

Examination Control Division

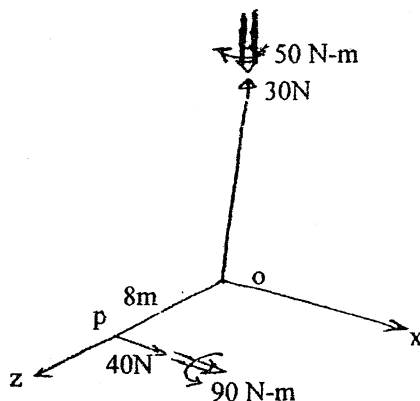
2069 Chaitra

| Exam. | Regular | | |
|-------------|------------------------------------|------------|--------|
| Level | BE | Full Marks | 80 |
| Programme | BEL, BEX, BCT, BIE, B.Agr. B.Arch. | Pass Marks | 32 |
| Year / Part | I / I | Time | 3 hrs. |

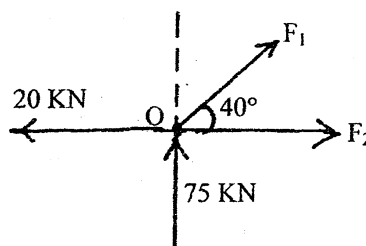
Subject: - Applied Mechanics (CE401)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

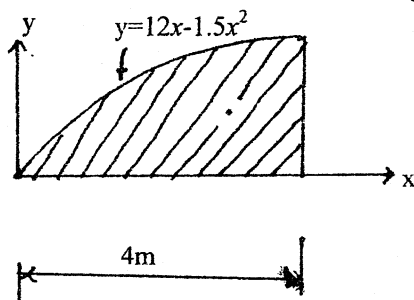
- Describe briefly the concept of particle, rigid body and deformable body. [3]
- Describe Free Body Diagram and physical meaning of equilibrium. Also describe the importance of Free Body Diagram and equilibrium in structural analysis. [2+2+2+2]
- Replace the two wrenches as shown in figure by a single equivalent wrench and determine (a) the resultant force, (b) indicate it's line of action. [8]



- Determine the value of F_1 and F_2 if the forces shown in figure below are in equilibrium. [4]

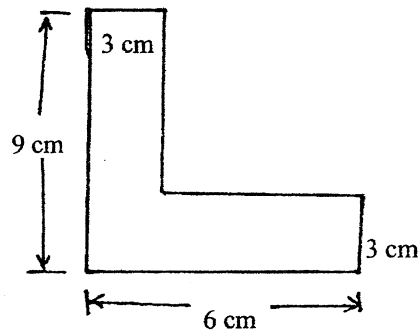


- Determine centroidal x coordinate of the shaded area shown in figure below. [4]



6. Determine radius of gyration (r_x) of the angle section shown in figure below about centroidal x-axis.

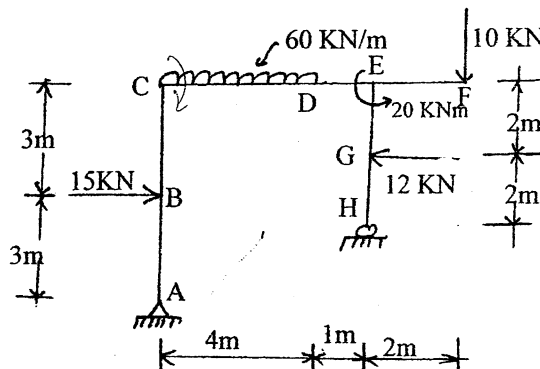
[8]



7. Illustrate impending motion state of friction and demonstrate the change in frictional force for different motion stages using relevant figure.
8. Draw AFD, SFD and BMD of the given frame loaded as shown in figure below. Indicate the salient feature if any.

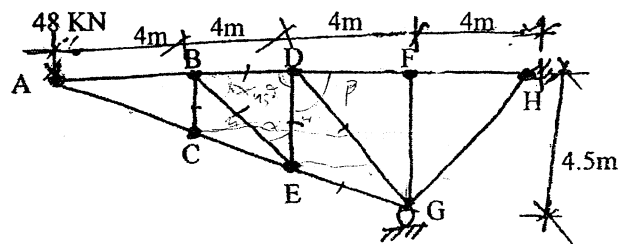
[4]

[14]



9. Compute the force developed in the member BC, BD, BE, DE, DG and EG of the given truss loaded as shown in figure.

[7]



10. Define uniformly rectilinear motion and uniformly accelerated rectilinear motion. A projectile is fired with an initial velocity of 244m/s at a target B located 610m above the level of gun A and at a horizontal distance of 3658m. Neglecting air resistance, determine the value of the firing angle.

[2+8]

11. Define the linear momentum and angular momentum. Find the velocity and acceleration of the bob in the given position. The bob of a 2m pendulum describes an arc of a circle in a vertical plane. Tension in the cord is 2.5 times the weight of the bob for the position shown.

[2+8]

