction in sliver and roving structure on fibre orientation and quality of yarn. **07**

(b) Which characteristics explain fibre orientation? **07**

OR

Q.5 **(a)** Define drafting force and carding force in relation with fibre orientation.

(b) How the helix angle and spinning triangle affect migration frequency and migration factor of compact and ring spun yarn. **07**

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