

# Model Question Paper-I with effect from 2022

## CBCS SCHEME

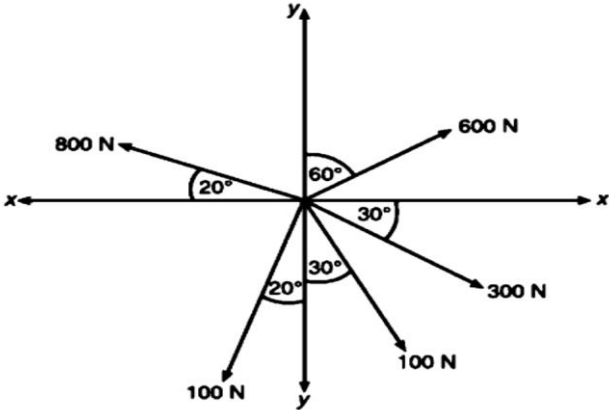
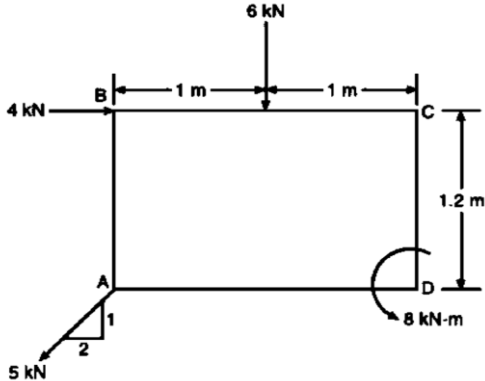
### First Semester B.E Degree Examination, \_\_\_\_\_ Engineering Mechanics for Civil Engineering Stream (BCIVC103)

TIME: 03Hours

Max.Marks:100

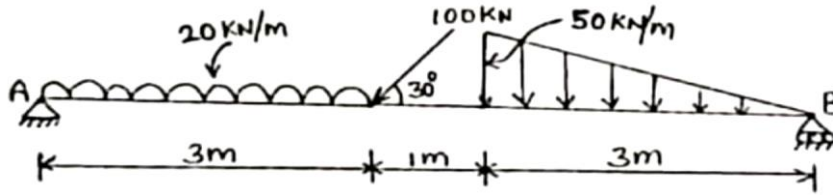
**NOTES:**

1. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**
2. VTU Formula Hand Book is permitted.
3. M – Marks, L – Bloom’s Level, C – Course Outcomes

		Module - 1	M	L	C
Q.1	a	Explain classifications of force system.	6	L2	C01
	b	State and prove law of parallelogram of forces.	7	L2	C01
	c	Determine the magnitude and direction of the resultant of the coplanar force system. shown in in <b>Fig. 1(c)</b>	7	L3	C01
 <p style="text-align: center;"><b>Fig.1(c)</b></p>					
OR					
Q.2	a	Define force and explain its characteristics.	4	L2	C01
	b	State and prove Varignon’s theorem.	6	L2	C01
	c	Determine the magnitude, direction and position of the resultant of the coplanar non concurrent force system, shown in <b>Fig.2(c)</b>	10	L3	C01
 <p style="text-align: center;"><b>Fig.2(c)</b></p>					
Module - 2					

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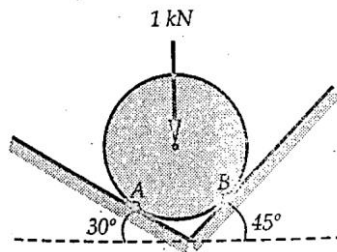
<b>Q.3</b>	<b>a</b>	State and prove Lami's theorem.	5	L2	C02
	<b>b</b>	Explain different types of Beams.	5	L2	C02
	<b>c</b>	Determine the reactions at the supports for the beam shown in <b>Fig. 3(c)</b>	10	L3	C02



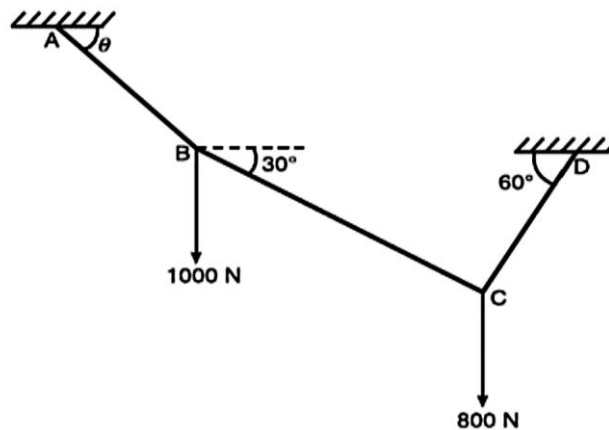
**Fig. 3(c)**

OR

<b>Q.4</b>	<b>a</b>	What is meant by equilibrium? State the conditions of static equilibrium for both coplanar concurrent and non-concurrent force system.	5	L2	C02
	<b>b</b>	Draw the FBD of sphere shown in <b>Fig.4(b)</b> and find the reactions of the points of contact.	7	L2	C02
	<b>c</b>	Determine the tension in the strings. Also calculate 'θ' for shown in <b>Fig. 4(c)</b>	8	L3	C02



