

**BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT**

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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**First Semester B.E. Degree Make-up Examinations, August 2022****ELEMENTS OF CIVIL ENGINEERING**

(Common to all Branches)

Duration: 3 hrs

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.**2. Missing data, if any, may be suitably assumed*

Q. No	Question	Marks	(RBTL:CO:PI)
	<b><u>Module - 1</u></b>		
1 a	Briefly explain the scope of different field of civil engineering.	10	(2:1 : 1.4.1)
b	What are the different types of bridges? Explain with a neat sketch.	10	(2:1 : 1.4.1)
	(OR)		
2 a	Explain the role of civil engineer in the infrastructure development and economy of the country.	08	(2:1 : 1.4.1)
b	Differentiate between rigid and flexible pavement with their advantages and disadvantages.	07	(2:1 : 1.4.1)
C	Mention the different types of dams based on material.	05	(1:1 : 1.4.1)
3	<b><u>Module - 2</u></b>		
a	Which are the key aspects to be considered while planning a city?	10	(2:2 : 1.4.1)
b	What is surveying? Explain the principles of surveying.	06	(2:2 : 1.4.1)
c	Differentiate between fine aggregate and coarse aggregate.	04	(1:2 : 1.4.1)
	(OR)		
4 a	How do you classify timber? List the characteristics of good timber.	10	(1:2 : 1.4.1)
b	Explain the field and laboratory tests to be carried out on bricks as per Indian Standards?	10	(2:2 : 1.4.1)
	<b><u>Module-3</u></b>		
5 a	Explain the classification of force system with a neat sketch.	06	(2:3 : 1.3.1)
b	A door needs 8000 N-mm to open it. Sita applies force at the edge of the door shutter which is at 800 mm from hinge and Gita applies it at 550 mm from the hinge. What forces they must apply to open door?	04	(2:3 : 1.3.1)
c	Find the magnitude of resultant and direction of the given force system shown in Figure. Q 5(c). Also represent the resultant with a sketch.	10	(2:3 : 1.3.1)

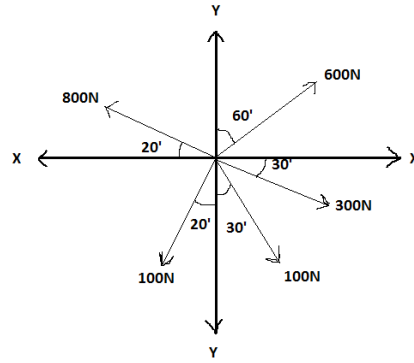


Figure. Q 5(c)

(OR)

- |          |                                                                                                                                                          |           |                      |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------|
| <b>6</b> | <b>a</b> State and prove Varignon's principle of moments.                                                                                                | <b>07</b> | <b>(2:3 : 1.3.1)</b> |
|          | <b>b</b> Find the resultant and position of the system of coplanar forces acting on a lamina as shown in Figure. Q 6(b). Each square has a side of 1 cm. | <b>08</b> | <b>(2:3 : 1.3.1)</b> |

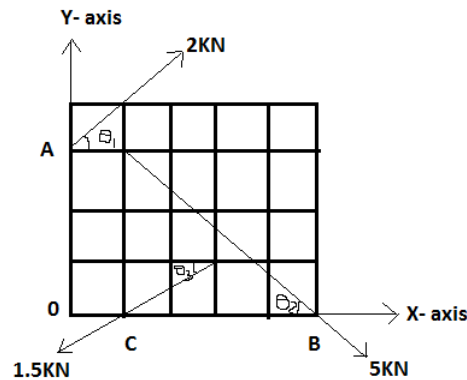


Figure.Q 6(b)

- |          |                                                                                                                                                            |           |                      |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------|
| <b>c</b> | Explain (i) Principle of superposition (ii) Principle of transmissibility (iii) Principle of physical independence of force (iv) Continuum (v) Rigid Body. | <b>05</b> | <b>(2:3 : 1.3.1)</b> |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------|

#### Module-4

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|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------|
| <b>7</b> | <b>a</b> A system of connected flexible cables shown in Figure.Q 7(a) is supporting two vertical forces 200 N and 250 N at points B and D respectively. Determine the forces in various segments of the cable. | <b>08</b> | <b>(2:4 :1.3.1)</b> |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------|

