Total No. of Printed Pages: 02

PRN No.	

PAPER CODE	U124 - 3113

May 2024 (ENDSEM) EXAM

F.Y.B. TECH. (SEMESTER - II)

COURSE NAME: ENGINEERING MECHANICS BRANCH: MECHANICAL COURSE CODE: ME12233

(PATTERN 2023)

Time: [1Hr. 30 Min] **[Max. Marks: 40]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed.**
3) **Use suitable data wherever required.**
4) **All questions are compulsory. Solve any one sub question from each Question 1 and 2 and any three sub questions each from Questions 3 and 4.**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Describe different types of force systems with examples.	[5]	1	1
	b) Describe different types of forces on a body with example.	[5]	1	1
Q2	a) Describe different types of trusses with examples.	[5]	2	2
	b) Describe 1. Frictional force 2. Angle of friction 3. Angle of repose	[5]	2	2
Q.3	a) Find the centroid of the unequal angle 200 x 150 x 12 mm, shown in Figure 1. (All dimensions are in mm)	[5]	3	3
	b) Determine the centroid of the reinforced concrete retaining wall section as shown Figure 2. (All dimensions are in m)	[5]	3	3
	c) Determine the moment of inertia of the section shown in figure 3 about an axis passing through the centroid and parallel to the topmost fiber of the section.	[5]	3	3
	d) For the above problem find moment of inertia about the axis of symmetry i.e. y axis. Hence find out radii of gyration.	[5]	3	3
Q.4	a) A stone is dropped from the top of a tower. During the last second of its flight, it is found to fall 1/5 th of the whole height of the tower. Find the height of the tower. What is the velocity with which the stone hits the ground?	[5]	4	3
	b) A small steel ball is shot vertically upward from the top of a building 20 m above the ground with an initial velocity of 20 m/sec. In what time, it will reach the maximum height? How high above the building will the ball rise? Compute the velocity with which it will strike the ground and the total time it is in motion.	[5]	4	3
	c) A mine cage weighs 12 KN and can carry a maximum load 20 KN. The average frictional resistance of the slide guides is 500 N. What constant cable tension is required to give a loaded	[5]	4	3

	cage an upward velocity of 3 m/sec, from rest in a distance of 5 m? d) A passenger train 300 m long, moving with a velocity of 72 kmph, overtakes a goods train, moving on a parallel path in the same direction, completely in 40 seconds. If the length of the goods train is 200 m, determine the speed of the goods train.	[5]	4	3

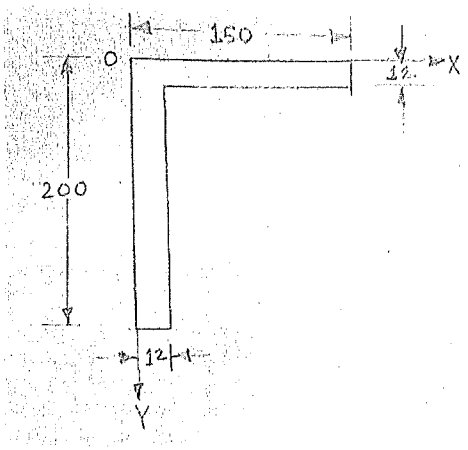

Figure.1

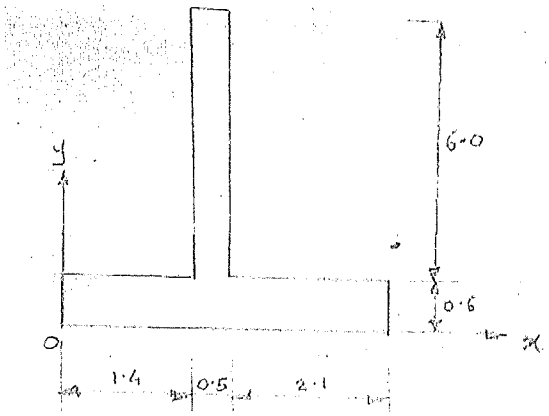

Figure. 2

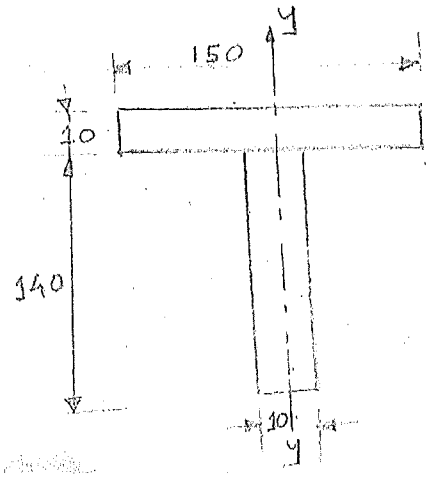

Figure. 3

Note BT Level: 1. Remember 2. Understand 3. Apply 4. Analyse 5. Evaluate 6. Create