PAPER ID-311335

Subject Code: KCE301

Roll No: | | | | | | | | | | | | | |

B TECH
(SEM-III) THEORY EXAMINATION 2020-21
ENGINEERING MECHANICS

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

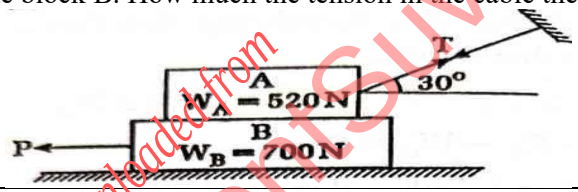
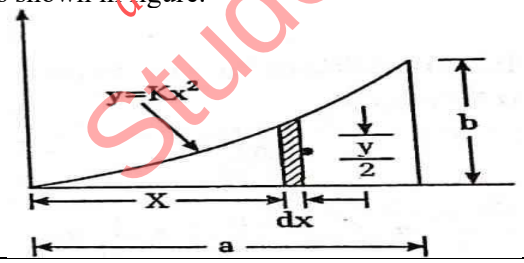
SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Qno.	Question	Marks	CO
a.	What do you understand by line of action of force?	2	1
b.	Define Non-concurrent Non-Parallel coplanar force system.	2	1
c.	What is the difference between center of gravity and centroid?	2	2
d.	How will you find co-ordinates of centroid of an area?	2	2
e.	What is perfect truss?	2	3
f.	Define redundant frame.	2	3
g.	Define uniform motion.	2	4
h.	What do you understand by impulse momentum for rigid bodies?	2	4
i.	What is the difference between real work and virtual work?	2	5
j.	What is the application of energy method for equilibrium?	2	5

SECTION B

2. Attempt any *three* of the following:

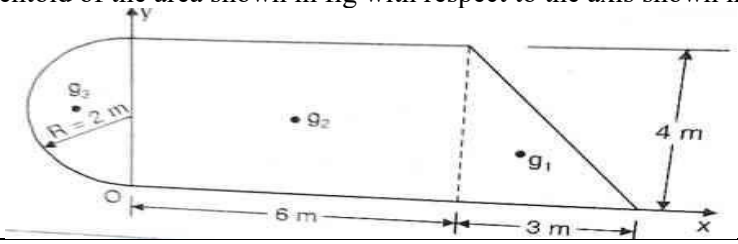
Qno.	Question	Marks	CO
a.	Write the steps for finding the resultant of Concurrent coplanar force system.	10	1
b.	Block A of weight 520N rest on the horizontal top of block B having weight 700 N on shown in fig. Block A is tied to a support C by a cable at 300 horizontally. Coefficient of friction is 0.4 for all contact surface. Determine the minimum value of the horizontal force P just to move the block B. How much the tension in the cable then? 	10	
c.	Determine the centroid of the area bound by x-axis, the line x=a and the parabola of the from $Y=Kx^2$ as shown in figure. 	10	
d.	A motorist travelling at a speed of 70 km/h, suddenly applies and halts after skidding 50 m. Determine (i) The time required to stop the car (ii) The coefficient of friction between tyres and the road.	10	
e.	State and explain work energy equation.	10	

SECTION C

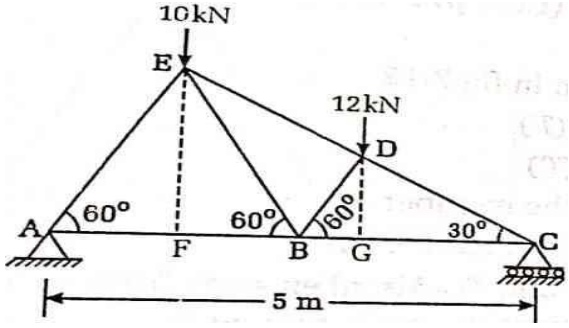
3. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	The resultant of two forces, one of which is double the other is 560 N. If the direction of larger forces is reversed and the other remain unaltered, the resultant reduces to 180 N. Determine the magnitude of the forces and the angle between the forces.	10	1
b.	Derive the expression to the find effort required to raise load using a screw jack.	10	1

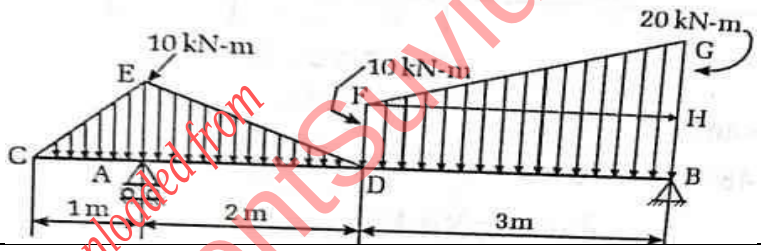
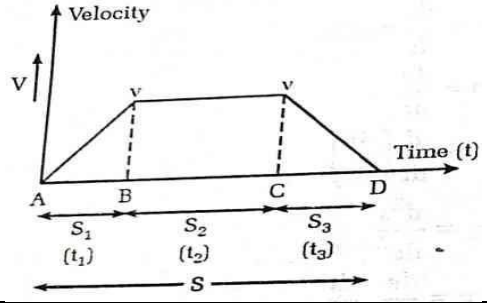
4. Attempt any *one* part of the following:

a.	Determine the moment of inertia of a solid sphere radius R about diametral axis.	10	2
b.	Locate the centoid of the area shown in fig with respect to the axis shown in fig. 	10	2

5. Attempt any *one* part of the following:

a.	Write the assumptions made in analysis of a simple truss. And write the uses of truss.	10	3
b.	Determine the forces in all the members of the truss loaded and supported as shown in figure.  by method of joint.	10	3

6. Attempt any *one* part of the following:

a.	Determine the reaction at supports A and B of the loaded beam as shown in figure 	10	3
b.	The greatest possible acceleration and deceleration that a train may have is α and its maximum speed is V. Find the maximum time in which the train can get one station to the next , if they are 'S' distance apart. 	10	4

7. Attempt any *one* part of the following:

a.	A car weighing 50 kN and moving 54kmph along the main road collides with a lorry of weight 100kN which emerges at 18 kmph from a crossroad at right angles to main road. If the two vehicles lock after collision, what will be magnitude and direction of the resulting velocity?	10	5
b.	Establish the relationship between linear velocity of point on a body rotating about fixed axis and its angular velocity. Also describe the two velocities.	10	5