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Question Paper Code: 53A03

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

Third Semester

Agricultural Engineering

15UAG303 - FUNDAMENTALS OF ENGINEERING MECHANICS

(Regulation 2015)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

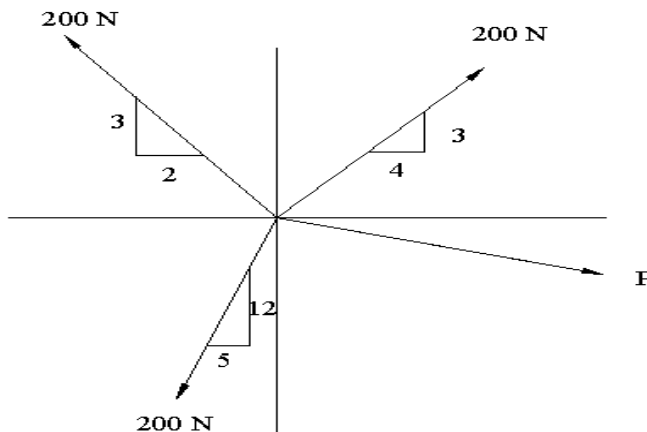
1. The forces with common line of action are called_____ CO1- R
(a) Co-planar forces (b) Collinear forces (c) Parallel forces (d) Concurrent forces
2. Two vectors are at right angles to each other, the dot product of the CO1- R
vectors should be_____ (a) One (b) Zero (c) Infinity (d) None of the above
3. If one end of the beam is fixed and the other end is free, then it is CO2- R
known as _____ (a) Simply supported beam (b) Overhanging beam (c) Fixed beam (d) Cantilever
4. Roller support has _____ reaction CO2- R
(a) Vertical (b) Horizontal (c) No (d) Both horizontal and vertical
5. If an area is symmetrical about any of the centroidal axes, then the product of CO3- R
inertia is _____ (a) Zero (b) Maximum (c) Minimum (d) Infinity
6. The axes about which the product of inertia is zero are called _____ CO3- R
(a) Major axes (b) Minor axes (c) Principal axes (d) None of the above

7. When a particle of the body move in a concentric circular path, then it is said to be _____ CO4- R
 (a) Translation (b) Rotation (c) Angular motion (d) None of the above
8. A man pulls a cart of mass 120 kg and produces an acceleration 2 m/sec^2 . The force exerted by the man is _____ CO4- R
 (a) 240 N (b) 60 N (c) 122 N (d) 2400 N
9. The co-efficient of kinetic friction is _____ to the co-efficient of friction CO5- R
 (a) Equal (b) Greater (c) Lesser (d) All of the above
10. Angle of repose is equal to _____ CO5- R
 (a) Angle of friction (b) Frictional force
 (c) Co-efficient of friction (d) Normal reaction

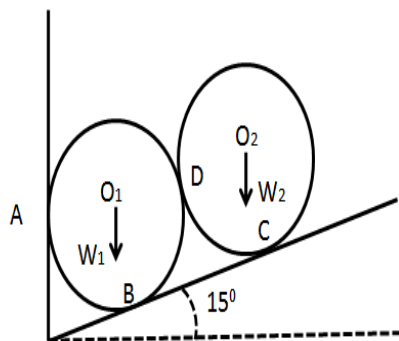
PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

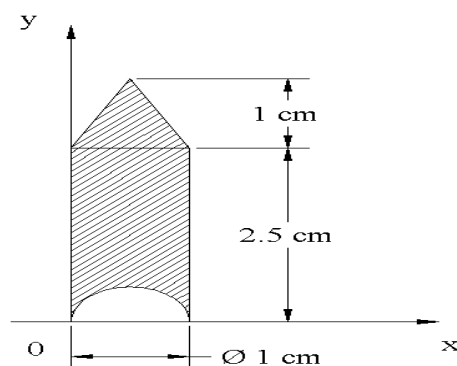
11. The resultant of the force system shown in fig is 520N along the negative direction of y axis. Determine P and θ . CO1- App (8)



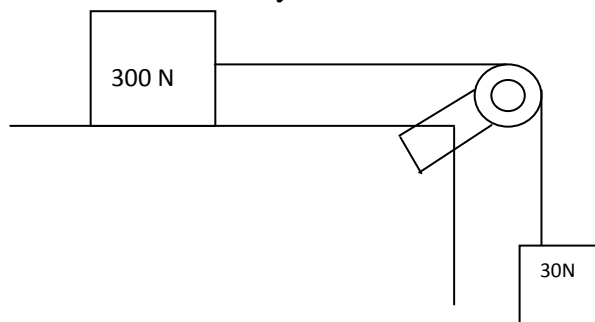
12. Two cylinders of same diameter are supported by an inclined plane and vertical wall as shown in the figure. The weight of the lower cylinder (W_1) is 200 N and the weight of the upper cylinder (W_2) is 250 N. Assuming the surfaces to be smooth, find the reaction induced at the points of support A, B, C & D. CO2- App (8)



13. Locate the centre of gravity of a bullet, 1 cm diameter with a cone in the front and a hemisphere cut from the back as shown in fig. assume the material to be homogeneous. CO3- App (8)



14. The figure shows a body of weight 300 N on a smooth horizontal plane which is attached by a string to a 30 N weight, which hangs vertically. Find the acceleration of the system and the tension in the string. CO4- App (8)



15. A body of weight 500 N is placed on a rough horizontal plane. CO5- App (8)
 (i) Determine the frictional force developed in the surface, if it is subjected to a horizontal fore 'P'.