**Fig.4(b)**



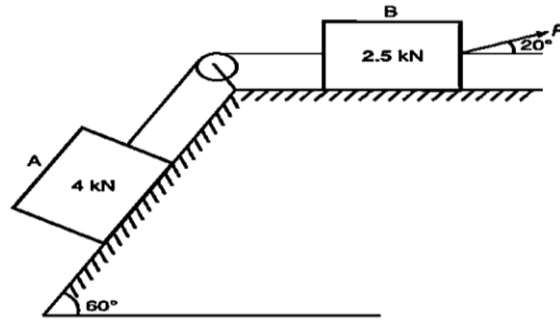
**Fig. 4(c)**

Module - 3

<b>Q5</b>	<b>a</b>	Outline the assumptions made in truss analysis.	4	L2	C03
	<b>b</b>	Explain the different types of friction.	4	L2	C03
	<b>c</b>	Two blocks A & B weighing 4.0 kN & 2.5kN respectively are connected by a wire passing over a smooth pulley as shown in <b>Fig.5(c)</b> and determine the value of 'P'. Take μ between the contact	12	L3	C03

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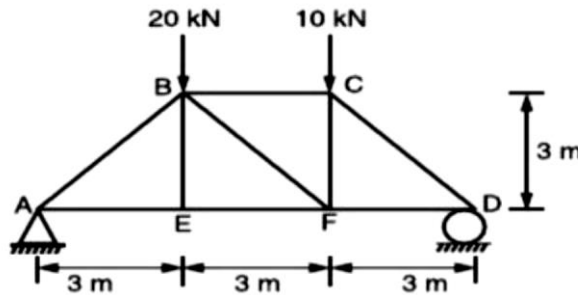
surfaces is 0.2.



**Fig.5(c)**

OR

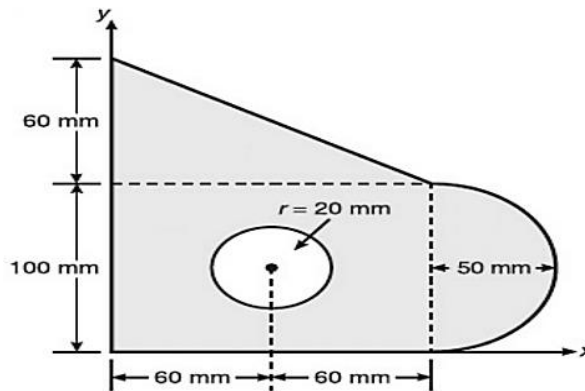
<b>Q.6</b>	<b>a</b>	Outline the laws of static friction.	5	L2	C03
	<b>b</b>	Classify the different types of trusses.	5	L2	C03
	<b>c</b>	Determine the support reactions and the forces in members EF, BF and BC for the truss shown in <b>Fig.6(c)</b> by method of Section.	10	L3	C03



**Fig.6(c)**

Module - 4

<b>Q.7</b>	<b>a</b>	State and Prove Parallel axis theorem.	8	L2	C04
	<b>b</b>	Determine the Centroid of the shaded area as shown in <b>Fig.7(b)</b>	12	L3	C04

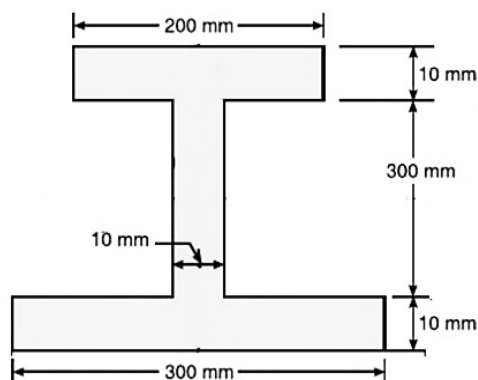


**Fig.7(b)**

OR

<b>Q.8</b>	<b>a</b>	Derive the expression for centroid of a triangle from first principle.	8	L2	C04
	<b>b</b>	Determine the Moment of Inertia about its Centroidal axes as shown in <b>Fig.8(b)</b>	12	L3	C04

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**Fig.8(b)**

### Module - 5

<b>Q.9</b>	<b>a</b>	Define the following terms i) Acceleration    ii) Displacement    iii) Speed    iv) Velocity	<b>4</b>	<b>L1</b>	<b>C05</b>
	<b>b</b>	Explain Super elevation and its necessity of providing super elevation.	<b>6</b>	<b>L2</b>	<b>C05</b>
	<b>c</b>	A Stone is dropped into well and the splash of sound is heard after 09 seconds. Determine the time taken by the sound and also height of drop from the water surface. Assume velocity of sound is to be 330 m/sec.	<b>10</b>	<b>L3</b>	<b>C05</b>
<b>OR</b>					
<b>Q.10</b>	<b>a</b>	Define the following terms i) Kinetics    ii) Kinematics    iii) Projectile motion.	<b>6</b>	<b>L1</b>	<b>C05</b>
	<b>b</b>	State D'Alembert's Principle and mentions its applications in plane motion	<b>6</b>	<b>L2</b>	<b>C05</b>
	<b>c</b>	A projectile is fired with a velocity of 60 m/s on horizontal plane. Find its time of flight in the following cases i) Its range is four times the maximum height ii) Its maximum height is four times the horizontal range iii) Its maximum height and horizontal range are equal.	<b>8</b>	<b>L3</b>	<b>C05</b>