

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 Examinations, May 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)
	<u>Module - 1</u>		
1	a State the scope of following fields of civil engineering. i) Structural engineering ii) Water resources & Irrigation engineering.	08	(2:1 : 1.4.1)
	b Explain different types of roads.	06	(2:1 : 1.4.1)
	c With the help of neat sketch, explain the cross section of earthen dam and gravity dam.	06	(1:1 : 1.4.1)
	(OR)		
2	a Write a brief note on role of civil engineer in infrastructure development.	08	(2:1 : 1.4.1)
	b With the help of neat sketch, briefly explain the cross section of the road.	06	(2:1 : 1.4.1)
	c Explain the following bridges, with neat sketches. i) Suspension bridge ii) Arch bridge.	06	(1:1 : 1.4.1)
3	<u>Module - 2</u>		
	a What are the objectives and principles of surveying?	08	(2:2 : 1.4.1)
	b Briefly explain classification of bricks.	06	(1:2 : 1.4.1)
	c Briefly explain the benefits of green buildings.	06	(2:2 : 1.4.1)
	(OR)		
4	a Explain i. Cement concrete blocks ii. Stabilized mud blocks iii. Bituminous road.	08	(2:2 : 1.4.1)
	b Explain the importance of surveying.	06	(1:2 : 1.4.1)
	c Write the key trends in smart cities developments.	06	(2:2 : 1.4.1)
	<u>Module-3</u>		
5	a State and explain basic idealization in mechanics.	06	(2:3 : 1.3.1)
	b A 100 N vertical force is applied to a shaft A as shown in Figure.Q 5(b) Determine the effect of 100 N force at O.	06	(2:3 : 1.3.1)

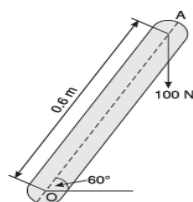


Figure.Q 5(b)

- c Four coplanar forces acting at a point is shown in Figure Q 5(c). One of the forces is unknown and its magnitude is shown by P. The resultant has a magnitude of 500 N and is acting along the x-axis. Determine the unknown force P and its inclination with the x- axis. 08 (2:3 : 1.3.1)

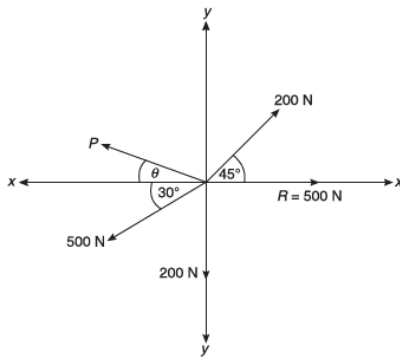


Figure. Q 5(c)

(OR)

- 6 a Define couple and mention its characteristics. 06 (2:3 : 1.3.1)
- b Find the resultant of the force system shown in Figure.Q 6(b) 06 (2:3 : 1.3.1)

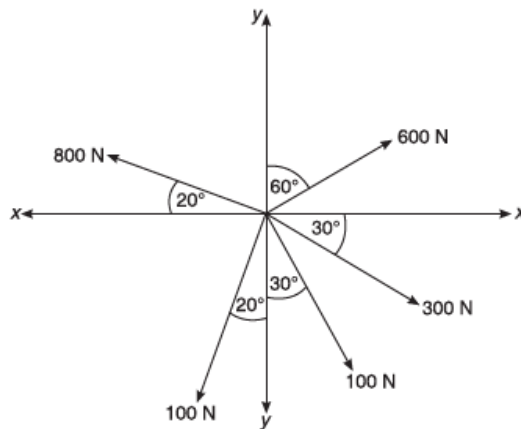


Figure.Q 6(b)

- c Forces acting on 1m length of a dam are shown in Figure. Q 6(c). By neglecting the weight of the dam, determine the resultant force acting on the dam. Find the point of intersection of the resultant with the base of the dam. 08 (2:3 : 1.3.1)

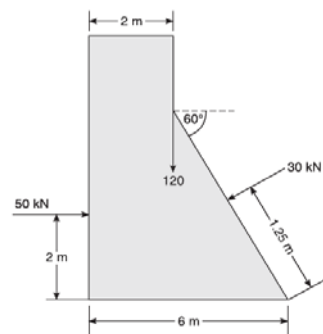


Figure.Q 6(c)