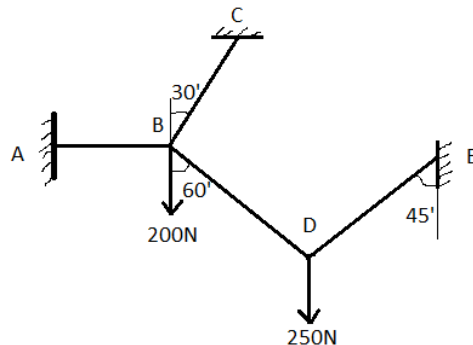


Figure. Q 7(a)

- |          |                                                                                                                                                                         |           |                      |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------|
| <b>b</b> | Briefly explain different types of beams.                                                                                                                               | <b>06</b> | <b>(2:4 : 1.4.1)</b> |
| <b>c</b> | A simply supported beam of length 9 m and carrying UDL of 10 kN/m for a distance of 6 m from left and 40 kN load at 4 m from left end. Determine the support reactions. | <b>06</b> | <b>(2:4 : 1.4.1)</b> |

(OR)

- 8 a Distinguish between statically determinate and indeterminate structures with example. 06 (2:4 : 1.4.1)
- b A simply supported beam AB of 6 m span is shown in Figure. Q 8(b). Determine support reactions. 06 (2:4 : 1.4.1)

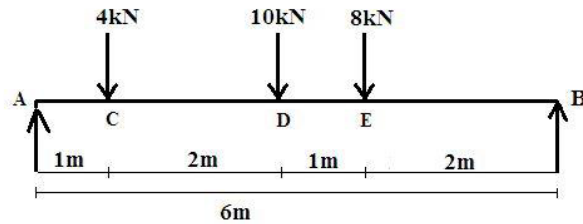


Figure Q 8(b)

- c State and prove Lami's theorem. 08 (2:4 : 1.3.1)

**Module-5**

- 9 a Define radius of gyration and polar moment of Inertia. 04 (2:5 : 1.3.1)
- b Determine the centroid of the area shown in Figure. Q9 (b) with respect to axes. 10 (2:5 : 1.3.1)

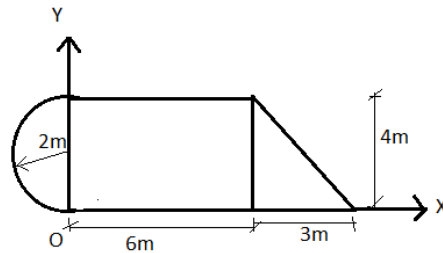


Figure. Q9 (b)

- c Locate the centroid of shown in Figure. Q 9(c) with reference to the axes. 06 (2:5 : 1.3.1)

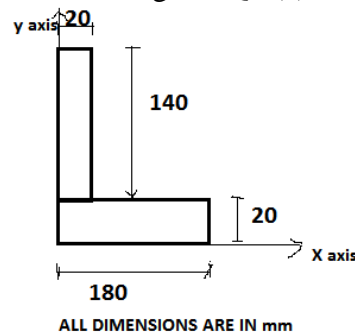


Figure. Q 9(c)

(OR)

- 10 a State and prove parallel axis theorem and perpendicular axis theorem. 10 (2:5 : 1.3.1)

- b** Determine the moment of inertia of the unequal I-section about its centroidal axes as shown in Figure.Q 10(b).

**10 (2:5 : 1.3.1)**

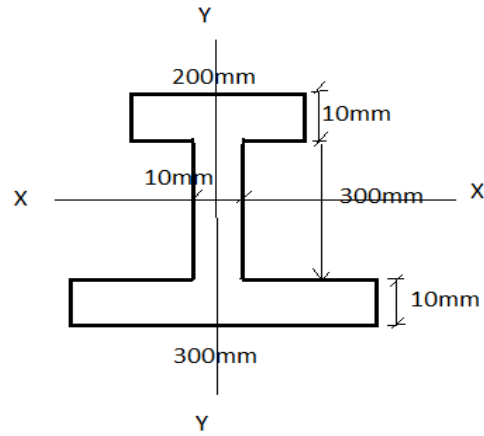


Figure. Q 10(b)

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