Hall Ticket Number:

Code No.: 1115 I

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD B.E. I Year I-Semester Examinations*, July/August-2016

Engineering Mechanics-I

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A $(10 \times 2=20 \text{ Marks})$

1. State and explain Lame's Theorem.

2. Find the magnitude and direction of the resultant of the forces 10i + 5j + 7k N and -8i + 4j - 3k N...

3. Find the force 'T' in the bar BC in figure 3.

4. Determine the force P for the system shown in figure 4.

5. Find the force in the member CD of truss shown in figure 5.

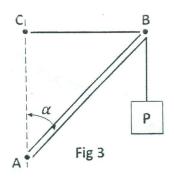
6. Find the force in the member CD of truss shown in figure 6.

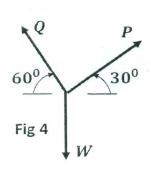
7. A 10000 N weight block is placed on a plane inclined to horizontal by 15° and another block 100 N weight is placed on another plane of slope 17°. If coefficient of friction is 0.286 for both the planes and blocks determine which block is in equilibrium.

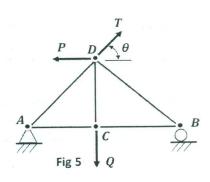
8. A wooden block of weight 30 N is placed on a rough horizontal surface for which coefficient of friction is 0.35. What is the minimum horizontal force that causes motion of the block to impend?

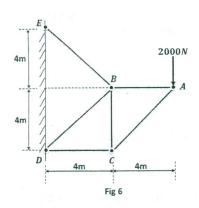
9. What is the y-coordinate of the centroid of the area shown in figure 9 from its base?

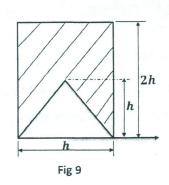
10. Using transfer formula, determine the moment of inertia of a semicircular area of radius r shown in figure 10 about its centre of gravity. No derivations are needed.

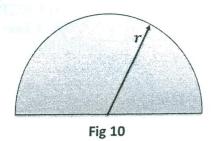












Part 'B'

Answer any five of the following

 $5 \times 10 = 50 M$

- 11. Two cables AC & BC are supporting a rod OD and a weight 200 N is attached at point D as shown in figure 11. If the tensions in the two cables are 450 N in AC and 900 N in BC, find the resultant moment of all the three forces about the point O.
- 12. Two rollers A and B of weight 2 KN and 4 KN respectively rest on smooth inclined planes and connected by a rigid bar of negligible weight as shown in figure 12. Find the force F to be applied to roller A at 60 to the vertical as shown to keep the system in equilibrium.
- 13. A weight W KN is to be raised by means of the wedges A and B as shown in figure 13. If coefficient of friction is 0.25 for all the contiguous surfaces, determine the value of W if two forces P = 65 KN are required to impend raising the block C. Neglect the weights of the three blocks.
- 14. Determine the location of the centroid of the plane area shown in figure 14 from top left corner.
- 15. Determine the moment of inertia of the built up section about X axis shown in figure 15. All the dimensions are in cms.
- 16. Find forces in all the members of the truss shown in figure 16.
- 17. (a) Two identical blocks A and B are connected by a rod and they rest against vertical and horizontal planes respectively as shown in figure 17a. If sliding impends when the rod is at 45° with horizontal, determine the coefficient friction which is same for all the contiguous surfaces.
- 17 (b). Determine the radius of gyration of the area shown in figure 17(b) about the X axis. All dimensions are in cm.

