Hall Ticket Number:

Code No.: 1116N

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. I Year I-Semester (New) Examinations, December - 2015

Engineering Mechanics-I

Time: 3 hours Max. Marks: 50

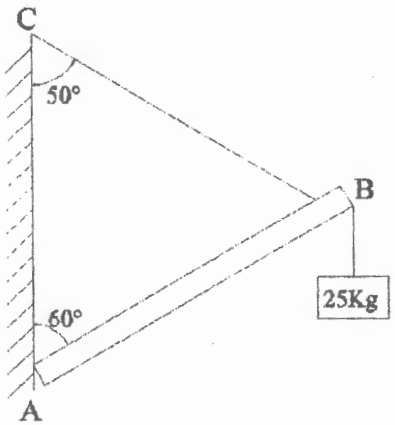
*Note: Answer **ALL** questions in **Part-A** and any **FIVE** questions from **Part-B***

Part-A (15 Marks)

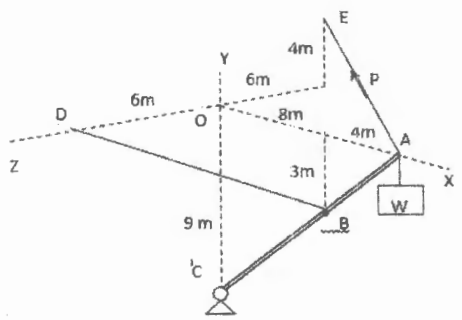
1. Define moment of a force. [1]
2. Explain about hinged support. [1]
3. Define angle of friction. [1]
4. How do you evaluate radius of gyration? [1]
5. Describe about a truss. [1]
6. State Lami's theorem and list its limitations. [2]
7. Define free body diagram and sketch one example. [2]
8. Distinguish between a deficient and a redundant truss. [2]
9. Describe about Wedge and explain how it is used to raise heavy loads. [2]
10. State and prove perpendicular axis theorem. [2]

Part-B (5 X 7=35 Marks)

11. a) A bar AB of 6mts length and 100N weight is hinged at A. It supports a load of 25 kg at point B. The end B of the bar is connected to the wall by string BC. Determine the tension in the string and the reaction at A. [3]



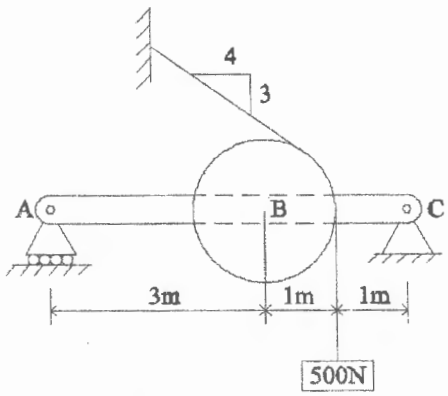
b) If the force multiplier of a force P acting from A to E is P_m=10N/m, and that of F acting from B to D is F_m=30N/m referring Fig. Find out the following:
i) Component of each force along AC
ii) Moment of P about the axis CD. [4]



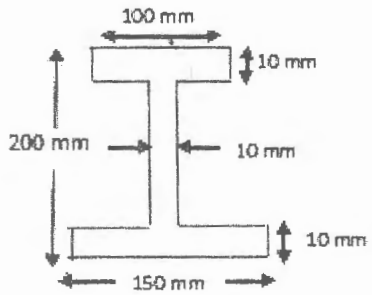
Contd...2

12. a) Explain various force systems. [3]

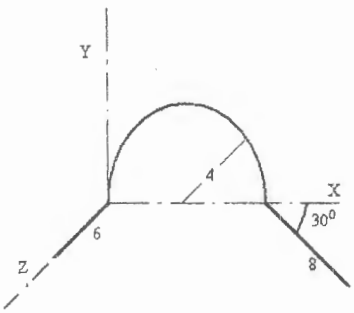
b) A pulley of 1mt radius, supporting a load of 500N, is mounted at B on a horizontal beam. If the beam weighs 200N and the pulley weighs 50N, find the hinge force at 'C'. [4]



13. a) Compute the moment of inertia of the I-section shown in figure about centroidal xx-axis. [4]