Module-4

- 7 a State and prove Lami's theorem. 04 (2:3 : 1.3.1)
- b The system of connected flexible cables shown in Figure. Q 7(b) is supporting two loads of 400 N and 500 N at points B and D respectively. Determine the tensions in the various segments of the cable. 08 (2:3 : 1.3.1)

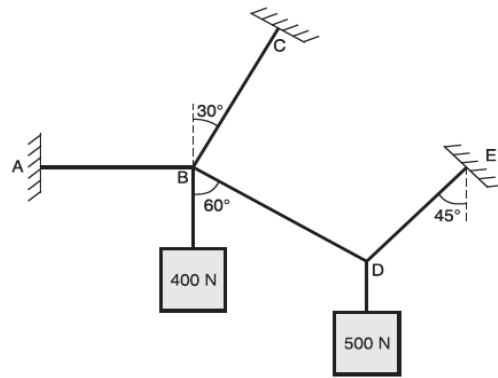


Figure. Q 7(b)

- c Two identical rollers, each weighing 400 N, are placed in a trench as shown in Figure Q 7(c). Assuming that all contact surfaces are smooth, determine the reactions at contact points A, B, C, and D. 08 (2:3 : 1.3.1)

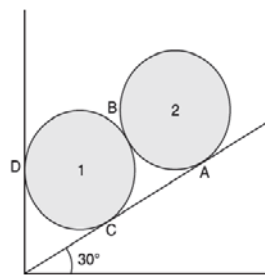


Figure.Q 7(c)

(OR)

- 8 a What are the different types of beams? Explain with a neat sketch. 06 (2:4 : 1.4.1)
- b Calculate the support reaction for the cantilever beam shown in Figure.Q 8(b). 06 (2:4 : 1.4.1)

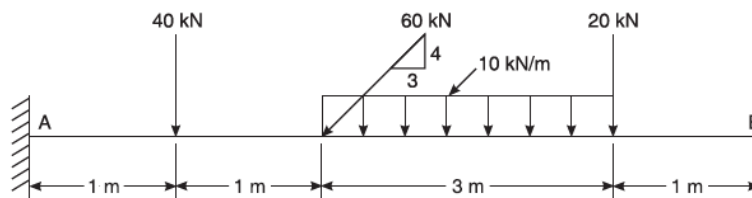


Figure.Q 8(b)

- c For the beam with loading shown in Figure Q 8(c), determine the reactions at the supports. 08 (2:4 : 1.4.1)

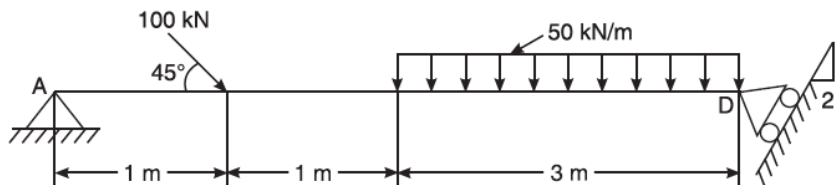


Figure. Q 8(c)

Module-5

- 9 a Derive the expression for centroid of a semi-circle from first principle. 08 (2:5 : 1.3.1)

- b Find the centroid as shown in Figure.Q 9(b).

12 (2:5 : 1.3.1)

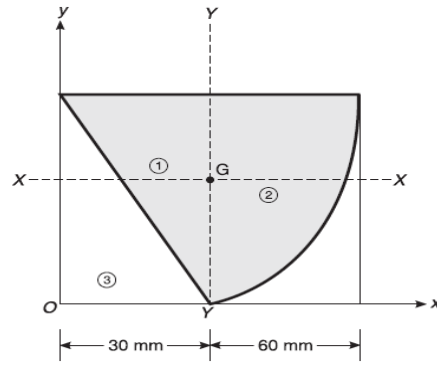


Figure.Q 9(b)

(OR)

- 10 a State and prove parallel axes theorem.

08 (2:5 : 1.3.1)

- b Determine the moment of inertia of the section, shown in Figure Q10 (b) about its centroidal axes. Calculate the least radius of gyration.

12 (2:5 : 1.3.1)

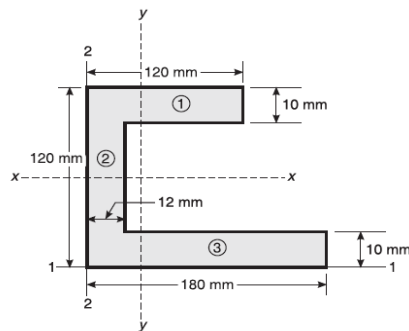


Figure. Q 10(b)