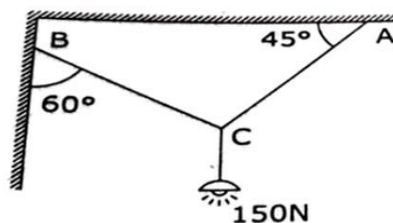


THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Third Semester**Civil Engineering***ME3351 - Engineering Mechanics***(Common to Mechanical Engineering)**Regulations - 2021**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

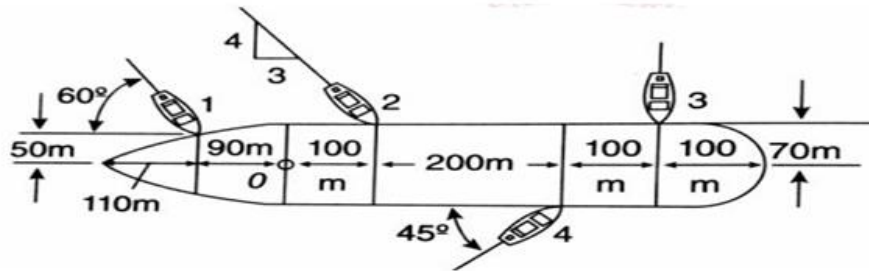
<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	State Lami's theorem.	L1	1	2
2.	Define principle of transmissibility.	L1	1	2
3.	Distinguish between couple and moment.	L2	2	2
4.	Illustrate free body diagram with an example.	L2	2	2
5.	A semicircular area having radius of 100 mm is located in the XY plane such that its diameter coincides with the Y-axis. Determine the X coordinate of the centroid.	L3	3	2
6.	State parallel axis theorem.	L1	3	2
7.	Classify the type of friction.	L1	4	2
8.	Correlate the co-efficient of friction and the angle of friction.	L2	4	2
9.	A car starts from rest with a constant acceleration of 8 m/sec ² . Determine the distance travelled in the 7 th second.	L3	5	2
10.	State Newton's law of collision of elastic bodies	L1	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11. a	Five forces are acting on a particle. The magnitude of the forces are 300N, 600N, 700N, 900N and P and their respective angles with the horizontal are 0°, 60°, 135°, 210°, 270°. If the vertical component of all the forces is 1000N. Find the value of P. Also calculate the magnitude and the direction of the resultant, assuming that the first force acts towards the point, while all the remaining forces act away from the point.	L3	1	16
Or				
b	An electric light fixture weighing 150N hangs from a point C, by two strings AC and BC as shown in Fig. Determine the forces in the strings AC and BC.	L3	1	16

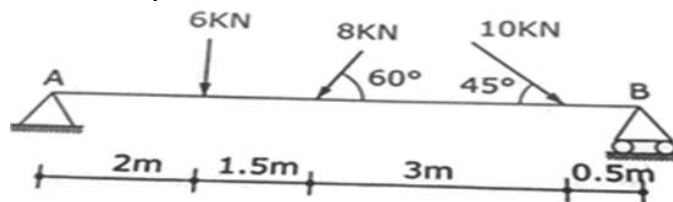


12. a Four tug boats are used to bring a large ship to its pier. Each tug boat exerts a 5000 N force in the direction as shown in Fig. Determine the equivalent force - couple system at point 'O' and the point on hull where a single more powerful tug boat should push to produce the same effect as the original four boats.

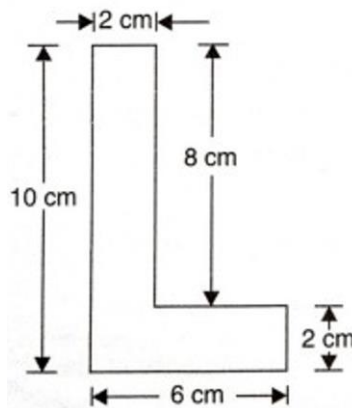


Or

- b A beam is supported at points A and B and subjected to given loads as shown in the figure. Calculate the reactions at the supports using the equations of static equilibrium.



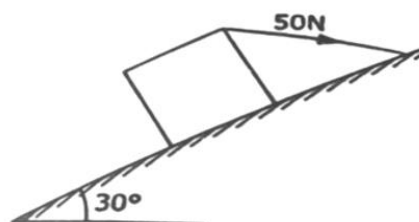
13. a Compute the principal moment of inertia of an angle section shown in fig. with respect to its centroidal axes.



Or

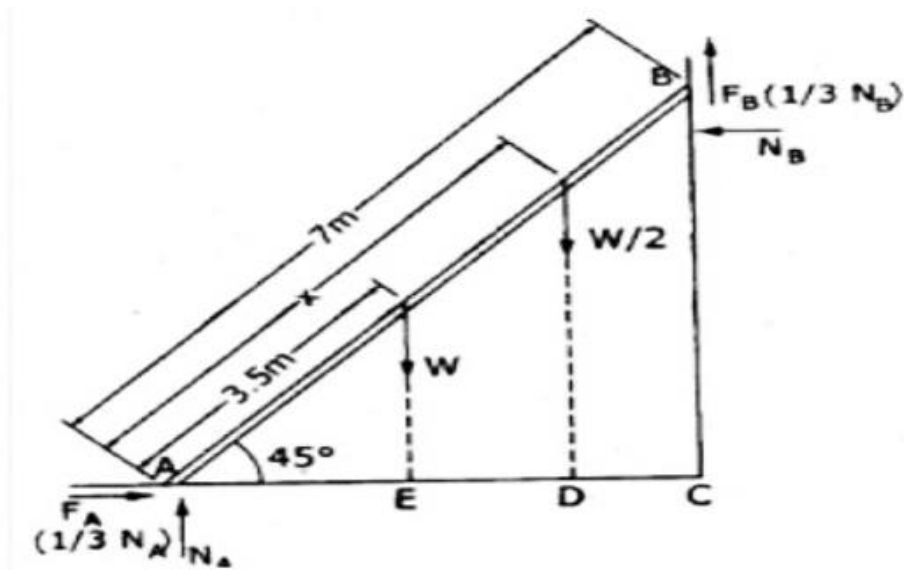
- b Obtain an expression to determine the mass moment of inertia of prism along three axes.

14. a A block of weight 150N is resting on a rough inclined plane as shown in fig. The block is tied up by a horizontal string, which has a tension of 50N. Find
i) The frictional force on the block
ii) The normal reaction of the inclined plane
iii) The coefficient of friction between the surfaces of the contact



Or

- b A 7m long ladder rests against a vertical wall, with which it makes an angle of 45° and on a floor. If a man whose weight is half of the ladder climbs it, at what distance along the ladder will he be, when the ladder is about to slip? Take coefficient of friction between the ladder and the wall is $1/3$ and that between the ladder and the floor is $1/2$.



15. a The motion of a particle along a curved path is given by the equation:
 $x = t^2 + 8t + 4$, and $y = t^3 + 3t^2 + 8t + 4$.
 Determine:
 (i) Initial velocity of the particle
 (ii) Velocity of the particle at $t = 2$ sec
 (iii) Acceleration of the particle at $t = 0$ and
 (iv) Acceleration of the particle at $t = 2$ sec
 Or
 b A ball is dropped from a height of 15m on a fixed steel platform. Determine the height to which the ball rebounds on the first, second and third bounces. The co-efficient of restitution between the ball and the plate is 0.9.