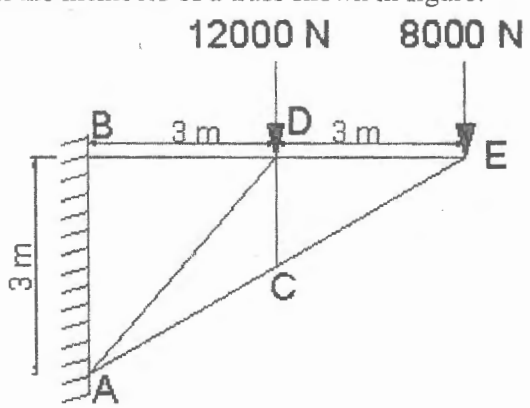


b) Locate the center of gravity of a uniform wire is bent into the shape as shown in the fig. Take all dimensions in m [3]



14. a) List the steps involved in analysis of a truss. [2]

b) Find the axial forces in all the members of a truss shown in figure. [5]

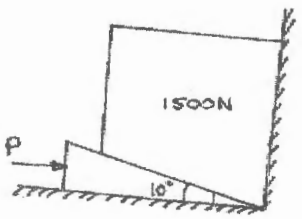


Contd…3

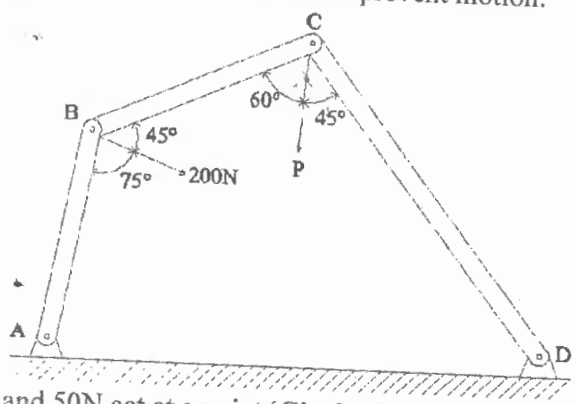
Code No.: 1116N

15. a) Two equal bodies A and B of weight 'W' each are placed on a rough inclined plane. The bodies are connected by a light string. If $\mu_A = 1/2$ and $\mu_B = 1/3$, show that the bodies will be both on the point of motion when the plane is inclined at $\tan^{-1}(5/12)$ [3]

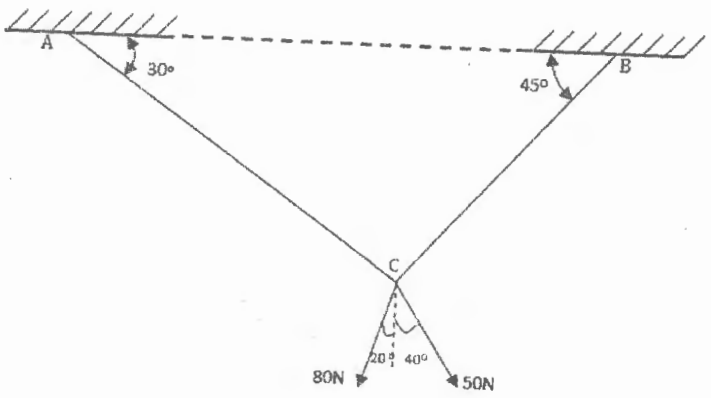
b) A block overlying a 10° wedge on a horizontal floor and leaning against a vertical wall and weighing 1500N is to be raised by applying a horizontal force to the wedge. Assuming the coefficient of friction to be 0.3, determine the minimum horizontal force to be applied to raise the block. [4]



16. a) Three bars pinned together at B and C and supported by hinges at A and D. Form a four-link mechanism. Determine the value of 'P' that will prevent motion. [4]



b) Two forces of 80N and 50N act at a point 'C' of string ACB attached at points A and B. Determine the tension in each position of the string. [3]



17. Write short notes on any **two** of the following: [7]

a) Friction applications to simple systems.

b) Distinguish between a cantilever and simply supported beam and how will you find reactions in both the cases.

c) Derive from first principle the expression to compute the centroid of a semicircular plane area which is symmetric about y-axis and having radius R

******