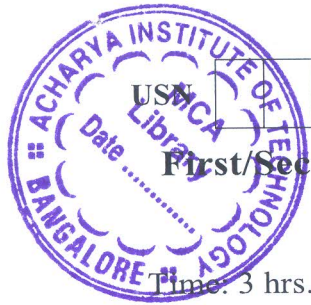


CBCS SCHEME



BCIVC103/203

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2023

Engineering Mechanics

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.*

Module - 1			M	L	C
Q.1	a.	Define Couple. Explain characteristics of Couple.	5	L2	CO1
	b.	Determine the magnitude and direction of resultant for given concurrent force system as shown in Fig.Q1(b).	7	L3	CO1
	<p style="text-align: center;">Fig.Q1(b)</p>				
c.	Explain classification of force system with neat diagram.	8	L2	CO1	
OR					
Q.2	a.	State and prove Varignon's theorem.	7	L2	CO1
	b.	Find the magnitude, direction and position of the resultant with respect to the point A for the force system shown in Fig.Q2(b).	10	L3	CO1
	<p style="text-align: center;">Fig.Q2(b)</p>				
c.	Explain principle of transmissibility of force.	3	L2	CO1	
Module - 2					
Q.3	a.	State and prove Lamis theorem.	6	L2	CO1
	b.	Explain the condition of equilibrium of coplanar concurrent and non concurrent force system.	5	L2	CO1
	c.	The system of connected flexible cable as shown in Fig.Q3(c) two vertical forces 200 N and 250 N at B and D. Determine the forces in various segments of the cable.	9	L3	CO1
<p style="text-align: center;">Fig.Q3(c)</p>					

OR

Q.4	a. Explain different types of beam with neat sketch.	6	L2	CO1
	b. A beam carries load as shown in Fig.Q4(b). Determine reaction at the supports.	7	L3	CO1
<p style="text-align: center;">Fig.Q4(b)</p>				
	c. Determine the reaction at support for given beam shown in Fig.Q4(c).	7	L3	CO1
<p style="text-align: center;">Fig.Q4(b)</p>				

Module - 3

Q.5	a. Explain different type of truss with sketch.	5	L2	CO2
	b. Write short notes on method of sections.	4	L2	CO2
	c. Find forces in all the members of the truss shown in Fig.Q5(c). Tabulate the results and indicate the magnitude and nature of forces on the diagram of truss.	11	L3	CO2
<p style="text-align: center;">Fig.Q5(c)</p>				

OR

Q.6	a. Explain : (i) Angle of friction (ii) Angle of Repose (iii) Laws of friction (iv) Co-efficient of friction.	8	L2	CO3
	b. For the block shown in Fig.Q6(b), determine force P required to push the block up the plane take $\mu = 0.25$ for all contact surface refer Fig.Q6(b).	6	L3	CO3
<p style="text-align: center;">Fig.Q6(b)</p>				

	<p>c. A ladder of 3m length and weighing 200 N is placed on wall at an inclination of 60° which is as shown in Fig.Q6(c) and coefficient of friction between ladder and wall is 0.28 and between ladder and floor is 0.34. A man weighing 600 N is to reach the top of ladder. Calculate the horizontal force P to be applied to the ladder at floor level to prevent ladder from slipping.</p>	6	L3	CO3
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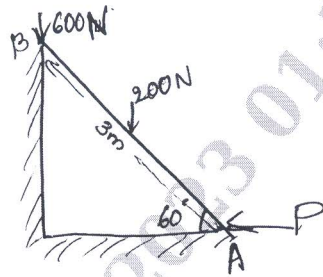


Fig.Q6(c)

Module - 4

Q.7	<p>a. Locate centroid of triangle with base B and height h by the method of integration.</p>	8	L2	CO4
	<p>b. Locate the centroid for the shaded part with respect to reference x and y axis Fig.Q7(b).</p>	12	L3	CO4

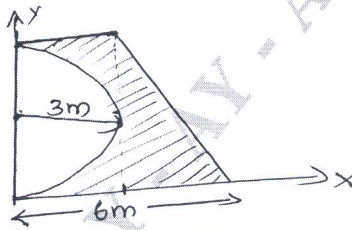


Fig.Q7(b)

OR

Q.8	<p>a. Explain perpendicular axis theorem.</p>	5	L2	CO4
	<p>b. Locate moment of inertia of rectangle about its horizontal centroidal axis by method of integration.</p>	7	L2	CO4
	<p>c. Calculate least radius of gyration for the section shown in Fig.Q8(c).</p>	8	L3	CO4

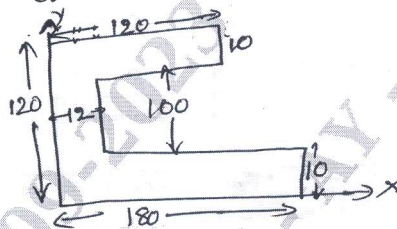


Fig.Q8(c) All dimensions are in mm

Module - 5

Q.9	<p>a. Define: (i) Displacement (ii) Speed (iii) Velocity (iv) Acceleration</p>	8	L2	CO5
	<p>b. Derive all three basic equation of motion.</p>	6	L2	CO5
	<p>c. A car starts from rest and accelerates uniformly to a speed of 75 kmph over a distance of 1000 m. Find acceleration of car and time taken to attain this speed.</p>	6	L3	CO5

OR

Q.10	<p>a. Explain D'Alembert's principle of equilibrium.</p>	6	L2	CO5
	<p>b. Explain: (i) Angle of projection (ii) Time of flight (iii) Vertical height</p>	6	L2	CO5
	<p>c. A projectile is projected from a point at an angle of elevation of 30° with a velocity of 600 m/sec, find the velocity and direction of motion of particle at the end of (i) 25 seconds (ii) 40 seconds</p>	8	L3	CO5
