

B.E. / B.Tech. Civil Engineering / Mechanical Engineering / Electrical (Electronics & Power)
Engineering (Model Curriculum) Semester-III
002 / 001 / ESC-CE202 / SE101 / ESC-202 - Engineering Mechanics

P. Pages : 4

Time : Three Hours



GUG/S/25/13712

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Two identical rollers each of 50N are supported by inclined plane and a vertical wall as shown in figure. Find reaction at point of contact A, B and C. **10**

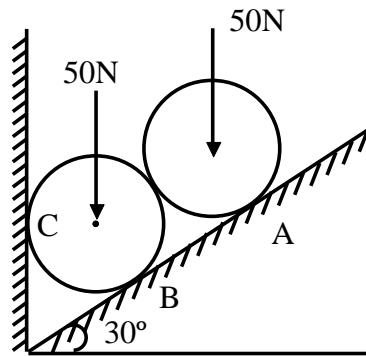


Figure 1

- b) Explain the principle of transmissibility with neat sketch. **6**

OR

2. a) State and explain Varignon's theorem with example. **6**
- b) The three forces as shown in fig. and a couple 'M' are applied to an angle bracket. Determine the moment of the couple 'M' if the line of action of the resultant of this force system is to pass through (i) B, (ii) C **10**

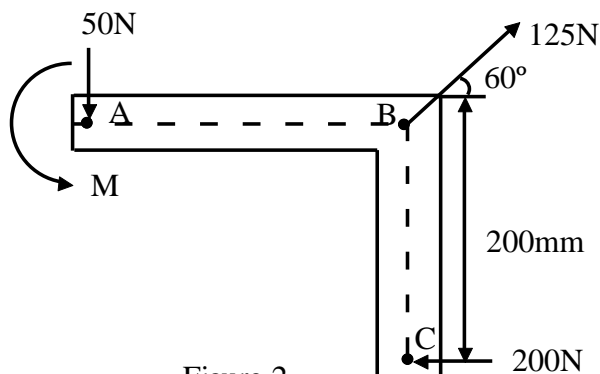
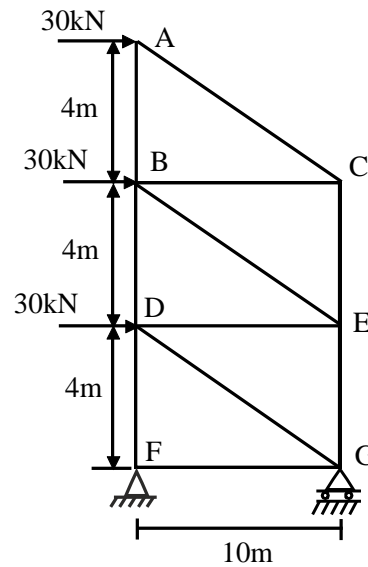


Figure 2

3. a)

12



b) State the various assumptions made in the analysis of truss.

4

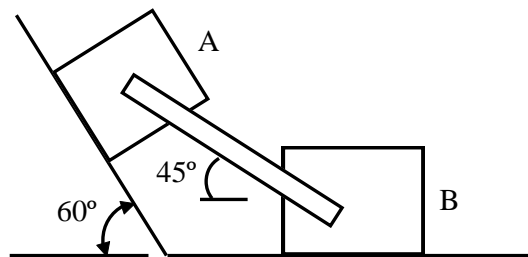
OR

4. a) Derive the formula of coil friction.

4

b) Two blocks A = 100 N and B = W are connected by a rod at their ends as shown in figure. Find the weight of block B required for limiting equilibrium of system if co-efficient of friction at all contact surface is 0.3.

12



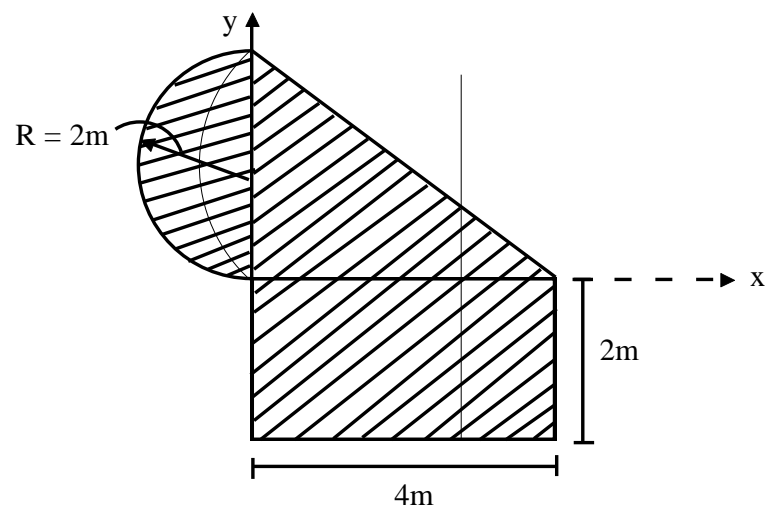
Figure

5. a) Explain moment of Inertia & product of inertia with its significance.

