

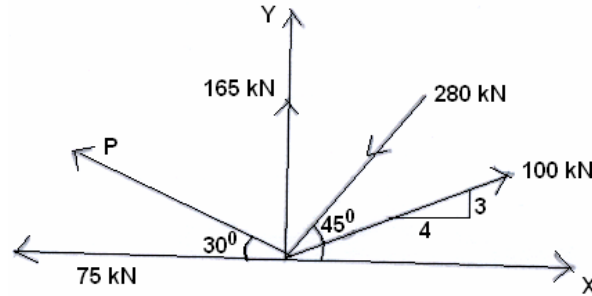
I B.TECH – EXAMINATIONS, DECEMBER - 2010
CLASSICAL MECHANICS
(COMMON TO ME, CHEM, MCT, MEP & AME)

Time: 3 hours

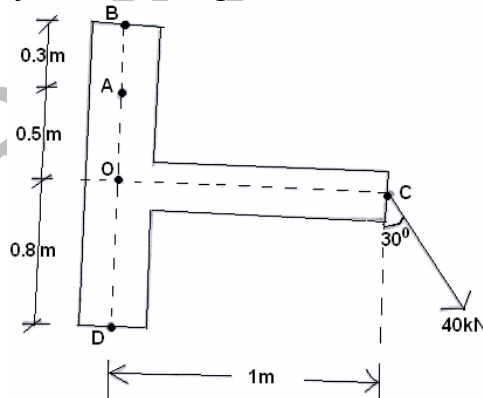
Max.Marks:80

Answer any FIVE questions
All questions carry equal marks

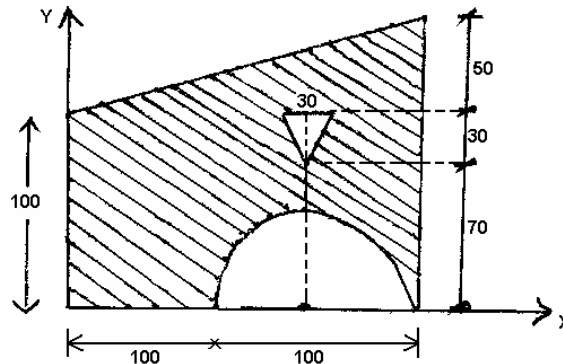
- 1.a) State and prove parallelogram law of forces.
 b) Calculate the magnitude of "P" and the resultant of the force system shown in figure. The algebraic sum of horizontal components of all these forces is -325 kN. [6+10]



- 2.a) State Lami's theorem of forces.
 b) A bracket is subjected to force as shown in figure. Determine:
 i) An equivalent force couple system at A.
 ii) An equivalent force couple system at B.
 iii) An equivalent system consisting of 90 kN at B and another force at A. [4+12]

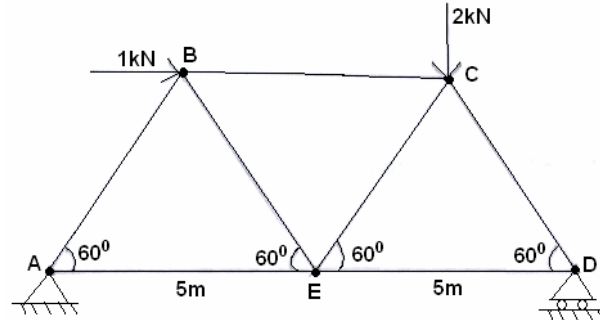


- 3.a) State Pappus's theorem.
 b) Locate the centroid of the shaded area shown in figure. All dimensions in mm. [4+12]

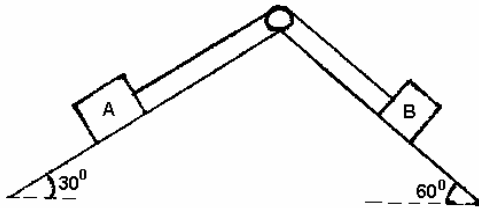


- 4.a) State and prove parallel axis theorem.
 b) Find the mass moment of inertia of the solid cone of height 'h' and base radius 'R' about:
 i) Its axis of rotation
 ii) An axis through vertex, normal to the axis of rotation. [6+10]

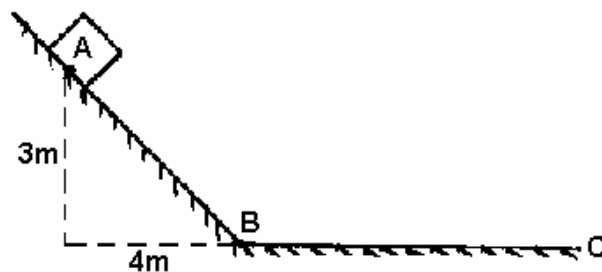
- 5.a) Analyze the truss shown in figure using method of joints.



