

**Model Question Paper-I/II with effect from 2021 (CBCS Scheme)**

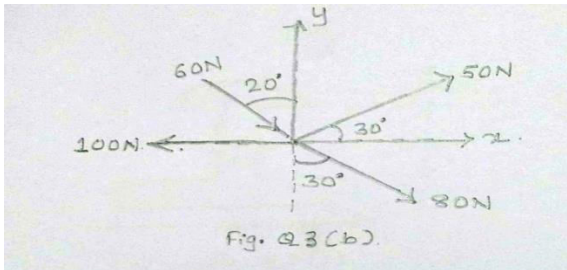
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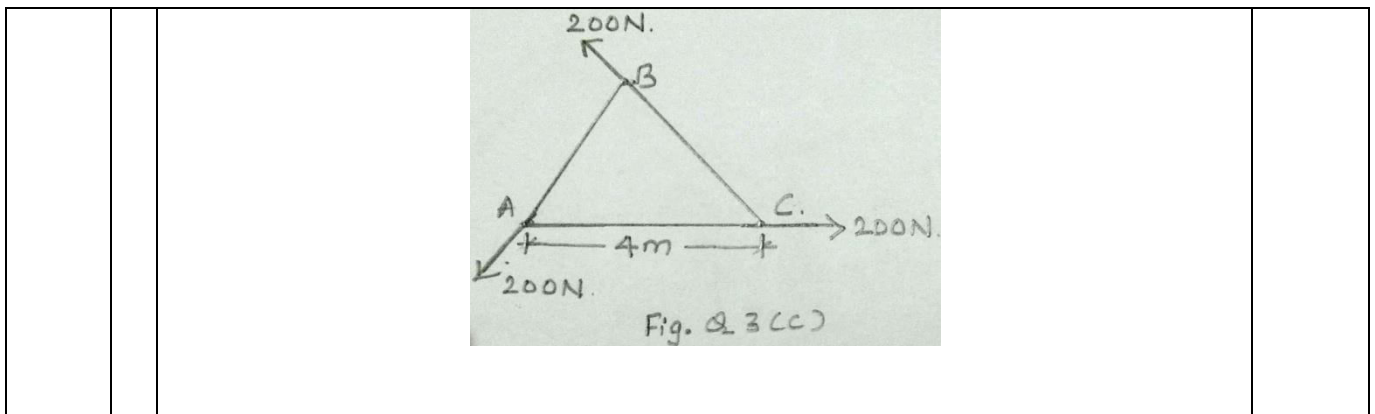
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**First Semester \_BE\_\_\_\_\_ Degree Examination**  
**Subject Title Elements of civil Engineering and Mechanics**

