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Question Paper Code: 93705

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Mechanical Engineering

19UME 305 – ENGINEERING MECHANICS

(Regulation 2019)

Duration: One hour

Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Static is a body _____. CO1- R
(a) At rest (b) In variable motion (c) Both (a) & (b) (d) In uniform motion
2. Which of the following is not a vector quantity CO1- U
(a) Weight (b) Velocity (c) Acceleration (d) Force
3. The Moment of a couple (M) is _____ if 'a' is the arm of the couple. CO2-R
(a) $M = Fa^2$ (b) $M = F / a$ (c) $M = Fa^3$ (d) $M = F a$
4. If a number of forces are acting at a point, their resultant will be inclined at an angle ϕ with horizontal, such that CO2-R
(a) $\tan \phi = \Sigma H / \Sigma V$ (b) $\tan \phi = \Sigma V / \Sigma H$
(c) $\tan \phi = \Sigma V \times \Sigma H$ (d) $\tan \phi = \Sigma H - \Sigma V$
5. For the two dimensional element the G is CO3- U
(a) Centre of gravity (b) Centre of the plane
(c) Centre of the area (d) Centroid
6. The unit of moment of inertia if an area is CO3- R
(a) kg-m^2 (b) m^4 (c) kg-m-s^2 (d) kg/m^2
7. Which of the following laws derive impulse moment principle? CO4- U
(a) Newton's 3rd law (b) Newton's 2nd law
(c) Newton's 1st law (d) All of the above
8. The range of a projectile is maximum, when the angle of projection is CO4- R
(a) 30° (b) 45° (c) 60° (d) 75°
9. Frictional force encountered after commencement of motion is called CO5- U

- (a) Post friction
- (b) Limiting friction
- (c) Kinematic friction
- (d) Dynamic friction

10. Angular Velocity _____.

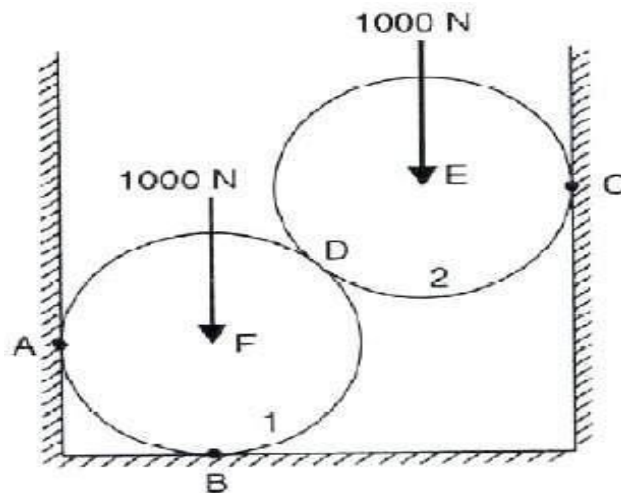
CO5- U

- (a) Linear Displacement x radius
- (b) Linear velocity x radius
- (c) Linear Displacement / radius
- (d) Linear velocity / radius

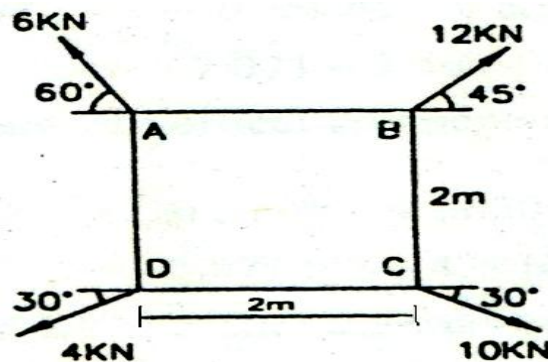
PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Two spheres, each of weight 1000N and radius 25cm rest in a horizontal channel of width 90cm as shown in the Figure. Find the reactions on the points of contact A, B and C. CO1- App (8)

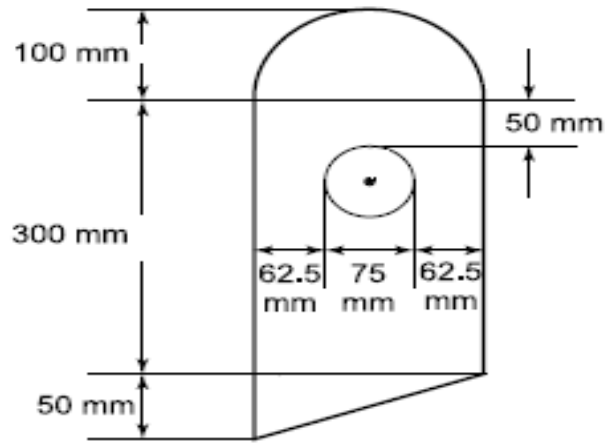


12. Solve the resultant in magnitude and direction and also locate its points of application and edge of intersection. CO2- App (8)



13. Locate the centroid of the plane area shown in figure.

CO3- App (8)



14. Two weights 80N and 20N are connected by a thread and move along a rough horizontal plane under the action of force 40N, applied to the first weight of 80N. The coefficient of friction between the sliding surfaces of the weights and the plane is 0.3. Determine the acceleration of the weights and the tension in the thread using work-energy principle. CO4-App (8)
15. 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 coefficient of friction between all the surfaces in contact to be 0.3, determine the minimum horizontal force to be applied to raise the block. CO5- App (8)