- b) Distinguish between Perfect and Imperfect frames. [12+4]
- 6.a) Distinguish between kinematics and kinetics.
 b) Blocks A and B weighing 500 N and 1500 N respectively are connected by a weightless rope passing over a frictionless pulley as shown in the figure. The coefficient of friction is 0.3 on all contact surfaces. Determine:
 i) Tension in the rope.
 ii) Velocity of the system 5 sec after starting from rest. [4+12]



- 7.a) State and explain work-energy principle.
 b) A small block starts from rest at point 'A' and slides down the inclined plane as shown in figure. What distance along the horizontal plane will it travel before coming to rest? The coefficient of kinetic friction between the block and plane is 0.3. The initial velocity with which it starts to move along BC is of the same magnitude as that gained in sliding from A to B. [4+12]



- 8.a) Derive the expression for the time period of a simple pendulum.
 b) The amplitude of SHM is 0.75m and the period is 1.2 sec. Determine:
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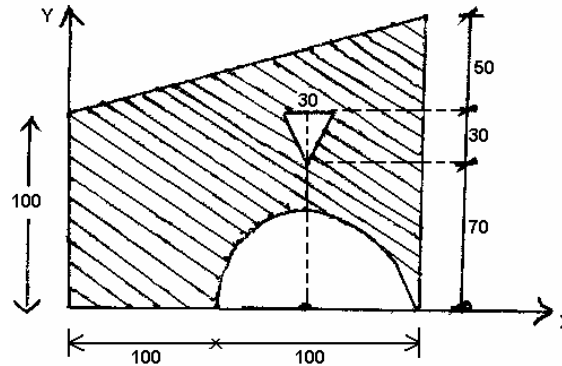
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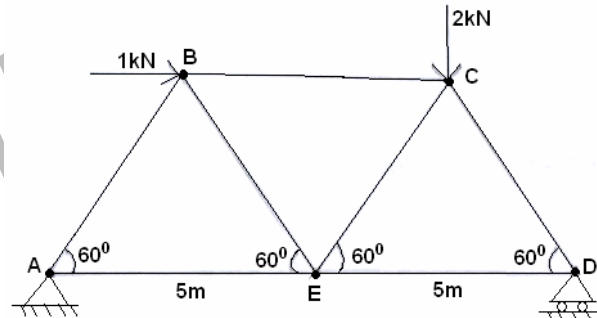
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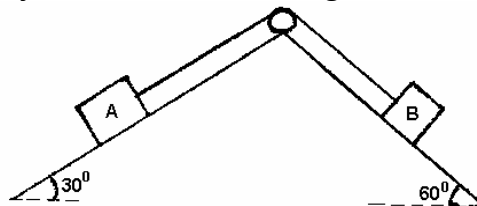
- 1.a) State Pappu's theorem.
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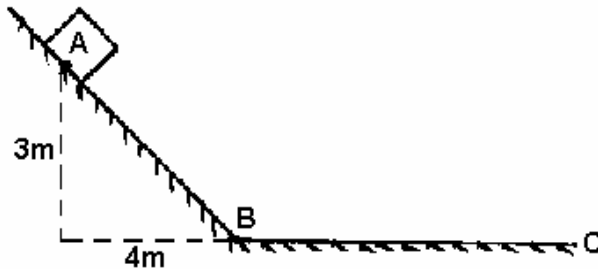
- 2.a) State and prove parallel axis theorem.
 b) Find the mass moment of inertia of the solid cone of height 'h' and base radius 'R' about:
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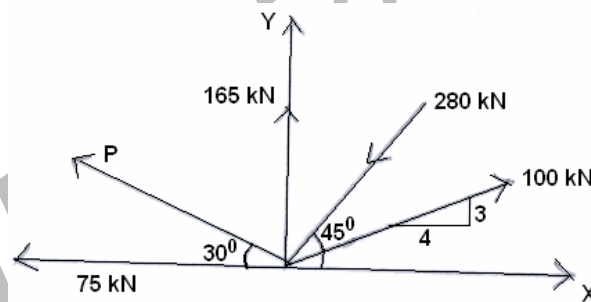
- b) Distinguish between Perfect and Imperfect frames. [12+4]
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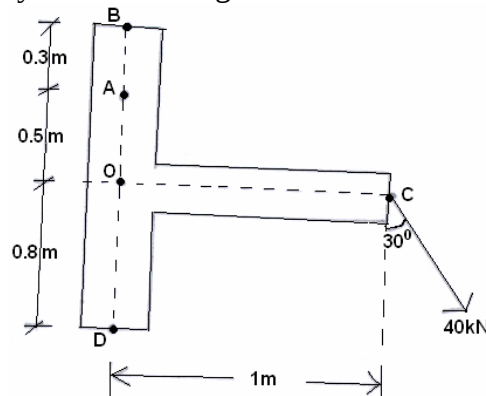
- 5.a) State and explain work-energy principle.
 b) A small block starts from rest at point 'A' and slides down the inclined plane as shown in figure. What distance along the horizontal plane will it travel before coming to rest? The coefficient of kinetic friction between the block and plane is 0.3. The initial velocity with which it starts to move along BC is of the same magnitude as that gained in sliding from A to B. [4+12]



