

F.E/F.T (Semester-I)

**SUBJECT – Engineering Mechanics****Branch: E & TC, IT, MECH, M&ME, AI & ML****Div: ALL****Duration: 60 Minutes****Instructions –**

1. All questions are compulsory.
2. Assume suitable data wherever necessary.
3. Diagrams / sketches should be given wherever necessary.
4. Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5. Figures to the right indicate full marks.

Q.1	Answer any 5 of the following questions	Marks	Course Outcomes	Learning Levels
	For a cube of side 5cm shown below, there is a couple of 40kN-m at D if this couple is to be shifted to vertex A what will be the new value of the couple at A.			
a.				
	A ball is thrown up and attains a maximum height of 150m. Calculate its initial speed.	2	5	A
c.	Enlist the types of impact.	2	6	R
d.	Express the forces in vector form having equal magnitudes 5kN along the X, Y and Z axis respectively.	2	4	A
e.	A ball is thrown up and attains a maximum height of 150m. Calculate its initial speed. <del>Define U.P</del>	2	5	A
f.	Enlist the different types of work done involved in work energy principle	2	6	U
g.	State any two examples of General plane motion.	2	5	U
Q.2 a.	Force of 800 N acts along AB, A(3, 2, -4) and B(8, -5, 6). Write the force vector.	5	4	AN
	OR			
b.	A particle falling under gravity falls 30 m in a certain second. Find the time required to cover the next 30 m.	5	5	AN
Q.3 a.	Derive an equation of path of the projectile (i.e. equation of trajectory) along with diagram.	5	5	U
	OR			
b.	A ball is dropped on to a smooth horizontal floor from a height of 4m. On the second bounce it attains a height of 2.25 m. find the coefficient of restitution between the ball and the floor	5	6	AN

### IN-SEMESTER EXAMINATION-1

F.E./ F.T. (Semester-I)

SUBJECT – Engineering Mechanics

Branch: E&TC, IT, MECH, M&ME, AI&ML

Div.: ALL

Duration: 60 Minutes

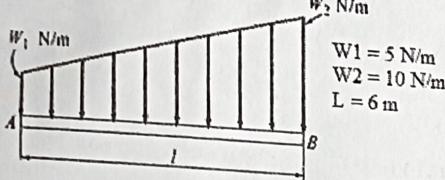
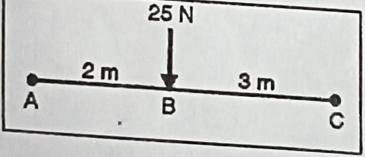
Instructions –

1. All questions are compulsory.
2. Assume suitable data wherever necessary and state the assumptions made.
3. Diagrams / sketches should be given wherever necessary.
4. Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
5. Figures to the right indicate full marks.

Date: 11/10/2023

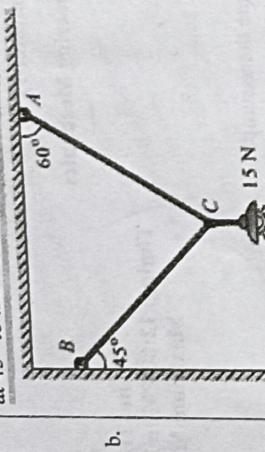
Timing: 12:00 PM to 1:00 PM

Maximum Marks: 20

Q.1	Answer any 5 of the following questions	Marks	Course Outcomes	Learning Levels
a.	Determine the formula for finding the moment of force for concurrent force system	2	CO 1	A
b.	State the theorem showing the relation between moment of forces acting on system and moment of resultant of same system	2	CO 1	R
c.	State type of support reaction and type of load used in Simple supported Beam experiment	2	CO 2	U
d.	Convert trapezoidal loading into point load.   $W_1 = 5 \text{ N/m}$ $W_2 = 10 \text{ N/m}$ $L = 6 \text{ m}$	2	CO 2	R
e.	State the signification of friction	2	CO 3	R
f.	Enlist any two Laws of friction	2	CO 3	U
g.	Define limiting friction	2	CO 3	R
Q.2	Resolve the 25N force into a force couple system at A and C  	5	CO 1	A
b.	Draw FBD and find support reaction at B.  OR	5	CO 2	AN

		5	CO 3	AN
Q.3	a. Explain the graphical relation between applied force and frictional force.			
	OR An electric light weighing 15 N hangs from a point C by the two strings AC and BC as shown in Fig. AC is inclined at $60^\circ$ to the horizontal and BC at $45^\circ$ to the vertical as shown. Find the forces in the strings AC and BC	5	CO 2	AN

