Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1722501 **Date: 06/07/2012**

Subject Name: Theory and Design of Textile Machines II

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 Write on various equations for axial and transverse air flows acting on the weft yarn on air jet loom. Also write on equation taking in to consideration complex yarn structure. **14**

Q.2 **(a)** For Straight line-Nominal movement type of picking cam, prove that **07**

(Effective picker stroke)= $\frac{p\omega\pi}{n} = \frac{x_{max}\pi}{2n}$

(with usual notations)

(b) Show that for a freely rotating back roller of sensitive back rest, the ratio of warp tension (T) to the applied force (F) is **07**

$$\mathbf{0.5\ sec^2\alpha \quad when\ \theta = 90^\circ}$$

(with usual notations)

OR

(b) Write briefly on cloth fell position. **07**

Q.3 **(a)** While considering parameters affecting selection of modern looms, discuss effect of Influence of warp length and Flexibility on performance. **07**

(b) Compare stress on the weft yarn with reference to projectile, air jet and rapier looms. **07**

OR

Q.3 Give answers of the following. **14**

(i) What is meant by nominal and actual picker displacement? Calculate force exerted by the picker(for manual running and full speed running) on the shuttle from following data:
Swell pressure on back wall of shuttle: 60 N
Coefficient of friction: 0.23 Mass of shuttle: 1 lbs
Speed of shuttle: 12.5 m/s Distance : 0.2 m

(ii) What is the effect of diameter and blowing time of relay nozzle on air consumption on an air jet loom?

(iii) For a shuttle loom, calculate maximum permissible loom speed from following data:
Effective reed space: 52” Average shuttle speed : 12 m/s
Duration of picking:135 deg Effec. length of shuttle: 30 cm

Q.4 **(a)** Which factors affect the yarn stresses in warping and beaming? Discuss any two in detail. **07**

(b) Define different zones of the main nozzle design while considering polytropic air flow. **07**

OR

Q.4 **(a)** What is the effect of sizing on weavability parameters of yarn? **07**

(b) With reference to EYC, discuss LD Short and LD Long settings in detail. **07**

Q.5 Taking a hypothetical example, show general features of shed-shape characteristics taking reed displacement angle versus shed angle. Also draw only shed-shape for a loom having no dwell and having shed crossing at 330 and 270 degrees. **14**

OR

Q.5 **(a)** Multicoloured warps of a 50s Nm spun yarns are wound on a horizontal section warping drum of 1.5 m diameter, on which inclines are fixed at 15 deg to the axis. Each warp is 3000 m long and 2 m wide and contains 6500 ends. Warp density on drum is 0.6 g/cm3. Determine the depth of yarn on drum when the warp is completed and the corresponding reed traverse per section. **07**

(b) Derive the equation for the ratio of warp tension (T_2) to the applied force (F) for the non rotating back rest which gives minimum tension. Draw the graph taking the value of coefficient of friction as 0.22 **07**

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