USN

Acharya Institute of Technology
Soladevanhalli, Bengaluru-560107.

INTERNAL ASSESMENT - 3 [Academic Year: 2018-19]

Sub with Code: Elements of Civil Engineering and Mechanics [18CIV14]
Semester/Section: 1ˢᵗ Semester/ C-Section [ISE]
Max Marks: 50   **Time: 90 min**

Note: *All questions are compulsory.*
Draw neat sketches where ever necessary.
Assume any missing data.

Q.No		CO's
1	(a) Explain briefly about centroid of plane figure and deduce an expression for centroid of triangle. (6 Marks) (b) Explain the following terms (a) Average velocity (b) Polar moment of inertia (2*2=4 Marks)	CO 2
	Or	
2	(a) Explain briefly about moment of inertia and deduce and expression for moment of inertia of rectangle. (6 Marks) (b) Explain the following : (a) Parallel axis theorem (b) Radius of gyration (2*2=4 Marks)	CO 2
3	Solve the centroid of the shaded area with reference to the corner point O of figure 1 (10 Marks)	CO 3
	Or	
4	Solve the centroid of the shaded area of figure 2 (10 Marks)	CO 3
5	Calculate the radius of gyration about x-x- axis of the shaded area as shown in the figure 3 (10 Marks)	CO 3
	Or	
6	Calculate the second moment of area (M.I) about horizontal centroidal axis for the shaded area as shown in figure 4. Also find radius of gyration about the same axis take R1= 50mm and R2= 20mm. (10 Marks)	CO 3
7	Show that the expression $\bar{I}_x = bd^3/36$ for moment of inertia of triangle (10 Marks)	CO 3
	Or	
8	Show that the expression for centroid of quarter circle of radius 'r' is $4R/3\pi$ (10 Marks)	CO 3

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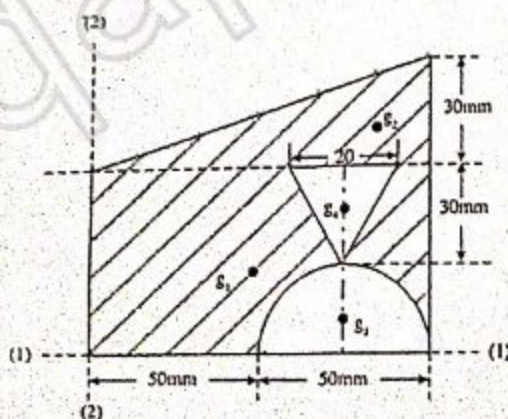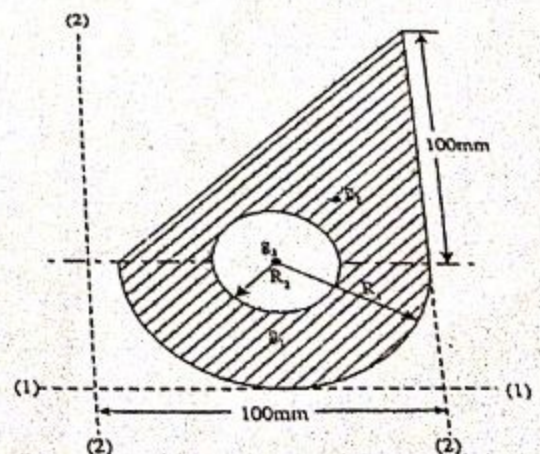|		
9	A projectile is fired from the top of cliff 200m height with an initial velocity of 190m/sec at an angle of elevation of 35° with the horizontal. Neglecting air resistance; Calculate 1) the greatest elevation above the cliff 2) the greatest elevation above the ground reached by the particle 3) the horizontal distance from the gun to the point where the projectile strikes the ground **(10 Marks)**	CO 3
	Or	
10	A stone A is dropped from the top of a tower 100m height. At the same time another stone B is thrown up from the foot of the tower with the velocity of 30m/sec. calculate the distance from the top and after how much time the two stones will cross each other **(10 Marks)**	CO 3
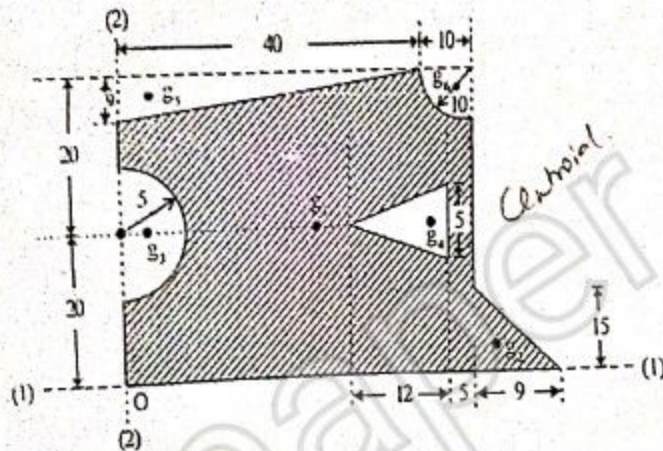
Figure 1
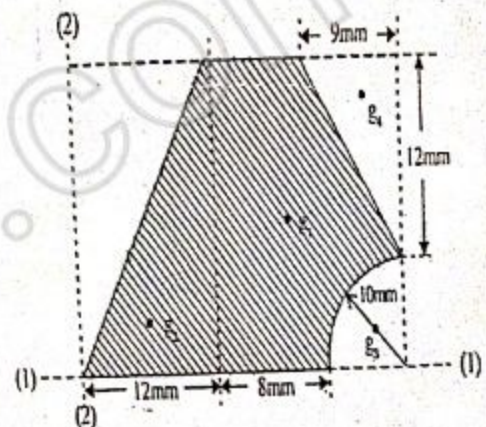
Figure 2

Figure 3

Figure 4

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