**TIME: 03 Hours****Max. Marks: 100**

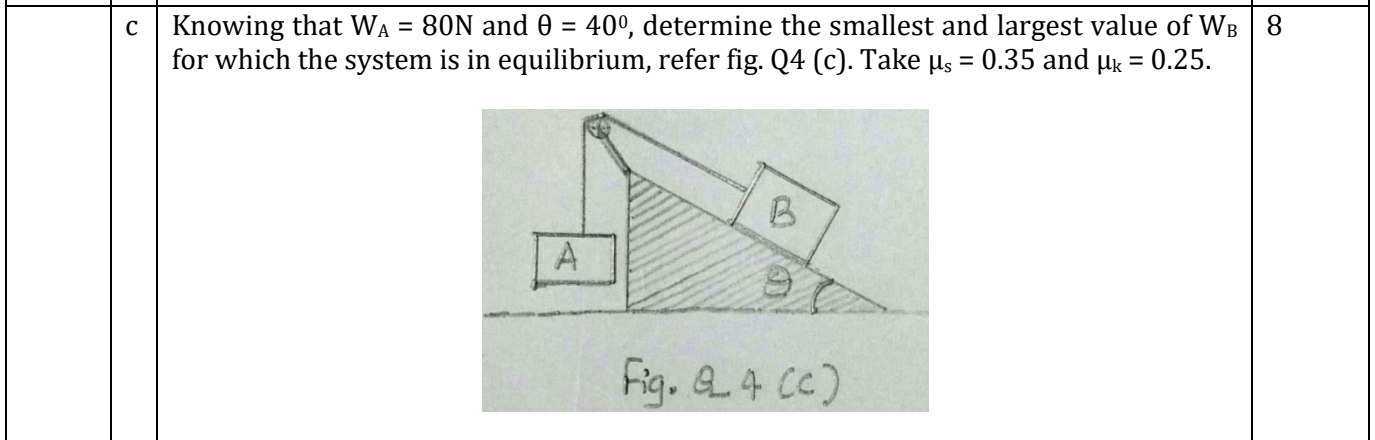
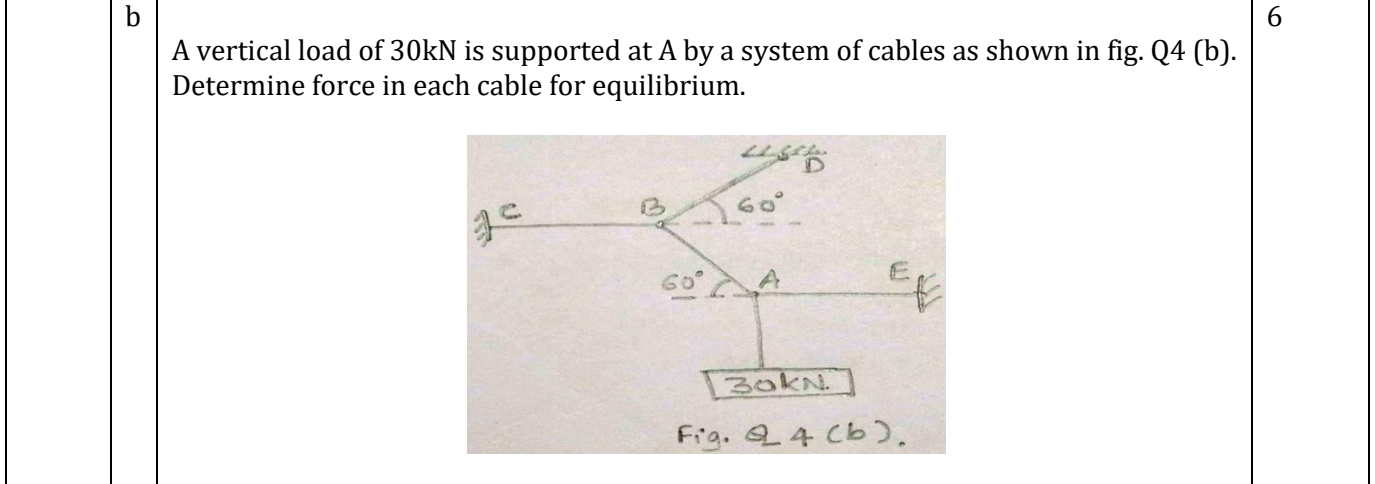
- Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.  
 02. Any missing data may suitable be assumed.  
 03.

<b>Module -1</b>			<b>Marks</b>
Q.01	a	Explain briefly the scope of civil engineering in i) Environmental and sanitary engineering ii) Construction engineering	8
	b	Explain briefly the role of civil engineers in the development of the nation	6
	c	What are the requirements of a good brick?	6
OR			
Q.02	a	Explain briefly the scope of civil engineering in i) Geotechnical engineering ii) Earthquake engineering	8
	b	Explain briefly different types of cement.	6
	c	Explain the classification of steel	6
<b>Module-2</b>			
Q. 03	a	State and prove parallelogram law of forces	6
	b	Determine the resultant of the force system shown in fig. Q3 (b).  	6
	c	Three forces of magnitude 200N each are acting along the sides of an equilateral triangle as shown in fig Q 3 (c). Determine the resultant in magnitude and direction with reference to point B.	8



