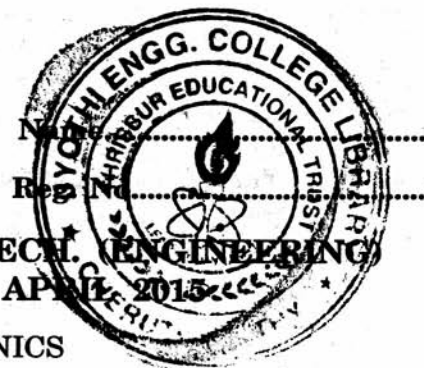


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COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING)
DEGREE [14 SCHEME] EXAMINATION, APRIL 2015

EN 14 105—ENGINEERING MECHANICS

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer any eight questions.
Each questions carries 5 marks.*

1. (a) Explain the principle of transmissibility.
- (b) Explain free body diagram with suitable example.
- (c) Discuss the different laws of friction.
- (d) Briefly comment upon theorems of MI and its applications.
- (e) Explain briefly any one method for determining the stresses in the various members of a perfect frame.
- (f) Distinguish between tangential acceleration and normal acceleration.
- (g) Derive an expression for maximum height attained by projectile.
- (h) A particle moves along a curve $x = 0.64y^2$. Its equation of motion is $x = 4t^2$, where x and y are in meters and t is in seconds. At $t = 35$, calculate velocity of the particle.
- (i) State and explain the law of conservation of energy.
- (j) Explain briefly impulse and momentum.

(8 × 5 = 40 marks)

Part B

*Answer all questions.
Each question carries 15 marks.*

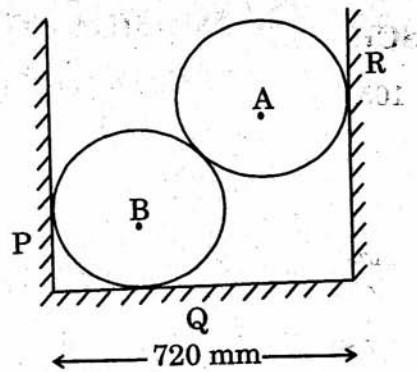
2. (a) A rope 9 m long is connected at A and B, two points on the same level, 8 m apart. A load of 300 N is suspended from a point C on the rope, 3 m from A. What load connected to a point D, on the rope, 2 m from B is necessary to keep portion CD parallel to AB.

Or

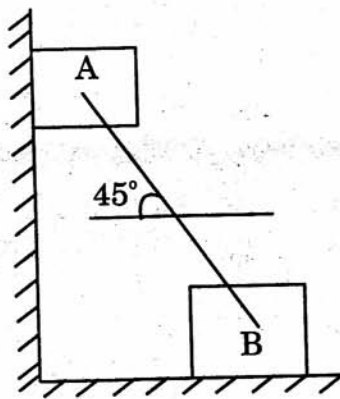
- (b) Two smooth cylinders A and B each of diameter 400 mm and weight 200 N rest in a horizontal

Turn over

channel having vertical walls and base width of 720 mm as shown in figure. Find the reaction at P, Q and R.

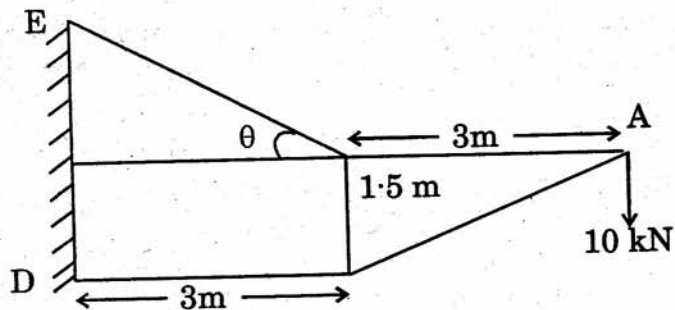


3. (a) Two identical block, A and B of weight W are supported by a rigid bar inclined 45° with horizontal as shown in figure. If both the blocks are in limiting equilibrium find the coefficient of friction, between the block and wall assuming it to be same.



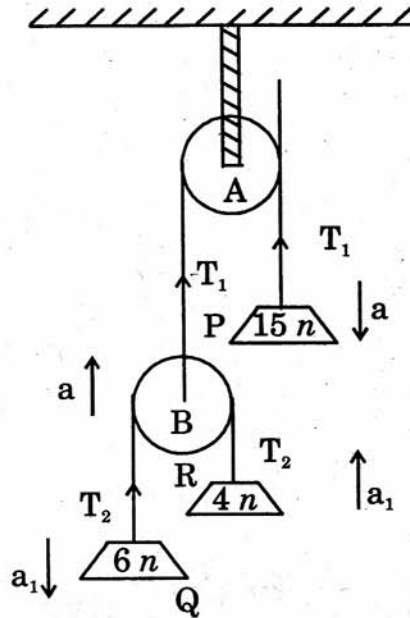
Or

- (b) Determine forces in members of the truss shown in figure using method of sections.



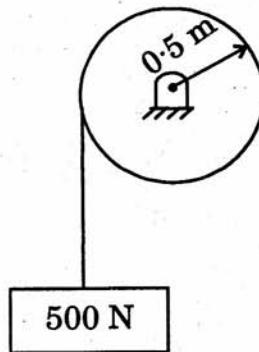
4. (a) A system of weight connected by strings passing over pulley A and B is shown in figure. Find the acceleration of the three weights P, Q and R.

Using D' Alemberts principle.



Or

- (b) A person running eastwards with a speed of 8 km ph, feels the wind to be blowing direct from north an doubling his speed, he feels the wind to blow from north-east. Find the actual direction and velocity of the wind.
5. (a) A block of 500 N is suspended by a tight rope wound round the pulley of weight 200 N and radius 0.5 m, as shown in figure. Determine the acceleration of the weight and the tension in the rope.



Or

Turn over

- (b) A truck of weight 120 kN moves down a slope of 1 in 100. The resistance due to friction is 10 N per kN. If the truck starts from rest and travels a distance of 500 m in 5 minutes, find the work done at the end of the period.

(4 × 15 = 60 marks)