Register Number:……..

B.TECH., DEGREE EXAMINATIONS MAY/JUNE 2013

Sixth Semester

TEXTILE TECHNOLOGY

TTX115: Mechanics of Textile Machinery

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10x1=10 Marks)

1. Belt drives are characterised with

   A. Flexible shaft centre distance B. More noise at higher speeds

   C. Slippage free even at overloads D. Indefinite life compared to gears.

2. PIV Gears are meant for:

   A. Step by Step increase in speed

   B. Maintenance free operation

   C. Change of speed ratio only for low power transmission.

   D. Precise speed adjustment

3. The below mentioned follower does not impose any restriction on the shape of the cam:

   A. Roller B. Knife C. Flat D. Curved

4. The Speed frame cone drums are profiled with:

   A. Both hyperbolic B. Both concave

   C. Top convex and bottom concave D. Top concave and bottom convex

5. Velocity is concerned with:

   A. Rate of change of displacement

   B. Rate of change of acceleration

   C. Rate of change of displacement in a given direction.

   D. Rate of change of speed in a given direction

6. Momentum is product of:

   A. Mass and Velocity B. Weight and Speed.

   C. Distance and Force D. Speed and Time

7. If a body is in equilibrium under the action of a number of forces, then the algebraic sum of the moments of the forces about any point is:

   A. Equal to zero. B. Not zero. C. Positive D. Negative

8. Kinetic energy:

   A. Can be dissipated through friction as heat.

   B. Cannot be stored in rotational motion

   C. Maintained in any article even when speed changes.

   D. Cannot be passed from one object to another.

9. The critical requirement of cone clutch is:

   A. The surface roughness of inner cone. B. The cone angle.

   C. The length of the cone. D. The coaxiality of driver and driven cone.

10. Internal Shoe Brake is:

A. Commonly available with one semi-circular shoe

B. Normally held in inactive position

C. Distinct from Wheel

D. Lined with low wearing property material to protect the drum

PART B (10x2=20 Marks)

11. What are the advantages of rope drives?
12. What is Electromagnetic drive?
13. State the Four parameters, required to design cone drums for the scutcher.
14. What are the four methods of accomplishing the follower beingalwaysin contactwith the Cam?
15. Write down the three famous equations of motion.
16. In what way Weight is different from Mass?
17. Define potential energy
18. What do you mean by centre of Gravity?
19. Brief on the multiple plate clutch kinematics.
20. State the factors contributing for the eccentricity of Sley.

PART C (5x14=70 Marks)

21. a) (i) An epicyclic gear consists of three wheels A, B, and C. The fixed wheel A has 72 internal teeth, B has 20 teeth, and C has 32 external teeth. The wheel B gears with both the wheels of A and C and carried on an arm D, which rotates about the centre of wheel A at 18 rpm. Find out the speed of the wheels B and C. (8)

(ii) Elucidate on the advantages, disadvantages, and application to textile drives of V Belts. (6)

(OR)

b) (i) The width of a belt is 200 mm and the maximum tension per mm of width not to exceed 1.5 kgs. The ratio of tension between tight and slack side is 2.0. The diameter of the driver pulley is 1000 mm and rotates at 220 rpm. Calculate the horse power transmitted. (6)

(ii) With an illustrativediagram, depict the Gearnomenclature. (8)

22. a) Draw a weaving tappet for 1up and 3 down twill, using the following particulars.

- The distance from the Centre of the tappet to the Nearest Point of Contact with the bowl---------- 100 mm
- Lift of the tappet ---------- 50 mm
- Treadle bowl diameter ---------- 40 mm
- Dwell ---------- 1/3 of Pick
- Shed ---------- Open

(OR)

b) Draw the profile of the Ring frame buildermotion Cam considering the following Data:

Bottom diameter of the cop --------- 65 mm

Nose diameter of the cop ---------- 25 mm

Lift of the cam ---------- 60 mm

Nearest Point of Contact ---------- 25 mm

No. of leaves ---------- 03

Winding to Binding coil ratio ------- 3:1

Bowl diameter ---------- 50 mm

23. a) (i) A Shuttle in a loom require 0.1 second to pass through the warp width of 1000 mm. The retardation is 10 m/Sec. Calculate the average velocity of the shuttle. (6)

(ii) Summarise the procedureto calculatepower consumption in a ring frame due to traveler and yarn dynamics taking into account the formulae involved reflecting all the parameters. (8)

(OR)

b) (i) A carding cylinder disengaged from all other parts, is attached to a rope coiled around a pulley on the cylinder shaft. The rope supported over a frictionless pulley is connected to 20 Kgs of weight on the other side at a height of 3 meter from the ground. When the weight is allowed to fall down, the cylinder makes 1.5 revolution and the rope is disengaged automatically from the cylinder pulley.

The cylinder comes to rest after making 7 revolutions.

Calculate A) Kinetic energy in weight when it reaches the floor,

B) Kinetic energy in the cylinder when it rotates at 180 rpm. (8)

(ii) Narrate the process of calculating picking power with relevant formulae. (6)

24. a) (i) The loading mechanism for a front drafting zone of a ring frame has the following data:

Roller stand angle ---------- 45 degree.

Mass of the weighting lever ------ 0.2 Kg

Mass attached to the weighting lever---- -1.5 kg at 150 mm. from fulcrum.

Centre of gravity of the lever ---- 75 mm from the fulcrum

Link connection from saddle to weighting lever----- 20 mm from fulcrum.

The link, connecting saddle with weighting lever is at a distance of 12 mm and 20 mm from the centre of front and middle roller respectively.

Calculate the load exerted on the top roller saddle. Also calculate the position of the weight if the link connection is at 25 mm. from fulcrum, to maintain the same load. (8)

(ii) The heald frame and the reversing spring are attached to a horizontal lever, at a distance of 50 cm. and 10cm. from the fulcrum respectively. The lever must exert a minimum resistance of 50 N to the lifting of the heald frame. What pull must the spring exert when the lever is horizontal? (6)

(OR)

b) Kinetic energy analysis has a definite say in understanding the mechanics of Textile Machines. Justify the statement.

25. a) (i) A loom beam of diameter 50 cm. and with ruffles of diameter 15 cm. is in equilibrium atthe point of turning. The mass of the beam is 60 kg. The tight and slack side tension is 2000N and 500 N respectively.

Assume all the other necessary conditions, whichever are required.

Calculate the warp tension.

If beam diameter is 15 cm and mass is 15kg, what chain tensions are required to maintain same warp tension, if the ratio between tight and slack side tensions remains same? (8)

(ii) A Band brake on a beam-warping machine has the following particulars:

The diameter of the braking drum - 30 cm.

The space between the two ends of the brake - 10 cm.

The mass of the weight hanging at a distance of 50 cm from the fulcrum in the lever - 25 kg.

Band brake overlapping - 240 degrees.

The Friction coefficient : 0.5

Calculate the braking torque when the drum rotates A) clockwise and

B) Anticlockwise. (6)

(OR)

b) (i) The length of a connecting arm and crank are 1200 mm and 300 mm respectively. The speed of the loom is 210 rpm. Calculate the velocity of the reed during the forward direction through analytical method, When crank angle is 30 degrees with horizontal.(7)

(ii) For the same problem given above, describe the procedure in terms of Velocity diagram Method (7)

****