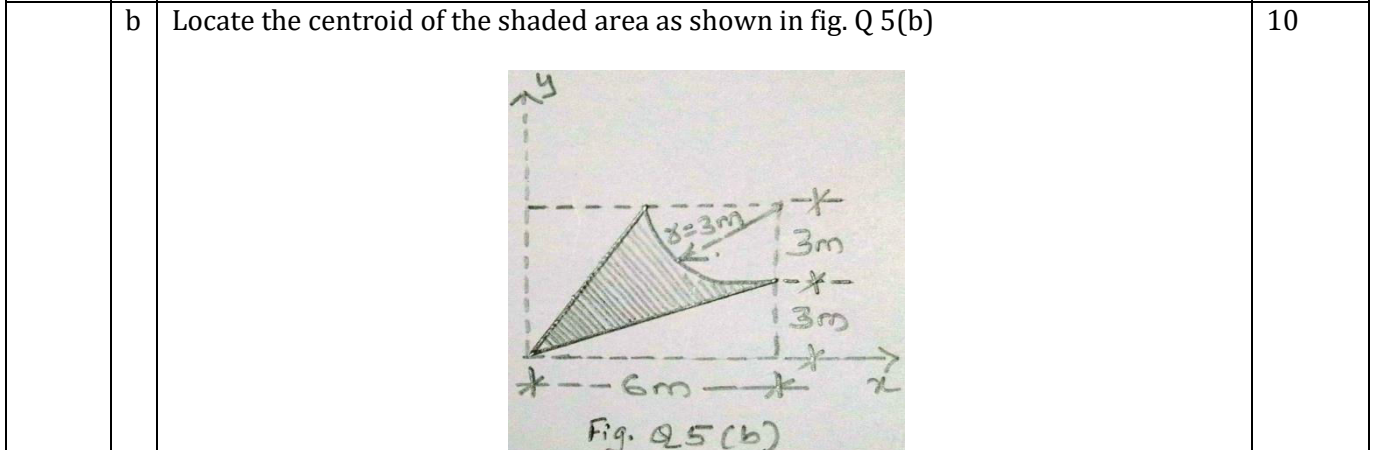
OR

Q.04 a State and Prove Lami's theorem 6

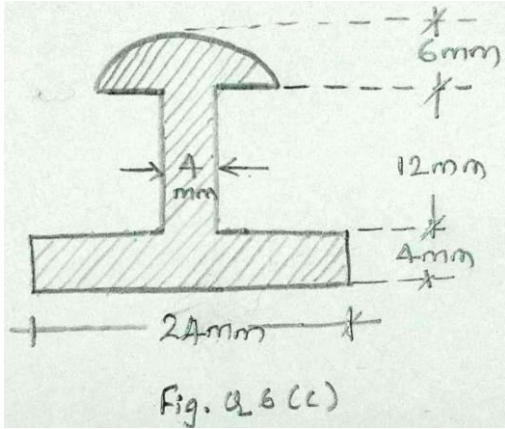
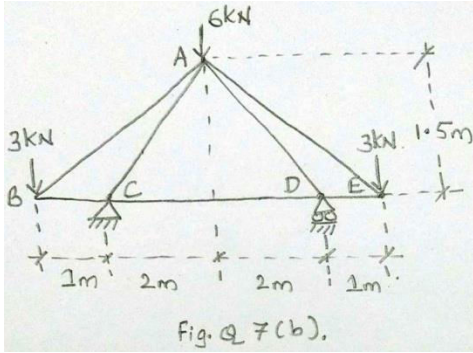
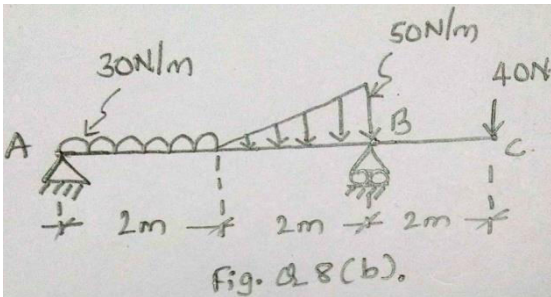


