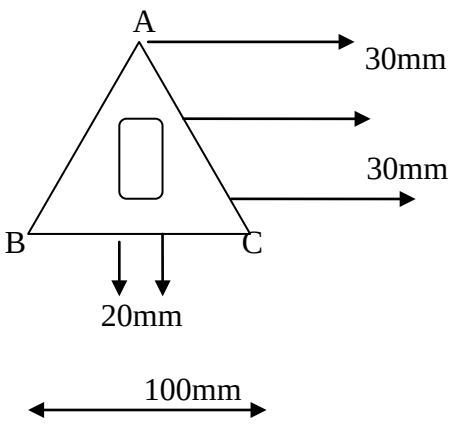
END SEMESTER EXAMINATION

SEMESTER-II

COURSE CODE : G-205 | **DURATION : 3 (THREE)HRS**
COURSE TITLE : Engineering Mechanic | **MAXIMUM MARKS : 75**
SESSION : JULY-DEC'2021 | **PASS MARKS : 35 %**

NOTE: *1. Attempt any 5 (five) questions.*
2. Mark for each question is shown against it.
3 . Assume suitable logical data wherever necessary.

PART – I

1.	**(a) Define the following below:**		**(9)**
		(i) Kinetics ,(ii) kinematics , (iii) mechanics , (iv) Moment of force	
		(v) Moment of inertia and (vi) dynamics.	
	(b)	Show that the algebric sum of all resolved part of a number of forces in a given direction is equal to the resolved parts of their resultant in the same direction.	(6)
2.	**(a)**	What are the various charecteristics of a force?	(2)
	(b)	What do you uderstand composition of force. Explain the method of find out the resultant force in analytically method.	(2+6)
	(c)	The resultant of two concurrent force is 1500N and the angles between the force is 90^0 . The resultant makes an angle of 36^0 with one of the force, Find the magnitude of each force.	(5)
3	**(a)**	Define centre of gravity and centroid.	(3)
	(b)	Derive an expression for the moment of inertia of a triangular section about an axis passing through the C.G. of the section and parallel to the base.	(5)
	(c)	A rectangular hole is made in a triangular section as shown in fig.  Determine the moment of inertia of the section about x-x axis passing through its centre of gravity and the base BC.	(7)
4.	**(a)**	Distinguish between following below:	(3+3)
		(i) Coefficient of friction and angle of friction. (ii) Statics friction and dynamic friction.	
	(b)	Establish a relation between the effort and load, when a square threaded screw is used for lifting purpose, taking frictional account.	(9)
5	**(a)**	Prove that the angle of friction is equal to the angle of the inclined plane, when a solid boby of weigh W placed on the inclined plane, is about to slide down.	(4)
	(b)	Define angle of repose. A body of weight 100 Newton is placed on a rough horizontal	(2+3)

	plane. Determine the coefficient of friction. If a horizontal force of 60N just causes the body to slide over the horizontal plane.		
	(c) Define angular velocity. Show the relationship between linear velocity and angular velocity.		**(2+4)**
6	**(a)**	A body is rotating with an angular velocity of 5radian/sec. After 4 sec, the angular velocity of the body becomes 13 rad. /s. Determine the angular acceleration of the body.	(3)
	(b)	Obtain an equation for trajectory of a projectile, and show that it is a parabola.	(6)
	(c)	Define angle of projection . A body is projected at such an angle that the horizontal range is three times the greatest height. Find the angle of projection.	(1+5)
7	**(a)**	What do you understand by the term' superelevation'? Discuss the necessity of providing a superelevation on road.	**(2+3)**
	(b)	Derive an expression for the centrifugal force of a body moving along a circular path. A body of mass 5kg is moving in a circle of radius of 1.5m with an angular velocity of 2 rad/s. Find the centrifugal force acting on body.	**(2+2)**
	(c)	Write short notes on the following:	**(6)**
		(i)Wheel and axle, (ii) rope and pulley.	
8	**(a)**	What do you understand by term 'relative velocity'?	**(2)**
	(b)	Explain working principle of power pump with suitable diagram	**(4)**
	(c)	Write the principle application of the virtual work in case of lifting machine.	**(3)**
	(d)	A screw jack has a square thread of 75mm mean diameter and a pitch of 15mm. Find the force, which is required at the end of 500mm long lever to lower a load of 25KN. Take coefficient of friction between the screw and thread as 0.05.	**(6)**

xxxxxxxxxxxxxxxxxx