VIT

Final Assessment Test (FAT) – May 2022

| Programme	B.Tech		Semester	Winter Semester 2021-22
Course Title	Engineering Mechanics		Course Code	BMEE201L
Faculty Name	Gajanand Gupta		Slot	C1+TC1
			Class Nbr	CH2021222300981
Time	3 Hours		Max. Marks	100

Section A (10 X 10 Marks)
Answer any 10 questions

1. Knowing that the tension in rope AC is 365 N, determine the resultant of the three forces exerted at point C of post BC.
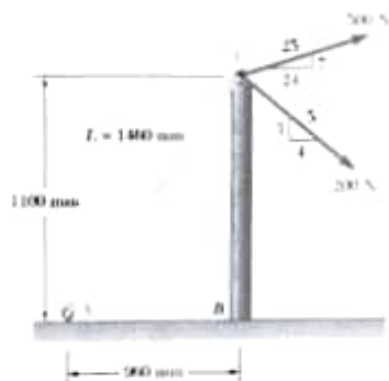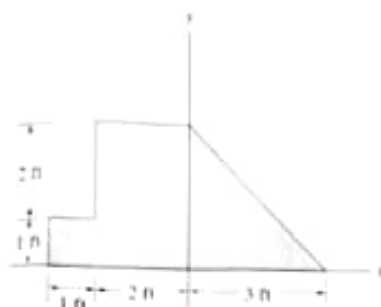

[10]

2. Find the magnitude and direction of the resultant of the two forces shown knowing that P = 600 N and Q= 450 N.
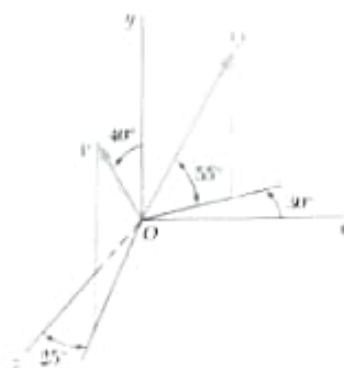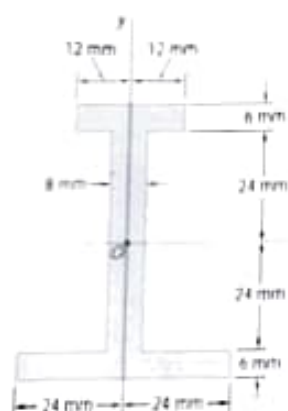

[10]

7. Locate the centroid of the plate area shown in the figure.

[10]

8. Determine the moment of inertia and the radius of gyration of the shaded area with respect to the x axis.

[10]

9. A motorist is traveling at 54 km/h when she observes that a traffic light 240 m ahead of her turns red. The traffic light is timed to stay red for 24 s. If the motorist wishes to pass the light without stopping just as it turns green again, determine (a) the required uniform deceleration of the car, (b) the speed of the car as it passes the light.
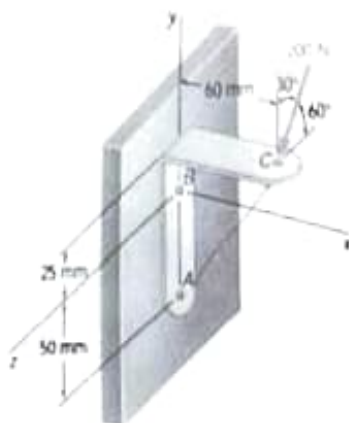
[10]

10. A volleyball player serves the ball with an initial velocity v0 of magnitude 13.40 m/s at an angle of 20° with the horizontal. Determine (a) if the ball will clear the top of the net, (b) how far from the net the ball will land.
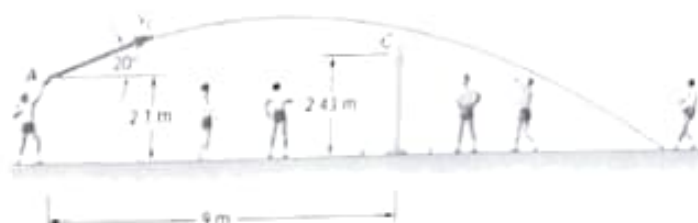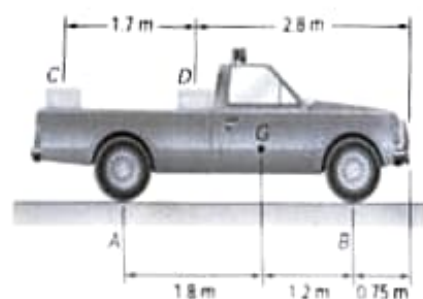
[10]

3. A 200-N force is applied as shown to the bracket ABC. Determine the moment of the force about A.
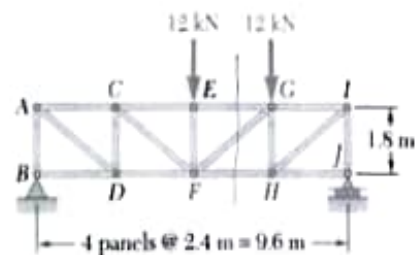

[10]

4. Two crates, each of mass 350 kg, are placed as shown in the bed of a 1400-kg pickup truck. Determine the reactions at each of the two (a) rear wheels A, (b) front wheels B.

[10]

5. Determine the force in members CD and DF of the truss shown using method of section

[10]

6. A 6.5 meter ladder AB leans against a wall as shown. Assuming that the coefficient of static friction μ, is the same at A and B, determine the smallest value of μ_s for which equilibrium is maintained.

[10]

11. Packages are thrown down an incline at A with a velocity of 1 m/s. The packages slide along the surface ABC to a conveyor belt which moves with a velocity of 2 m/s. Knowing that $\mu_k = 0.25$ between the packages and the surface ABC, determine the distance d if the packages are to arrive at C with a velocity of 2 m/s.

[10]
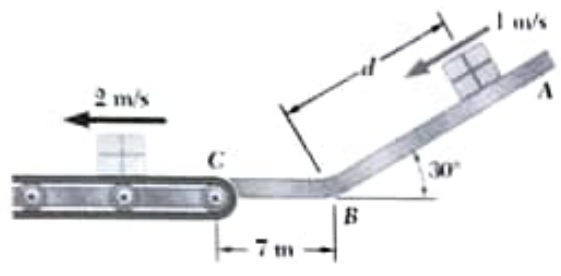
12. The bent rod ABCDE rotates about a line joining points A and E with a constant angular velocity of 9 rad/s. Knowing that the rotation is clockwise as viewed from E, determine the velocity and acceleration of corner C.

[10