4

b)

12

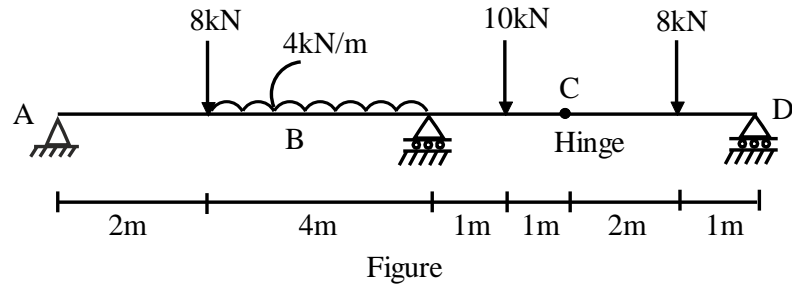


For the shaded area determine

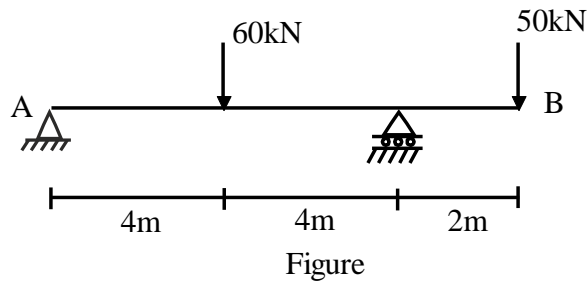
- Centroid with respect to x and y axis.
- Moment of Inertia about centroidal xy axis
- Moment of inertia about principle axis

OR

6. a) Using virtual work determine reaction at support A, B and D for the beam shown below. 8



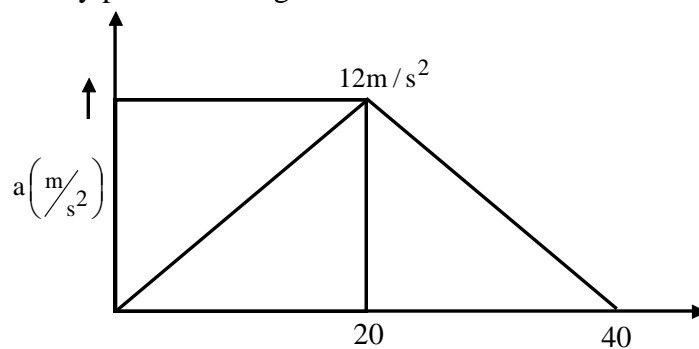
- b) Find the reaction at support A and B of beam as shown in figure, using virtual work method. 8



7. a) Write down the types of Motion with help of neat sketch and suitable example. 6
- b) A ball is thrown so, that it just clears a 7.5m wall 30m away. If it left the hand 1.5m above the ground and at an angle of 60° to the horizontal. What was the initial velocity of the ball. 10

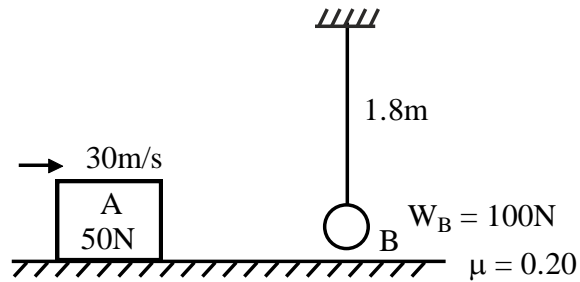
OR

8. Figure shows a diagram of acceleration verses time for a particle moving along x axis for a time interval of 0 to 40 sec. for the same time interval plot 16
- The velocity time diagram and
 - The displacement time diagram and find maximum speed attained and maximum distance covered by particle during the interval.



9. a) Explain D'Alembert's principle. 4

- b) The 50N block 'A' in fig has a velocity of 30m/sec when it strikes a 100N ball suspended from 1.8m cord. If $e = 0.8$ **12**
Determine:
1) Find position of block A
2) If impacts lasts for 0.01 sec
3) Maximum & minimum tension in the chord supporting B.



OR

10. a) State and explain work energy equation. **4**
b) Determine the acceleration of each body in figure assuming the pulleys to be frictionless and of negligible weight the incline plane is smooth. **12**

