

# END TERM EXAMINATION

SECOND SEMESTER [B.TECH] MAY-JUNE 2017

Paper Code: ETME-110

Subject: Engineering Mechanics

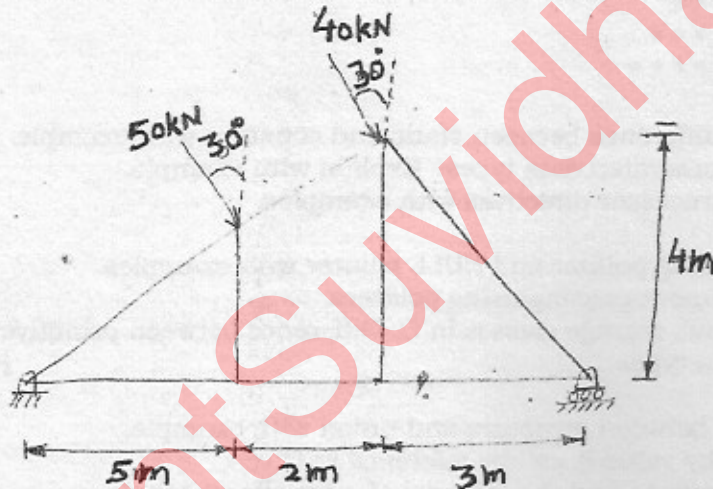
BATCH : 2013 ONWARDS

Time: 3 Hours

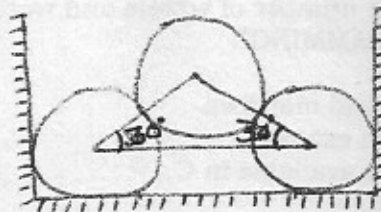
Maximum Marks: 75

Note: Attempt any five questions including Q no.1 which is compulsory.

- Q1 Short questions:- (5x5=25)
- (a) Classify the force systems.
  - (b) State and prove varignon's theorem with example.
  - (c) Explain cone of friction.
  - (d) State and explain D'Alembert's principle.
  - (e) What are the assumptions involved in analysis of a perfect truss?
- Q2 Derive the expression of the ratio of tensions for the belt pulley system. (12.5)
- Q3 Find the forces in all the members of the truss shown in figure. (12.5)



- Q4 Describe the method of finding centre of gravity of composite bent wires. (12.5)
- Q5 (a) Three identical tubes of weights 8 kN each are placed as shown in figure. Determine the forces exerted by the tubes on the smooth walls and floor. (6.5)



(b) State and prove parallel axis theorem. (6)

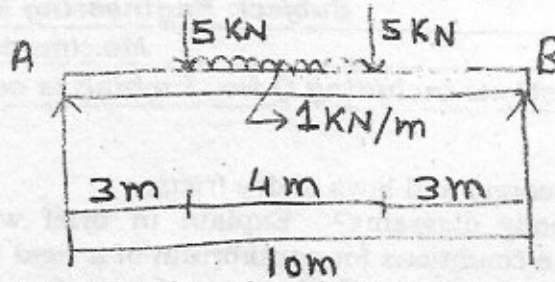
- Q6 Derive the expression for the coefficient of restitution. (12.5)

P.T.O.

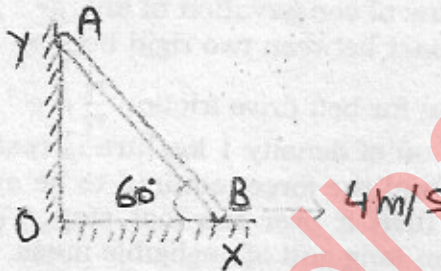
ETME-110 (N)



- Q7 Draw the shear force and bending moment diagram for the beam shown in figure. (12.5)



- Q8 (a) A straight rod AB, 50 cm long has one end B moving with a velocity of 4 m/s, and the other end A moving along a vertical line YO as shown in figure. Find the velocity of the end A and of the midpoint of the rod when it is inclined at  $60^\circ$  with horizontal. (6)



- (b) A stone falls freely from rest and total distance covered by it in last second of its motion equals the distance covered by it in first three seconds of its motion. Determine the time in which the stone remains in air. (6.5)

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