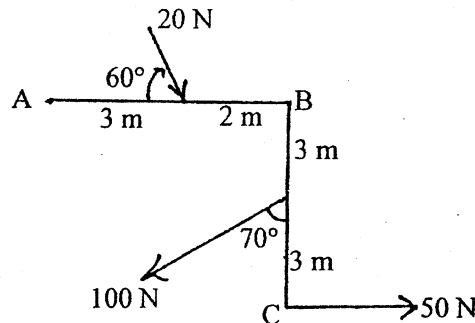


Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, BIE, B.Agric, B.Arch	Pass Marks	32
Year / Part	I / I	Time	3 hrs.

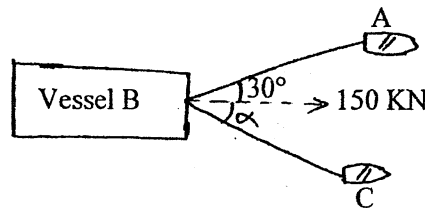
Subject: - Applied Mechanics (CE401)

- ✓ 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.

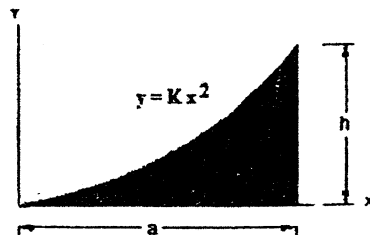
- Describe the scope of applied mechanics in engineering. [3]
- What is the physical meaning of equilibrium and why it is important in structure? How can we draw good Free Body Diagram? Explain with suitable examples. [4+4]
- Determine magnitude, direction and line of action of the resultant of forces acting in the system shown in figure below. [8]



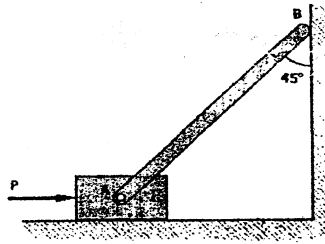
- A commercial vessel is being pulled into harbour for unloading by two tugboats as shown in figure knowing the vessel requires 150 kN along its axis to move it steadily. Compute the tensions in rope AB and BC when $\alpha = 40^\circ$. [4]



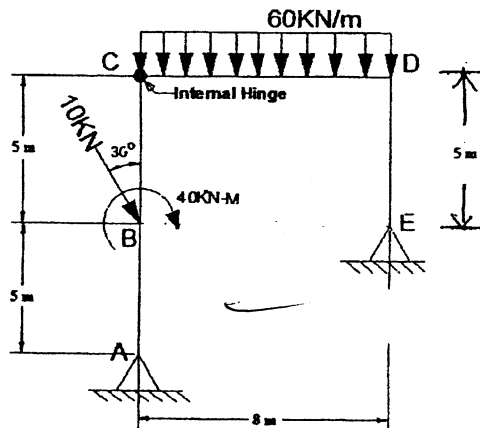
- State and prove parallel axis theorem. Also determine the centroidal X and Y coordinate of the hatched area. [3+8]



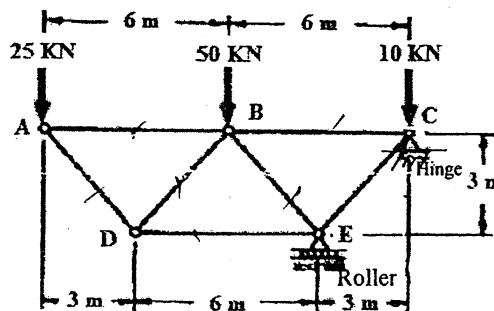
6. A uniform bar AB, weighing 424 N, is fastened by a frictionless pin to a block weighing 200 N as shown in figure. At the vertical wall, $\mu = 0.268$ while under the block, $\mu = 0.20$. Determine the force P needed to start motion to the right. [5]



7. Draw the Axial Force, Shear force and Bending Moment diagram of the given frame. Also show the salient features if any. [13]



8. Determine the member forces for given truss loaded as shown in figure below. [8]



9. The motion of a vibrating particle is defined by the equations $x = 100 \sin \pi t$ and $y = 25 \cos 2\pi t$ where x and y are expressed in mm and t in sec. [10]

- Determine the velocity and acceleration when $t = 1$ sec
- Find the nature of path of the particle

10. Determine the magnitude of force P required to give the block an acceleration of 10 m/s^2 . Coefficient of friction between the block and the floor is 0.25. [10]

