

**Vivekananda College of Engineering & Technology, Puttur**  
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 Affiliated to VTU, Belagavi & Approved by AICTE New Delhi

CRM08

Rev 1.11

Civil

14/03/2022

**CONTINUOUS INTERNAL EVALUATION - 3**

Dept:CV	Sem / Div: A,B,C	Sub:Elements of civil Engineering and Mechanics	S Code:21CIV14
Date:08/04/22	Time: 9:30 – 11:00 PM	Max Marks: 40	Elective:N

Note: Answer any 2 full questions, choosing one full question from each part.

Q/N	Questions	Marks	RBT	CO's
<b>PART A</b>				
1 a	Determine the centroid of a semicircular lamina from the first principle	8	L 3	CO 4
b	Locate the centroid of the lamina shown in Figure with respect to axes 1 – 1 and 2 – 2.	12	L3	CO 4
<p style="text-align: right;"><math>\alpha = 99.37169</math>  <math>\bar{x} = 506.733</math>  <math>\bar{y} = 533.656</math></p>				
<b>OR</b>				
2 a	State and prove parallel axis theorem.	8	L 3	CO 4
b	Find the moment of Inertia for the section shown in	12	L	CO

	Figure about centroidal axes.		3	4
	<p>Hand-drawn diagram of a T-shaped cross-section. The top flange is a semi-circle with a radius of 6 mm. The stem is 12 mm wide and 4 mm high. The base is 24 mm wide and 4 mm high. Centroidal axes are indicated with dashed lines.</p>			

**PART B**

3	a	A stone 'A' is dropped from top of a tower 50m high. At the same time another stone 'B' is thrown up from the foot of the tower with the velocity of 25m/s. At what distance from top and after how much time the two stones will cross each other.	10	L 3	CO 5
	b	Define displacement, distance travelled, velocity, acceleration and Super elevation. Mention their S.I units. Also explain the necessity of Superelevation.	10	L 3	CO 2

**OR**

4	a	State newtons laws of Motion. State D'Alembert's principle and its applications.	10	L 2	CO 5
	b	A projectile is fired from the top to cliff 150m height with an initial velocity of 180 m/s at an angle of elevation of $30^\circ$ with the horizontal. Neglecting air resistance; determine i) the greatest elevation above the cliff. ii) the greatest elevation above the ground reached by the particle. iii) the horizontal distance from the gun to the point where the projectile strikes the ground.	10	L 3	CO 2