

**Question Paper Code : P 1579**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Seventh Semester

Textile Technology

TT 1402 — TEXTILE MECHANICS

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Drawing sheets to be provided.

Graph sheets to be provided

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What do you mean by root clearance in gears?
2. State the conditions for maximum power transmission in belt drive.
3. Which one of the following winding and binding coil ratio of builder cam in ring frame will consume more power? Why?
  - (a) 16 : 8
  - (b) 27 : 9
  - (c) 16 : 16
4. Mention the different types of cams used in textile machines.
5. Write the equations of circular motion.
6. Explain why the traveller gets maximum speed while winding at full package diameter?
7. What do you mean by 'Principle of Moments'?
8. Calculate the work done in lifting a bale of fibres of mass 120 kg from the ground to a delivery bay 3 m above ground level. If the bale accidentally slips from the bay, what power is expended in its fall?

9. What is coil friction?
10. A leather brake block is held against the rim of a 40 cm diameter pulley by a 15 kg load. If the coefficient of kinetic friction is 0.45, calculate the power used in braking if the pulley speed is maintained at 150 rev/min.

PART B — (5 × 16 = 80 marks)

11. (a) A shaft which rotates at a constant speed of 160 rpm is connected by belting to a parallel shaft 180 cm apart which has to run at 60, 80 and 100 rpm. The diameter of smallest pulley on the shaft is 30 cm. Determine the remaining diameters of the two stepped pulleys
- (i) For an open belt drive
- (ii) For a crossed belt
- Neglect belt thickness and slip. (8 + 8)

Or

- (b) Draw the neat gearing diagram of Brook and Shah differential mechanism in a Simplex machine and show that bobbin lead principle of winding is adopted in this system.
12. (a) Construct the profile of cone-drums used in fly-frame with the following particulars :
- Empty Bobbin diameter : 30 mm, Full Bobbin diameter : 180 mm, Sum of top and bottom cone drum diameters : 500 mm, Belt shift : 1000 mm. Diameters of driving and driven conedrums are equal when roving bobbin is 50% full.

Or

- (b) Design a ring frame builder cam to get winding and binding coil in the ratio of 27 : 18 for the given particulars
- (i) Lift of the cam = 2 inches
- (ii) Nearest point of contact with bowl = 7 inches
13. (a) In a loom running at 440 ppm, a shuttle with 0.6 kg mass is accelerated for the period of 0.55 radian rotation of bottom shaft and leaves the shuttle box at a speed of 16.2 m/s. Find out the picking force in Newton and power for picking in KW.

Or

- (b) A shuttle 1 meter above floor level and moving at 12 m/s flies out of a loom at an angle of  $10^\circ$  with the horizontal. How high will it rise, how far it will move horizontally before it strikes the floor, how fast and in what direction is it then moving?

14. (a) (i) A loom sley with a mass equivalent to 60 kg and moving at 1.5 m/s is stopped by the fast-reed motion in 1.2 cm. Calculate the average force acting on it. (10)
- (ii) A shuttle leaves the shuttle box at 17 m/s, retardation of the shuttle in the shed is  $0.78 \text{ m/s}^2$  and the time for passage through the shed is 0.07 s. Find out the speed of the shuttle while leaving the shed. (6)

Or

- (b) Calculate the maximum velocity and acceleration of each heald shaft employed for producing 2/2 twill for the following given particulars.

- (i) Lift of the tappet used for controlling the front heald shaft is 2.8"
- (ii) Distance between fulcrum point to bowl is 25 cm
- (iii) Distance between bowl to the point at which the front heald shaft is connected on the lever is 22.5 cm
- (iv) Distance between the adjacent heald shaft is 1.8 cm
- (v) Distance between the cloth fell to front heald shaft is 14 cm
- (vi) Dwell period is  $1/3^{\text{rd}}$  of pick
- (vii) Loom speed is 500 ppm.

15. (a) Calculate the axial load and the power transmitted of a cone clutch using the following data. Minimum and maximum surface contact radii are 125 mm and 150 mm respectively. Semi contact angle is  $20^\circ$ . Allowable normal pressure is  $140000 \text{ N/Sq.m}$ , Coefficient of friction is 0.25.

Or

- (b) A band brake acts on the 75% of circumference of a drum 450 mm diameter which is keyed to the shaft. The band brake provides a braking torque of 225 N-m. One end of the band is attached to a fulcrum pin of the lever and the other end to a pin 100 mm from the fulcrum. If the operating force is applied at 500 mm from the fulcrum and coefficient of friction is 0.25. Find the operating force when the drum rotates in the anticlock wise direction.