- 6.a) Derive the expression for the time period of a simple pendulum.
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- 7.a) State and prove parallelogram law of forces.
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- 8.a) State Lami's theorem of forces.
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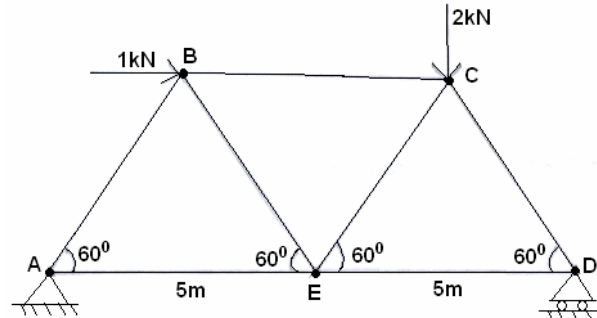
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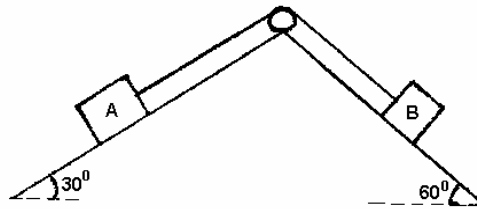
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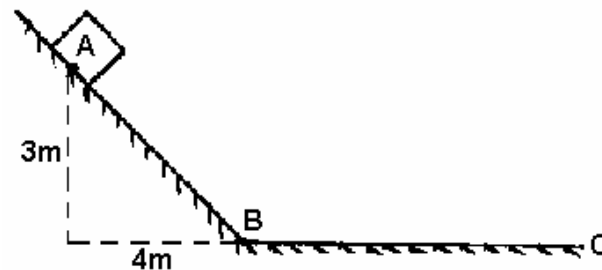
- 1.a) Analyze the truss shown in figure using method of joints.



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- [4+12]

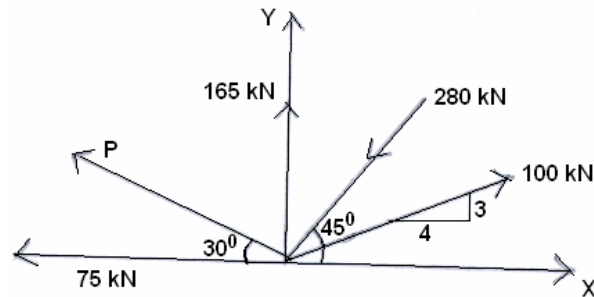


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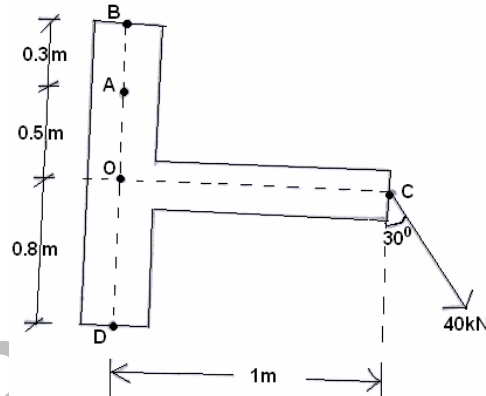


