Reg. No. :

Question Paper Code: 59713

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

Third Semester

Civil Engineering

19UCE303 – BASICS OF ENGINEERING MECHANICS

(Regulation 2019)

Duration: One hour   Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Forces are called concurrent when their lines of action meet in   CO1- R

   (a) one plane   (b) different planes

   (c)) perpendicular planes   (d) one point

2. The velocity ratio in case of an inclined plane inclined at angle 'θ ' to the   CO2- R
   horizontal and weight being pulled up the inclined plane by vertical effort is

   (a) sinθ   (b) cosθ   (c) tanθ   (d) cosecθ

3. A force of 200 N is acting through points A (2, 3) and B (2, 1). The   CO2-R
   moment of force about point O (0, 0) is

   (a) 400 N.m   (b) 600 N.m   (c) 200 N.m   (d) 100 N.m

4. Four forces 18 N, 36 N, 54 N and 72 N are acting along sides AB, BC, CD   CO2- R
   and DA of a rectangle ABCD of side (2 3) m. Their resultant forces is 150 N.
   Calculate position of resultant w.r.t. 'A'

   (a) 1.56 m   (b) 15.60 m   (c) 156 m   (d) 0.156 m

5. The units of moment of inertia of mass are   CO1- U

   (a) kg m^2 (b) kg/m^2 (c) kg/m   (d) m^2/kg

6. Moment of inertia of a squares of side b about an axis through its centre of   CO1- R
   gravity, is

   (a) b^3/4   (b) b^4/12   (c) b^{4}4/3   (d) b^4/8

7. When moving along a curved path, he _____ CO1- U

   (a) Leans inwards   (b) Leans outwards   (c) Is still   (d) Leans sideways

8. Which of the following kinetic friction is smaller? CO1- R

   (a) Limiting friction   (b) Static friction   (c) Rolling friction   (d) Sliding friction

9. Which of the following material is more elastic? CO1- U

   (a) Rubber   (b) Glass   (c) Steel   (d) Wood

10. A load of 1 kN acts on a bar having cross-sectional area 0.8 cm^2 and length   CO2- U
    10 cm. The stress developed in the bar is

    (a) 12.5 N /mm^2 (b) 25 N /mm^2 (c) 50 N /mm^2 (d) 75 N /mm^2

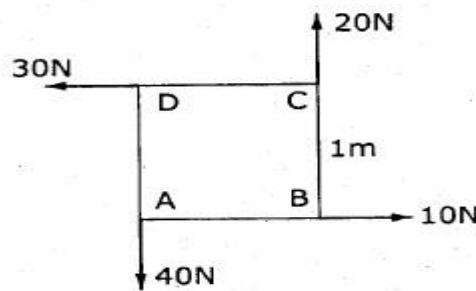<div align="center">

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)
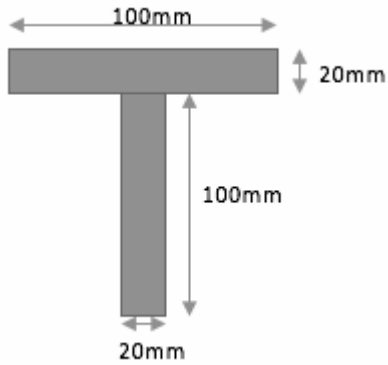
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11. Predict the tension in each cable for the given Figure   CO2- App   (8)
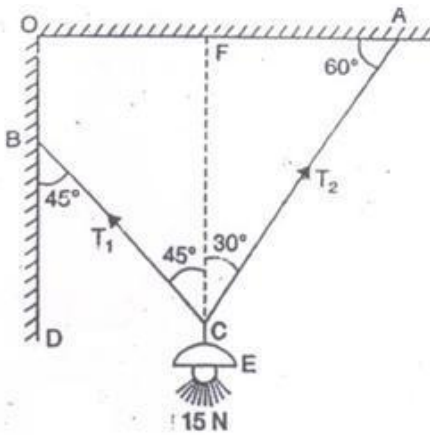
12. Four forces act on a square of side 1 m as shown in fig. Predict the   CO2- U   (8)
    force system into an equivalent force –couple system at A.

13. Determine the Moment of Inertia for the given T Section as shown in   CO3- U   (8)
    fig.

100mm

20mm

100mm

20mm

14. An effort of 200 N is required to move a certain body up an inclined plane of angle 15degree, the force is acting parallel to the plane.   CO4- U   (8)

   If the angle of inclination of the plane is made 20 degree, the effort required being again parallel to the plane, is found to be 230 N.

   Find the weight of the body and the coefficient of friction.

15. At a point in a strained material there are two mutually perpendicular stresses 100 MPa (Tensile), 40 MPa (Comp.) accompanied with a shear stress 50 MPa. Determine Principal stresses and its planes. Also determine maximum shear stress   CO5- U   (8)