SET - 1 | GR 14 | CODE: GR14A1012

I B. Tech I Semester Supplementary Examinations, June, 2015
Engineering Mechanics (Statics)
(Common to ME and CE)

Time: 3 hours **Max Marks: 70**

PART – A

Answer ALL questions. All questions carry equal marks

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10 * 2 Marks = 20 Marks

1). a	State and explain Varignons Theorem.	**[2]**
b	Define Angle Repose and Show that Angle of Repose is equal to Angle of Friction.	**[2]**
c	Define the terms Centre of Gravity and Centroid	**[2]**
d	Where does the Centre of Gravity of the following section lies? (i). Semicircle, (ii) Trapezium, (iii) Hemisphere and (iv) Right circular solid cone	**[2]**
e	State and explain the heorem of perpendicular axis, as applied to moment of inertia.	**[2]**
f	Define the terms: Moment of Inertia and Radius of Gyration.	**[2]**
g	Write an expression for the moment of inertia of a circular ring of uniform cross section of radius 'R' about its diametrical axis	**[2]**
h	Write an expression for the moment of inertia of a circular plate of radius 'R' and thickness 't' about its centroidal axis	**[2]**
i	What is the Truss? State the difference between a perfect and an imperfect Trusses.	**[2]**
j	Explain the terms: Virtual Displacement and Virtual Work.	**[2]**

PART – B

Answer any FIVE questions. All questions carry equal marks

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5 * 10 Marks = 50 Marks

2. a).Explain the different types Supports and Support Reactions. **[10]**
b). A beam AB is supported and loaded as shown in fig.1. Find the Reactions at the Supports.

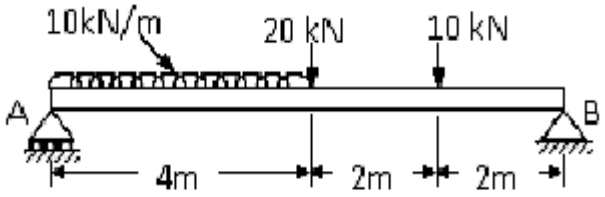

Fig:1

3. Find the centroid of the shaded figure shown in fig. 2 **[10]**

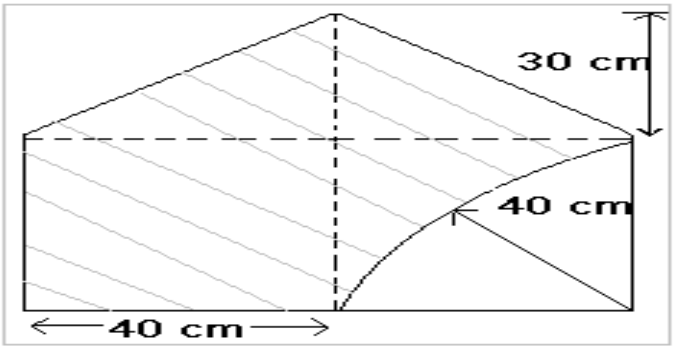

Fig:2

4. Find the Moment of Inertia of the shaded area shown in fig.3 about its centroidal axis. **[10]**

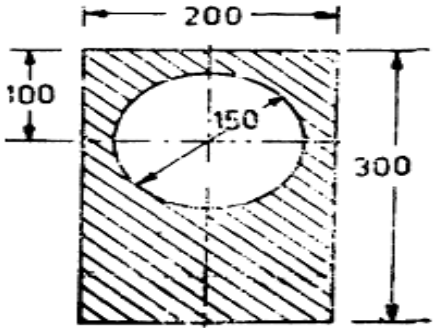

Fig:3

5. a). Determine the Moment of Inertia of a solid sphere of radius 'R' about its diametrical axis. **[10]**

b). Find the Mass Moment of Inertia of a rectangular plate of size **a** x **b** and thickness't' about its centroidal axis.

6. a). A Truss of Span 4 m is loaded as shown in fig.4. Find the reactions and forces in the members of the Truss. **[10]**

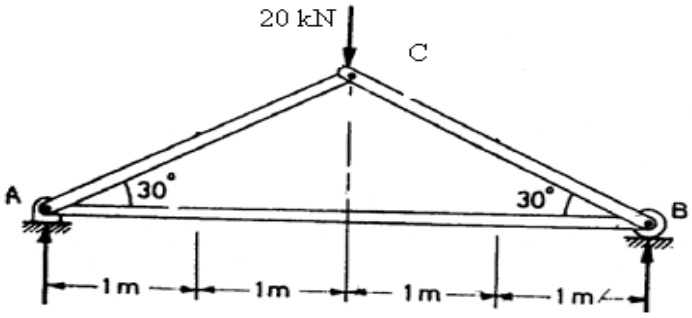

Fig:4

b). What are the assumptions made in finding out the forces in the Trusses?

7. Determine the vertical reaction developed at a supports A & B in the beam as shown fig:5 using principles of virtual works**.** **[10]**

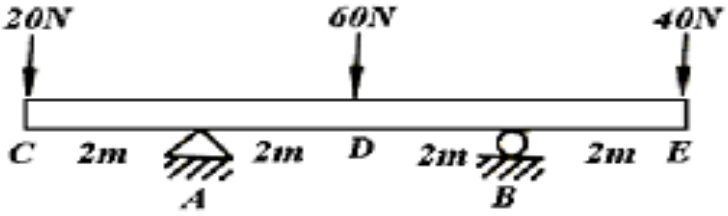

Fig:5

8. a). Explain the following terms: (i) Angle of Friction, (ii) Coefficient of Friction and (iii) Cone Friction **[3]**

b). A block resting on a rough horizontal surface required a pull of 190 N inclined at 30^0 to the surface just to move it. It was found that a push of 230 N inclined at 30^0 to the surface just moved the block. Determine the weight of the block and the coefficient of friction. **[7]**

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