Branch: E  
Branch: ALL  
Div: ALL  
Duration: 1 hr  
Instructions: 1, 2, 3



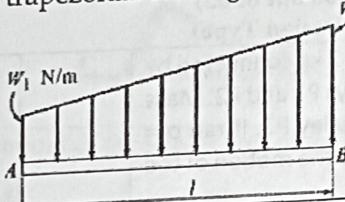
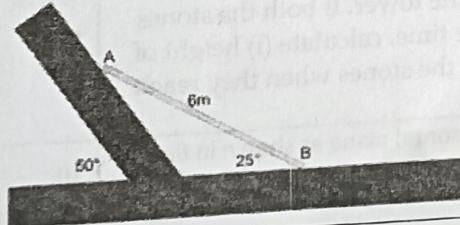
### END SEMESTER EXAMINATION, DECEMBER 2023

#### F.E./F.T. SEMESTER I (CBCGS-HME 2023)

Branch:	E&TC/IT/MECH/M&ME/AI&ML	Q.P. Code:	R11G2404-2
Subject:	Engineering Mechanics	Duration:	2 hours
Subject Code:	ESC1202	Max. Marks:	60

**Instructions:**

1. All sections are compulsory
2. Figures to the right indicate full marks.
3. Assume suitable data if necessary and state the assumptions clearly.

Section-I		Short Answer Questions (Answer any 05 questions out of 06) (Fundamental, Core Types) (10 Marks )			
Q. No.		Marks	CO	RBT Level	PI
1	Define the term "Impulse" involved in car accident.	2	6	R	1.2.1
2	A ball is thrown up and attains a maximum height of 150m. Calculate its initial speed.	2	5	A	1.4.1
3	State the formula for finding the moment vector.	2	4	R	1.3.1
4	Enlist any two Laws of friction	2	3	R	1.4.1
5	Convert trapezoidal loading into point load.   $W_1 = 5 \text{ N/m}$ $W_2 = 10 \text{ N/m}$ $L = 6 \text{ m}$	2	2	R	1.4.1
6	State the formula to determine magnitude and direction of resultant	2	1	A	1.4.1
Section-II		Descriptive Answer Questions(Answer any 04 out of 06) (Descriptive, Comprehension Types) (20 Marks )			
1	Enlist different types of Impact & explain any 2 with neat sketch.	5	6	U	2.1.2
2	The rod is in contact with two smooth stationary surfaces. At the instant shown in figure its end B has velocity 2 m/s rightward. Find velocity of end A and angular velocity of the rod. Also find velocity of a point on the rod, which is two meters from end B, at the same instant.  	5	5	AN	2.1.2



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<p><b>3</b></p> <p>Find the resultant force in the vector form for the forces acting on the bent cantilever beam. BC is parallel to z-axis.</p>		<b>AN</b> 2.1.2
<p><b>4</b></p> <p>Explain the graphical relation between applied force and frictional force.</p>	<p>5      3      U      1.4.1</p>	
<p><b>5</b></p> <p>What are the different types of loads?</p>	<p>5      2      R      1.4.1</p>	
<p><b>5</b></p> <p>Resolve the 25 N force into a force couple system at A and C</p>		<p>5      1      A      1.4.1</p>

(30 Marks)

- | Application, Analytical, Evaluation, Design, Type) | Figure shows two masses $m_1 = 1 \text{ kg}$ and $m_2 = 2 \text{ kg}$ connected by rope passing over two smooth massless pulleys P1 and P2. Mass $m_3 = 5 \text{ kg}$ is supported from the movable pulley P2. If $\tan \alpha = \frac{3}{4}$ and coefficient of friction is 0.1 determine the motion of the system. | 10 | 6 | AN | 2.2.2 |
|--|--|----|---|----|-------|
| 2  | <p>A stone is dropped from the top of a tower. When it has fallen a distance of 10 m, another stone is dropped from a point 38 m below the top of the tower. If both the stones reach the ground at the same time, calculate (i) height of the tower and (ii) velocity of the stones when they reach the ground.</p> | 10 | 5 | AN | 2.1.3 |
| 3  | <p>A wooden block rests on a horizontal plane as shown in figure. Determine the force 'P' required to (a) pull it (b) push it.</p>   | 10 | 3 | A  | 2.2.2 |

