

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER-II • EXAMINATION – SUMMER • 2014****Subject Code: 1722502****Date: 18-06-2014****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** (a) Why rotor yarn is known as bipartite structure? Find out no. of fibres in yarn cross section, flux in transport tube and at rotor surface with following particular: sliver linear density $\approx 3\text{ktex}$, opening roller speed $\approx 9000\text{rpm}$, opening roller diameter $\approx 65\text{mm}$, rotor speed $\approx 1,00,000\text{rpm}$, rotor diameter $\approx 30\text{mm}$, fibre length $\approx 36\text{mm}$, fibre fineness $\approx 1.30\text{dtex}$, yarn fineness $\approx 30\text{tex}$. **10**
- (b) How to measure false twist in rotor spinning with laser Doppler anemometry. **04**
- Q.2** (a) How the roller errors affect drafting at drafting arrangement? Also list out the consequences of it on textile product. **07**
- (b) Explain the effect of spinning angle and angle of wrap round the bottom roller on spinning geometry. **07**
- OR**
- (b) Discuss the effect of drafting on fibre configuration and effect of fibre configuration on yarn quality. **07**
- Q.3** (a) How floating fibre affect perfect drafting? Derive the equation of drafting force on a draw frame. **07**
- (b) Discuss the effect of fibre acceleration behind top comb at comber. **07**
- OR**
- Q.3** (a) Define and derive an equation of yarn air drag force at ring frame. **07**
- (b) Discuss the complex relation between winding zone, spinning zone and balloon zone tension at ring frame. **07**
- Q.4** (a) Briefly explain: **14**
- (1) Several arrangements for compact spinning
- (2) Advantages of siro spinning
- (3) Self twist spinning principle
- OR**
- Q.4** (a) Define: optimum twist, coriolis force, down twisting, torsional stiffness. **14**
- Q.5** (a) Why tenacity of ring spun yarn is more than rotor spun yarn? Explain. **07**
- (b) Briefly explain drafting force at drawing stage and carding force exerted on fibres. **07**
- OR**
- Q.5** (a) What is the effect of air pressure of DREF3 spinning on single strand strength, strand variability and yarn strength variability? **05**
- (b) Define FSI $\approx$ fibre straightness index. With neat sketch explain the indirect method to measure fibre orientation. **09**
