



B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fifth Semester

TEXTILE TECHNOLOGY

U18TXT5001: Mechanics of Textile Machinery

COURSE OUTCOMES

- CO1:** Define the importance of gear and belt drives and to express the relationship between tensions in belt drives and also the condition for maximum power transmission.
- CO2:** Design the profiles of cone drums used in speed frames as well as scutcher, plain and twill tappets and ring frame builder motion cams.
- CO3:** Calculate the picking force, shuttle velocity and acceleration in weaving machines and to use the equations of motions in textile applications.
- CO4:** Justify the use of kinetic energy, potential energy and principle of moments in textile industry.
- CO5:** Explain the importance of friction in textile applications and to point out the applications of brakes and clutches in textile industry and to derive the expressions for the torque transmitting capacity of various types of clutches.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

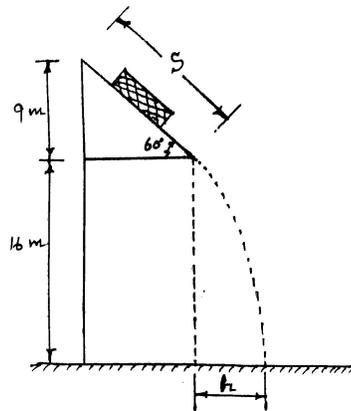
PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|--|-----|-------------------|
| 1. Define reverted gear train | CO1 | [K ₄] |
| 2. Illustrate the application of differential motion in textile industry | CO1 | [K ₂] |
| 3. Identify important parameters required for the construction of scutcher cone drum profile | CO2 | [K ₃] |
| 4. Define Simple Harmonic Motion | CO2 | [K ₁] |
| 5. Categorize various linear equations of motion | CO3 | [K ₄] |
| 6. Distinguish work and power | CO3 | [K ₄] |
| 7. Compare kinetic energy with potential energy | CO4 | [K ₄] |
| 8. List out the applications of principle of moments in textile industry | CO4 | [K ₄] |
| 9. Define sley eccentricity | CO5 | [K ₁] |
| 10. Mention two types of clutches used in textile industry | CO5 | [K ₄] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

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|-----|---|----|-----|---------------------------|
| 11. | Prove that the centrifugal force has no effect on power transmission and derive the condition for maximum power transmission. | 16 | CO1 | [K ₄] |
| 12. | Derive the expression for the velocity ratio considering belt thickness and slippage. | 16 | CO1 | [K ₄] |
| 13. | Construct the profile of shedding lappet for plain weave with following particulars. | 16 | CO2 | [K ₅] |
| | Type of weave - 1/1 | | | Lift – 60 mm |
| | Least radius (NPC) - 40 mm | | | Bowl dia – 75 mm |
| | Dwell - 1/3 of a pick | | | Type of movement - S.H.M. |
| 14. | A shuttle 1 m above floor level and moving at 10 m/s flies out of a loom at an angle of 0.15 rad above the horizontal. How high will it rise, how far horizontally from its starting position is the place where it lands, and what is its velocity as it strikes the floor and what is the angle of landing? | 16 | CO3 | [K ₅] |
| 15. | A bale of weight 100 kgs comes down a chute shoot as shown in figure. Find the potential and kinetic energy of the bale at the top and bottom of the shoot and at floor level. Also calculate the time to traverse the chute, the total time of the fall and the horizontal distance 'h'. | 16 | CO4 | [K ₄] |



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| 16. | Derive the expression for the tension acting in warp sheet in a negative let-off motion. | 16 | CO5 | [K ₅] |
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