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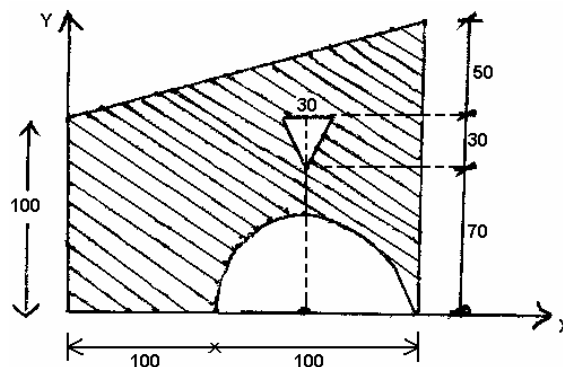
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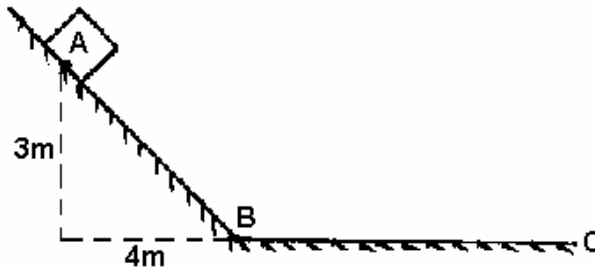
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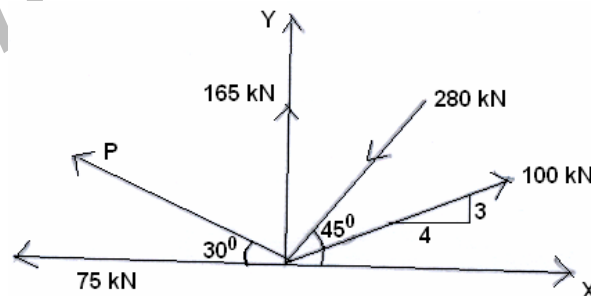
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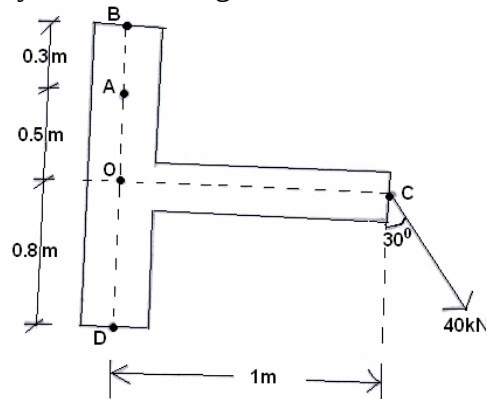
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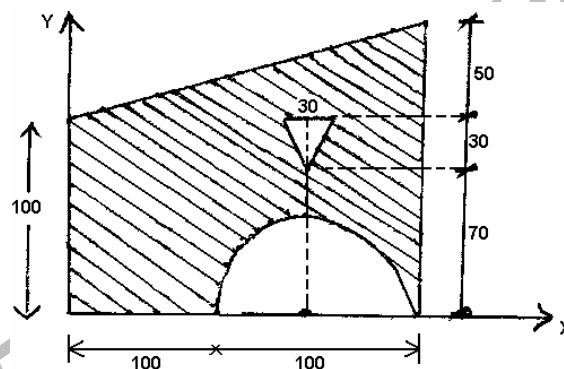
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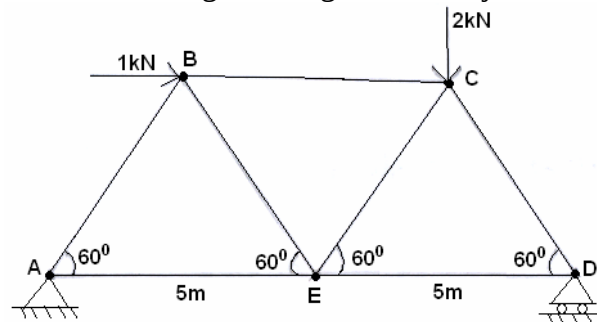


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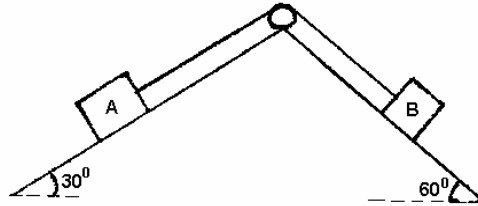
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FIRSTRANKER