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**Question Paper Code: 52106A**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Second Semester

Civil Engineering

15UCE206-BASIC ENGINEERING MECHANICS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. If two forces of 3kg and 4kg act at right angles to each other, their resultant force will be equal to CO1-R  
(a) 7kg                      (b) 1kg                      (c) 5kg                      (d) 1/7kg
2. What is not the condition for the equilibrium in three dimensional system of axis? CO1-R  
(a)  $\sum F_x=0$                       (b)  $\sum F_y=0$                       (c)  $\sum F_z=0$                       (d)  $\sum F \neq 0$
3. The unit of force in S.I. system of units is CO2-R  
(a) dyne                      (b) kilogram                      (c) newton                      (d) watt
4. Reactions at the supports of a structure can be determined by equating the algebraic sum of CO2-R  
(a) Horizontal forces to zero  
(b) vertical forces to zero  
(c) moments about any point to zero  
(d) all the above
5. The coefficient of friction depends on CO3-R  
(a) Area of Contact                      (b) Shape of surface  
(c) Strength of surfaces                      (d) Nature of surfaces

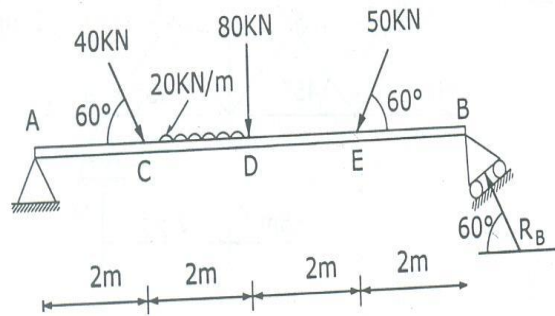


Or

- (b) A force vector of magnitude 100 N, is represented by a line AB of co-ordinate a(1,2,3) and B(5,8,12) determine CO1-App (16)

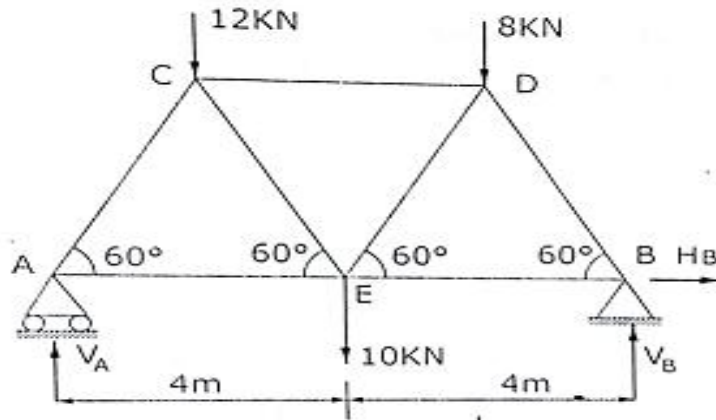
- (i) The components of the force along x,y and z axes
- (ii) Angles with x,y and z axes
- (iii) Specify the force vector

17. (a) Determine the support reaction of the beam as shown in fig. CO2-App (16)



Or

- (b) A truss of 8 m span is loaded as shown in below figure. Find the support reactions. CO2-Ana (16)



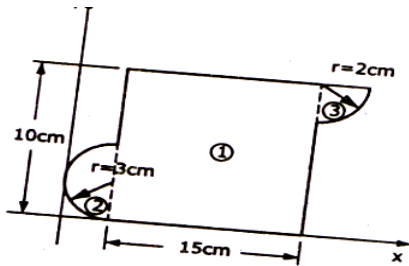
18. (a) A uniform ladder of weight 1000N and length 4m rests on a horizontal ground and leans against a smooth vertical wall. The ladder makes an angle of 60° with horizontal. When a man of weight 750N stands on the ladder, the ladder is at the point of sliding. Determine the coefficient of friction between the ladder CO3-Ana (16)

and the floor.

Or

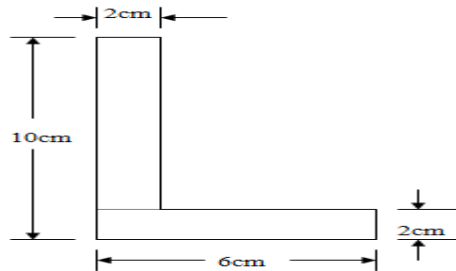
- (b) (i) A belt is running over a pulley of diameter 800mm and develop a tension of 900 N on the tight side and the angle of lap is  $165^\circ$  and coefficient of friction b/w the belt and pulley is 0.15. Find the power transmitted by the pulley when it rotates @ 300RPM. CO3-Ana (8)
- (ii) State coulombs' laws of dry friction. CO3-U (8)

19. (a) Locate the centroid of the given section as shown in fig.7 CO4-Ana (16)

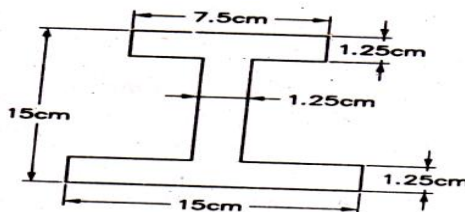


Or

- (b) Locate the centroid of the L-section shown in below figure. CO4-Ana (16)



20. (a) Find the moment of inertia of the section about its centroidal axis as shown in fig. CO5-U (16)



Or

- (b) (i) State moment of inertia theorems CO5-U (8)
- (ii) Derive the expression for moment of inertia about major axis CO5-U (8)

of a rectangular lamina of breadth  $b$  and depth  $d$ .