MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

### I B.Tech II Sem Supply Examination, July(March) 2021
Engineering Mechanics
(CIVIL & MECH)

Time: 3 Hours.   **Max. Marks: 70**

Note: 1. Answer any FIVE questions.
    2. Each question carries 14 marks and may have a, b as sub questions.

1	a)	Define and Explain the force system?	7M	CO1	BL1
	b)	A force of 500 N inclined at angles of 60^0, 45^0 and 120^0 respectively with draw the forces in the vector form?	7M	CO1	BL4
2	a)	Explain about the free body diagram?	7M	CO1	BL2
	b)	Three cylinders are placed in a rectangular ditch as shown in figure 2. Neglecting friction, determine the reaction between cylinder A and the vertical wall. Weights of cylinders A, B, C are 75 N, 200 N 100N and Radius is 100 mm, 150 mm, 125 mm respectively	7M	CO1	BL4
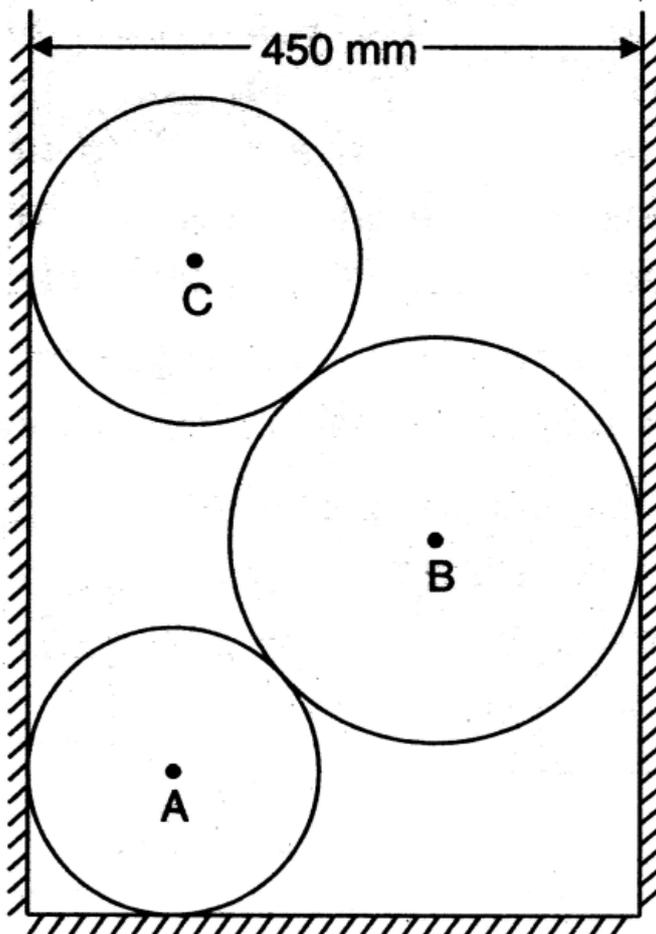
3	a)	Define angle of friction and angle of repose	7M	CO2	BL1
	b)	The force required to pull a body of weight 100 N on a rough horizontal plane is 30 N. Determine the coefficient friction if the force applied is at an angle of 15^0 with the horizontal.	7M	CO1	BL3

4	a)	Define the terms Centre of Gravity and Moment of inertia?	7M	CO3	BL1
	b)		7M	CO3	BL4
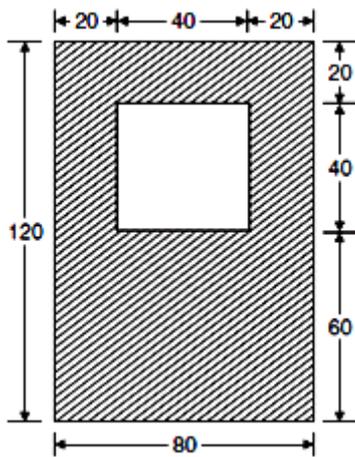
For the shaded area as shown in figure Determine the Moment of Inertia of an area of plane figure about their centroidal axes. All units are in centimeters.

5	a)	What is a screw jack? Explain the principle of operation of a screw jack with a neat sketch. ?	7M	CO2	BL1
	b)	State parallel axis theorem as applied to mass moment of inertia?	7M	CO3	BL1

6	a)	Write the impulse-momentum equation and mention its application	7M	CO3	BL1
	b)	Discuss on the rectilinear and curvilinear motion of the particle?	7M	CO4	BL2

7	a)	What is work-energy principle for rotation bodies?	7M	CO4	BL1
	b)	A train of weight 2000 kN is ascending a slope of 1 in 200 with a uniform velocity of 40 km/hr. Find the power exerted by the engine if the track resistance is 10 N/kN of the weight of train.	7M	CO5	BL4

8	a)	State and Explain the D' Alembert's Principle?	7M	CO4	BL4
	b)	Explain about the instantaneous centre of rotation in plane motion with suitable sketches?	7M	CO5	BL1

---oo0oo---