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**Question Paper Code: 59713**

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

Third Semester

Agriculture Engineering

19UAG303 – FUNDAMENTALS OF ENGINEERING MECHANICS

(Regulation 2019)

Duration: One hour

Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

- Which of the following is a vector quantity CO1- R  
(a) Momentum (b) Mass (c) Energy (d) Angle
- The angle between two forces when the resultant is maximum and minimum respectively are CO1- R  
(a)  $0^\circ$  and  $180^\circ$  (b)  $180^\circ$  and  $0^\circ$  (c)  $90^\circ$  and  $180^\circ$  (d)  $90^\circ$  and  $0^\circ$
- Cantilever beam has one end \_\_\_\_\_ and other end \_\_\_\_\_ CO1- R  
(a) hinged, free (b) fixed, free (c) fixed, hinged (d) none of the above
- The tendency of rotation of the body along any axis is also called CO1- R  
(a) Moment of inertia (b) Moment of couple (c) Torque (d) Force
- The units of moment of inertia of area are CO1- R  
(a)  $\text{Kg-m}^2$  (b)  $\text{m}^4$  (c)  $\text{Kg/m}^2$  (d)  $\text{Kg/m}$
- The polar moment of inertia of a circular section is about CO1- R  
(a) X-X axis (b) Y-Y axis (c) Z-Z axis (d) Neutral axis
- A body moves, from rest with a constant acceleration of 5 m per sec. The distance covered in 5 sec is most nearly CO2- R  
(a) 38 m (b) 62.5 m (c) 96 m (d) 240 m
- When the spring of a watch is wound it will possess CO1- R  
(a) Heat energy (b) Kinetic energy  
(c) Potential energy (d) Wound energy
- Force required at the end of the lever of a screw jack to raise the weight CO1- R  
(a)  $W \tan (\phi + \alpha)$  (b)  $W \tan (\phi - \alpha)$  (c)  $W \tan (\phi \times \alpha)$  (d)  $W \tan (\phi / \alpha)$

10. Coulomb friction is the friction between

CO1- R

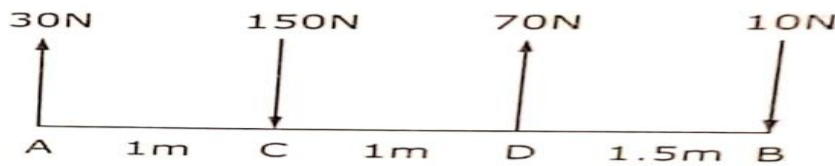
- (a) Bodies having relative motion                      (b) Two dry surfaces  
(c) Two lubricated surfaces                                (d) Solids and liquids

PART – B (3 x 8= 24 Marks)

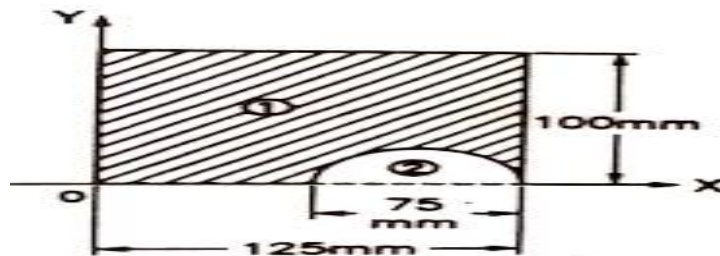
(Answer any three of the following questions)

11. Particle “O” is acted upon by the following forces 20N inclined  $30^\circ$  to north of east, 25N towards north, 30N towards north-west, 35N inclined  $40^\circ$  to south of west. Find the resultant. CO3- App (8)

12. A system of parallel forces are acting on rigid bar as shown in figure. Reduce the system to (i) a single force, (ii) a single force and a couple at A . CO3- App (8)



13. Locate the centroid of the lamina shown in figure. CO3- App (8)



14. Two balls are projected from the same point in directions inclined at  $60^\circ$  and  $30^\circ$  to the horizontal. If they attain the same maximum height what is the ratio of their velocities of projections. CO3- App (8)

15. A rope is wrapped around a rod as shown in the figure. Determine the force required on the free end of the rope, to support a load of 20kN weight. The coefficient of friction between the rope and the rod is 0.3. CO5- U (8)

