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Total Pages : 04

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December 2024

B.Tech. (ME) (Third Semester)

ENGINEERING MECHANICS (ESC-203A/21)

*Time : 3 Hours*] [*Maximum Marks : 75*

**Note :** It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

## Part A

**1.** (a) Define Idealization in Mechanics. **1.5**

(b) Explain Zero Force Members in trusses. **1.5**

(c) What is Limiting Friction ? **1.5**

(d) Define Centroid. **1.5**

(e) Explain Virtual Work. **1.5**

(f) What is Rectilinear Motion ? **1.5**

(g) Explain the Work- Energy Principle. **1.5**

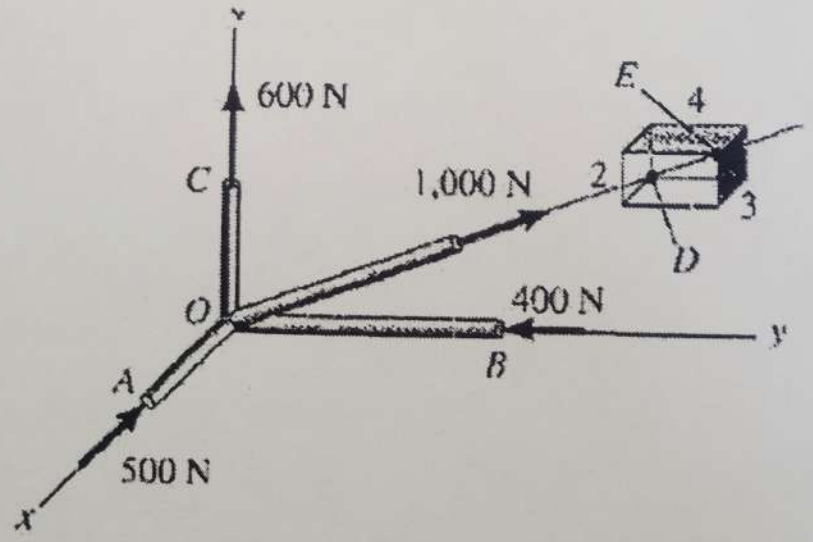
(h) The First Moment of Area about the centroid is equal to..... **1.5**

(i) Differentiate between Kinematics and Dynamics. **1.5**

(j) Name the different types of Beams. **1.5**

## Part B

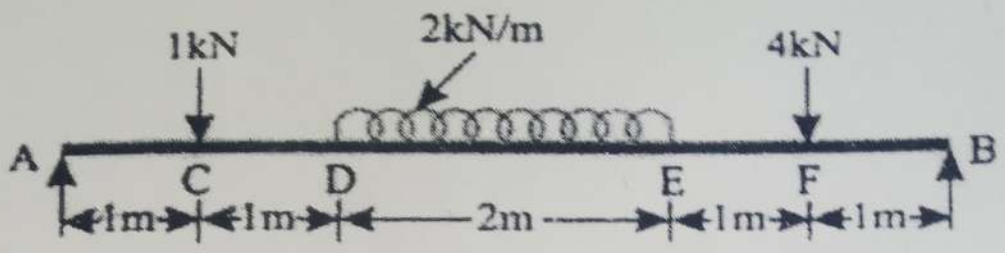
**2.** Four members of a space frame are loaded as shown in the figure. What are the orthogonal components of the forces on the ball joint at point O ? The 1000 N force goes through points D and E of the rectangular parallelopiped. **15**




**3.** (a) Define Static Indeterminancy. **5**

(b) Derive the equation for efficiency of a screw jack while lowering a load. **10**

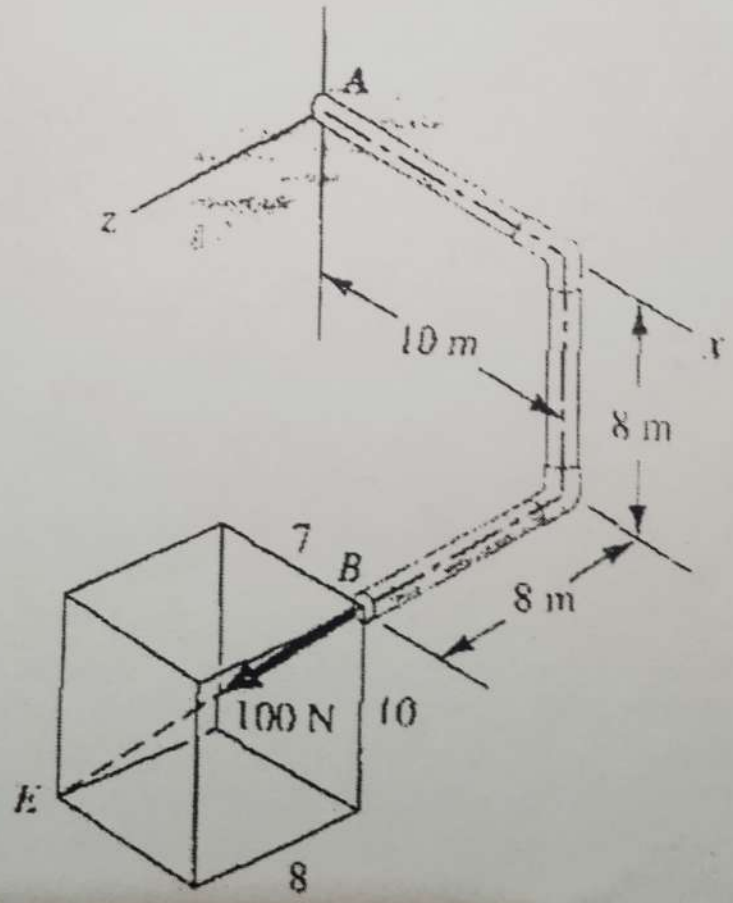
4. Draw the Shear Force and Bending Moment diagrams for the beam shown in the figure. 15




5. (a) Define Varignon's Theorem. 5

(b) Explain the Newton's Law for Path Variables. 10

6. What is the equivalent force system at point A for the 100 N force shown in the figure ? 15



7. Calculate the force in member AB for the truss shown in the figure. **15**