Q.P. Code: 18CE0101 **R18**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations Nov/Dec 2019

ENGINEERING MECHANICS

(CE,ME & AGE)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	a	Write Lami's Theorem	**2M**
	b	Classify different types of Friction	**2M**
	c	Define Centre of Gravity	**2M**
	d	What is Radius of Gyration	**2M**
	e	What are the types of Trusses	**2M**

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

1	a	Define free body diagram, Transmissibility of a force and resultant of a force	**5M**
	b	Write the Equilibrium equations for concurrent force system in space.	**5M**

OR

2 A 75 N vertical force is applied to the end of a bar 3 m long which is attached to a shaft at ***O*** as shown in figure . Determine

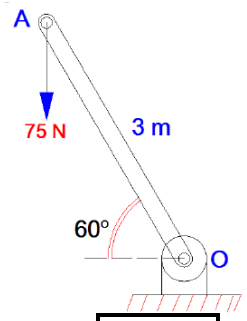
a) The moment of the 75 N force about ***O***

b) The magnitude of the horizontal force applied at ***A*** which creates the same moment about ***O***

c) The smallest force applied at ***A*** which creates the same moment about ***O***

d) How far from the shaft at ***O*** a 200 N vertical force must act to create the same moment about ***O***?

10M



UNIT-II

3 A screw jack raises a load of 40 KN. The screw is square threaded having 3 threads per 20 mm length and 40 mm in diameter. Calculate the force required at the end of a lever 400 mm long measured from axis of screw, if coefficient of friction between screw and nut is 0.12. **10M**

OR

4 A block weighing 100 N is resting on a rough plane inclined 20 degrees to the horizontal. It is acted upon by a force of 50N directed upward at angle of 140 above the plane. Determine the friction. If the block is about to move up the plane, determine the co-efficient of friction. **5M**

UNIT-III

5 a To determine centroid for the rectangle lamina, having a width of"b" and height of "h". **5M**

b To determine the centroid for triangular lamina, having a base "b" and height "h". **5M**

OR

6 A steel ball of diameter 150 mm rests centrally over a concrete cube of size 150mm. Determine the center of gravity of the system, taking weight of concrete=25000N/m2 and that of steel 80000N/m2. **10M**

UNIT-IV

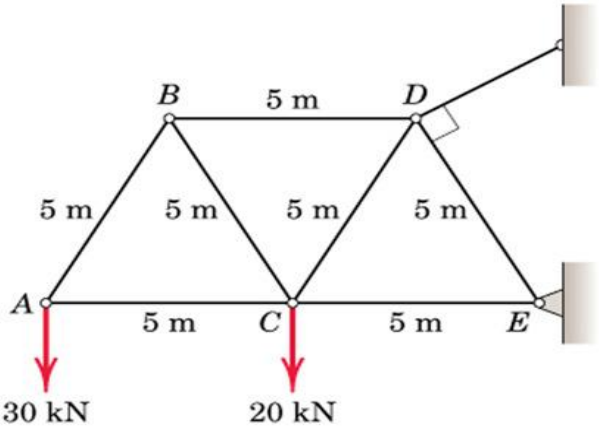
7 Derive the expression for mass moment of inertia of a homogeneous sphere of radius 'r' and mass density 'w', with reference to its diameter. **10M**

OR

8 Derive the expression for mass moment of inertia of a cone of height 'h' and base radius 'r' and mass density 'w' with respect to its geometrical axis. **10M**

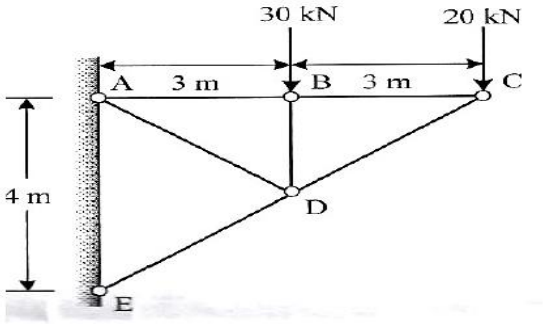
UNIT-V

9 Find the force acting in all members of the truss shown in Figure. **10M**



OR

10 Determine the forces in each member of the truss and state if the members are in tension or compression. **10M**



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