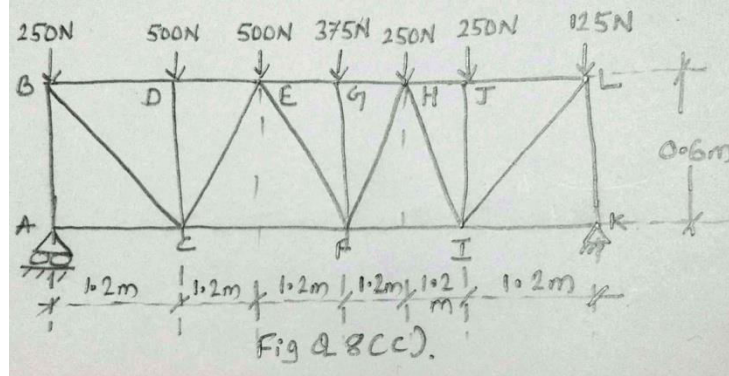
**Module-3**

Q. 05 a Find the centroid of the area enclosed by a right angled triangle from first principle. 10



OR

Q. 06	a	State and prove parallel axes theorem	6
	b	Derive an expression for moment of inertia of a rectangle from first principle about its vertical centroidal axis.	6
	c	Find the polar radius of gyration for the area as shown in fig. Q 6 (c)	8
 <p style="text-align: center;">Fig. Q. 6 (c)</p>			
<b>Module-4</b>			
Q. 07	a	Explain different types of supports and reactions.	8
	b	Analyse the truss as shown in fig Q 7(b), by methods of joints.	12
 <p style="text-align: center;">Fig. Q. 7 (b).</p>			
OR			
Q. 08	a	What are the assumptions made in analysis of a truss.	4
	b	Find the support reactions for the beam as shown in fig Q 8 (b).	8
 <p style="text-align: center;">Fig. Q. 8 (b).</p>			
	c	A floor truss is loaded as shown in fig Q 8 (c), determine the forces in members CF, EF and EG.	8



**Module-5**

Q. 09	a	Define i) Displacement ii) Velocity iii) Acceleration iv) Speed	4
	b	A stone is released from top of the tower, during the last second of its motion, it covers $\frac{1}{4}$ <sup>th</sup> of the height of the tower. Find the height of the tower.	8
	c	A target is fired with an initial velocity of 180m/s at a target located 500m above the gun and at a horizontal distance of 2100m. Neglecting air resistance, determine the value of the firing angle.	8
OR			
Q. 10	a	State and explain D' Alembert's principle.	6
	b	A fly wheel rotates at 200rpm and after 10 seconds it rotating at 160rpm. If the retardation is uniform determine number of revolutions made and time taken by flywheel before it-comes to rest from the speed of 200 rpm.	6
	c	A particle of mass 100N is acted upon by a force $F = (20t^2 - 40)N$ , where 't' is time in second. At $t = 0s$ , velocity of the particle is 5m/s and position $x = 0$ . Find velocity and position of the particle at $t = 2s$ .	8

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome				
Question		Bloom's Taxonomy Level attached	Course Outcome	Program Outcome
Q.1	(a)	L1	1	1
	(b)	L1	1	1
	(c)	L1	1	1
Q.2	(a)	L1	1	1
	(b)	L1	1	1
	(c)	L1	1	1
Q.3	(a)	L2	2	3
	(b)	L2	2	3
	(c)	L2	2	3
Q.4	(a)	L2	3	3
	(b)	L2	3	2
	(c)	L2	3	2
Q.5	(a)	L2	4	3
	(b)	L2	4	3
	(c)	L2	4	3
Q.6	(a)	L3	4	2
	(b)	L3	4	2
	(c)	L3	4	3
Q.7	(a)	L2	3	3
	(b)	L3	3	2
	(c)	L2	3	3
Q.8	(a)	L3	3	4
	(b)	L2	3	3
	(c)	L3	3	3
Q.9	(a)	L2	5	3
	(b)	L3	5	2
	(c)	L3	5	3
Q.10	(a)	L2	5	3
	(b)	L3	5	3
	(c)	L3	5	3
Bloom's Taxonomy Levels	<b>Lower order thinking skills</b>			
	Remembering(knowledge): $L_1$	Understanding (Comprehension): $L_2$	Applying (Application): $L_3$	
	<b>Higher order thinking skills</b>			
	Analyzing (Analysis): $L_4$	Valuating (Evaluation): $L_5$	Creating (Synthesis): $L_6$	



# Model Question Paper-I with effect from 2021 (CBCS Scheme)

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## First Semester B.E Degree Examination ELEMENTS OF CIVIL ENGINEERING AND MECHANICS

TIME: 03 Hours

Max. Marks: 100

- Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.  
02. Assume any missing data.

