

Seat No.: _____

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GUJARAT TECHNOLOGICAL UNIVERSITY**M.E –IIst SEMESTER–EXAMINATION – JULY- 2012****Subject code: 1722502****Date: 09/07/2012****Subject Name: Theory of yarn manufacturing****Time: 10:30 am – 13:00 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) With neat sketch explain forces involved in ring, rotor and friction spinning. Also compare ring, rotor and friction spinning yarn based on hairiness index. **07**

(b) Define and discuss **07**

(i) “bipartite structure” of rotor yarn

(ii) Fibre extent and orientation

(iii) Spinning in coefficient

Q.2 (a) List out the factor which affects twist density of yarn in ring frame spinning zone. **07**

(b) Discuss different types of fibre feed with merit and demerits in OE friction spinning system. **07**

OR

(b) What is the significance of fibre acceleration behind top comb in comber? **07**

Q.3 (a) With neat sketch explain fibre deposition and layer formation in rotor groove. **07**

(b) Explain in short “theory of drafting” by Foster. **07**

OR

Q.3 (a) Elaborately discuss different principle involved in making fascinated yarn. **07**

(b) Calculate maximum radius of balloon from following. **07**

Tension in yarn – 20000 dynes

Yarn count – 50s

Angular traveler speed – 1600 rad/sec

Ring diameter – 6.7 cm

Height of balloon – 22cm

Q.4 (a) What is the role of fibre friction field to select draft in drafting in draw frame? **07**

(b) Write a note on ring spinning new phenomenon – rotating ring. **07**

OR

Q.4 (a) Explain **07**

(i) Coriolis force

(ii) Effect of balloon height on balloon radius

(iii) Difference between thread shape and balloon in ring frame system

Q.4 (b) Write a note on fibre pressure field in drafting. **07**

Q.5 (a) Derive an equation of yarn tension at any radius ‘r’. **07**

(b) Derive equation for traveler speed. **07**

Calculate the traveler speed at start and end of the doff from following.

Spindle speed – 17000 r.p.m

T.P.I. – 20

Package diameter at start – 0.7 inch

Package diameter at doff – 1.7 inch

OR

Q.5 (a) Derive the formula for winding tension considering traveler mass, traveler speed, ring diameter and ring traveler friction analysed by Krause. **07**

(b) Calculate drafting force required to draft the material, if the fibre length at front roller of draw frame is as follows: **07**

Fibre length in cm	6	5.9	5.8	5.7	5.6	total
Fibre flux	12	15	10	8	5	50

Single fibre withdrawal force – 1.3gm

No. of fibres entering from back roller – 5500

Total draft - 15
