PRN:		Course Code:	U01ES001

First Year **B. Tech** End Semester Examination Winter 2024

Engineering Mechanics

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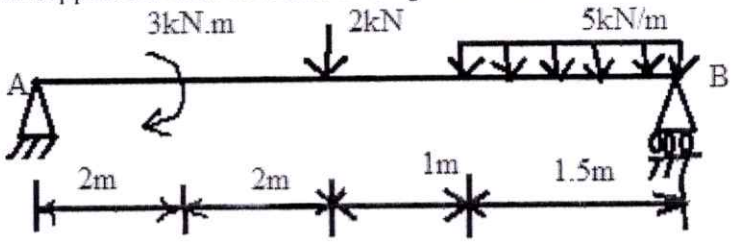
Day and Date: Wed 4 DEC 2024 Max Marks: **35**

Time: 02:00PM To 04:00PM Duration: **02** hrs

Instructions:

1. All questions are compulsory.
2. Assume suitable data wherever necessary and mention it clearly.

		Marks	Bloom's Level	CO
Q.1	**Attempt the following Question.**			
a)	Explain the following terms 1. Explain the different types of force system. Also explain any two types of force system in detail. 2. State the Law of parallelogram with neat sketch. 3. Define Moment of Inertia. State the parallel axis theorem of moment of inertia with neat sketch 4. State D' Alembert Principle 5. Define coefficient of restitution	7	1	1
Q.2	**Attempt the following Question.**			
a)	Calculate support reaction at A and B for given beam.	7	3	1



OR

b)	Determine the force in each member of the truss shown in figure 2. State whether each member is in tension or compression.	7	3	2

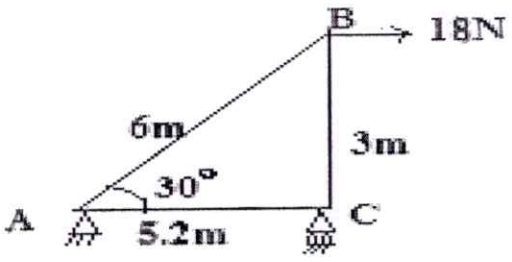


Fig.2

Q.3	**Attempt the following Question.**			
a)	Determine the moment of inertia of the symmetric I-section shown in figure 3 about its centroidal axes X-X and Y-Y. Also determine moment of inertia of the section about a centroidal axis perpendicular to X-X axis and Y-Y axis.	7	2	2
	OR			
b)	Locate the centroid of the area shown in figure lamina as shown in	7	2	2

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figure 4.

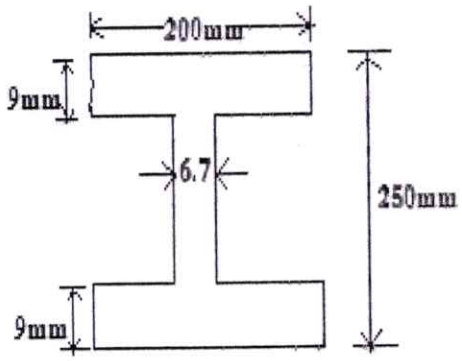


Fig.3

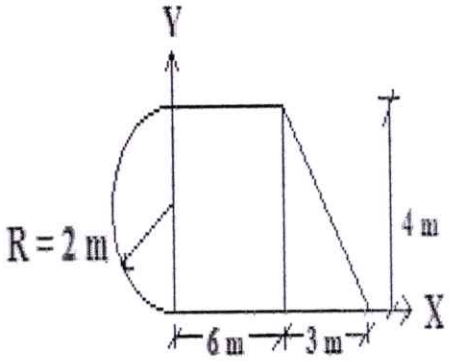


Fig. 4

Q.4 **Attempt the following Question.**

a) Explain following terms — 7 1 4
   1. Kinetics
   2. Kinematics
   3. Equation of motion

OR

b) Explain following terms — 7 3 4
   1. Projectile motion
   2. Angle of projection
   3. Horizontal range

Q.5 **Attempt the following Question.**

a) A small steel ball is shot vertically upwards from the top of a building 25m above the ground with an initial velocity of 18m/sec. — 7 3 5
   a) In what time, it will reach the maximum height?
   b) How high above the building will the ball rise?
   c) Compute the velocity with which it will strike the ground and the total time it is in motion.

OR

b) A hammer of mass 1500 kg drops from a height of 80cm on a pile of mass 600kg. Find a) The common velocity after impact b) The average resistance of the ground if pile comes to rest after penetrating 10cm into the ground. — 7 3 5

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