Module -1			Marks
Q.01	a	What are the different branches of Civil Engineering and explain any two	12
	b	Define concrete and types of concrete	08
OR			
Q.02	a	Define Infrastructure? What is the role of Civil Engineer in the Infrastructural Development of a country?	12
	b	What are different types of construction materials used. Explain any two.	08
Module-2			
Q.03	a	State and prove Varignon's theorem	05
	b	For the non concurrent coplanar system shown below determine the magnitude, direction and position of resultant force with reference to 'A'. Refer fig. 1	10
			fig. 1
	c	Draw the FBD of sphere shown below and determine the reactions of the points of contact using Lami's theorem. Refer fig. 2	05
			fig. 2
OR			
Q.04	a	Define i) Angle of Friction. ii) Angle of Repose.	05

	b	A body of weight 500N is pulled up and inclined plane by a force of 350 N. The inclination of the plane is $30^\circ$ to the horizontal and the force is applied parallel to the plane. Determine the coefficient of friction	08
	c	A body of weight 450N is pulled up along an inclined plane having inclination $30^\circ$ to the horizontal at a steady speed. Find the force required if the coefficient of friction between the body and the plane is 0.25 and force is applied parallel to the inclined plane. Find P	07
Module-3			
Q. 05	a	Derive an expression of centroid of triangle, by method of first principles	08
	b	Determine the centroid w.r.t origin for the section as shown in fig.3. All dimensions in mm	12
			fig.3
OR			
Q. 06	a	State & Prove Parallel Axis Theorem	08
	b	Determine the radius of gyration shown in fig.4	12
			fig.4
Module-4			
Q. 07	a	Explain types of loads and supports	05
	b	Determine the reactions at A and B. Refer fig.5	15



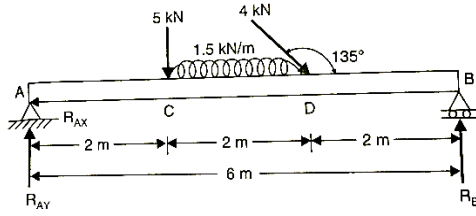


fig.5

OR

Q. 08 a Explain the procedure to analyse by method of joints 05

b Determine the forces in the truss which carries a horizontal load of 12kN and a vertical load of 18kN. Use method of joints. Refer fig.6 15

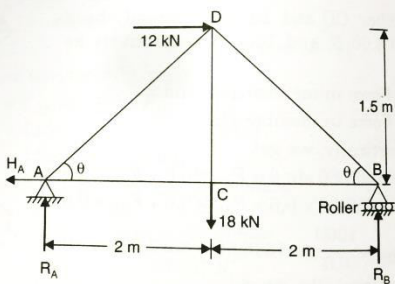


fig.6

Module-5

Q. 09 a Define speed, linear displacement, average velocity, Acceleration 08

b On a straight road, a smuggler's car passes a police station with a uniform velocity of 10m/sec. After 10 sec, a police party follows in pursuit in a jeep with a uniform acceleration of 1m/sec. Find the time necessary for the jeep to catch up with the smugglers car 12

OR

Q. 10 a Define Angular displacement, speed, linear displacement, uniform velocity 08

b A police officer observes a car approaching at the unlawful speed of 60kmph. He gets on his motor cycle and starts chasing the car, just as it passes in front of him. After accelerating for 10 secs, at a constant rate, the officer reaches his top speed of 75Kmph. How long does it take for the officer to over take the car from the time he started. 12

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome

Question	Bloom's Taxonomy Level attached	Course Outcome	Program Outcome	
Q.1	(a)	L1	C01	P01,P02
	(b)	L1	C01	P01,P02,P03
Q.2	(a)	L1	C01	P01,P02
	(b)	L1	C01	P01,P02,P03
Q.3	(a)	L1	C02	P01,P02
	(b)	L3	C02	P01,P02,P03



	©	L3	C02	P01,P02,P03
<b>Q.4</b>	(a)	L1	C02	P01,P02
	(b)	L3	C02	P01,P02,P03
	(c)	L3	C02	P01,P02,P03
<b>Q.5</b>	(a)	L1	C03	P01,P02
	(b)	L3	C03	P01,P02,P03
<b>Q.6</b>	(a)	L1	C03	P01,P02
	(b)	L3	C03	P01,P02,P03
<b>Q.7</b>	(a)	L1	C04	P01,P02
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<b>Q.8</b>	(a)	L1	C04	P01,P02
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<b>Q.9</b>	(a)	L1	C05	P01,P02
	(b)	L3	C05	P01,P02,P03
<b>Q.10</b>	(a)	L1	C05	P01,P02
	(b)	L3	C05	P01,P02,P03
<b>Lower order thinking skills</b>				
<b>Bloom's Taxonomy Levels</b>	Remembering( knowledge): $L_1$		Understanding Comprehension): $L_2$	Applying (Application): $L_3$
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