14-03-2022_EM_FE_Sem-I (R19)_TSEC

1. The question paper will have MCQs (for 20 marks) and subjective/descriptive questions (for 60 marks).

2. MCQ correct options and subjective questions answers to be written on papers. Scan all pages of answer papers of Q1 to Q4 and create single file in pdf format to upload in the link given.

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* Required

1.   Enter your Name *

2.   Enter your Exam Seat Number *

Questions

1. The question paper will have MCQs (for 20 marks) and subjective/descriptive questions (for 60 marks).

2. MCQ correct options and subjective questions answers to be written on papers. Scan all pages of answer papers of Q1 to Q4 and create single file in pdf format to upload in the link given.

3.   paste the question

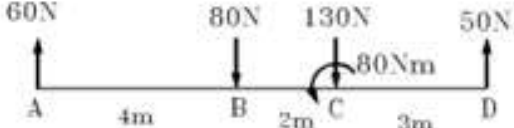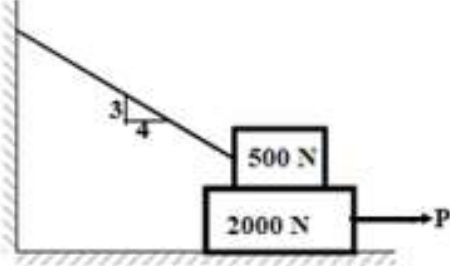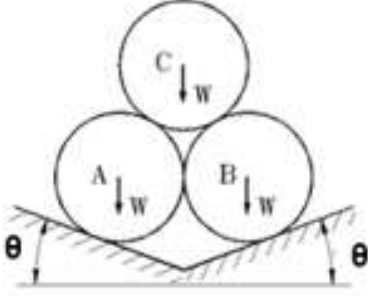| Q1.	Choose the correct option for the following questions. All the Questions are compulsory and carry two marks each.
1.	If the angular distance, $\theta = 3t^3 - 2t^2$, the angular acceleration at $t = 1$ sec is
Option A:	1 rad/sec^2
Option B:	4 rad/sec^2
Option C:	6 rad/sec^2
Option D:	14 rad/sec^2
2.	The limiting frictional force is 4.5N and the normal reaction is 12N. Then coefficient of friction is
Option A:	0.375
Option B:	3.75
Option C:	2.67
Option D:	0.72
3.	Centroidal coordinates of a quarter circle having diameter 8cm is
Option A:	0,3.4cm
Option B:	1.7cm,1.7cm
Option C:	0,1.7cm
Option D:	3.4cm, 3.4cm

4.   paste the question

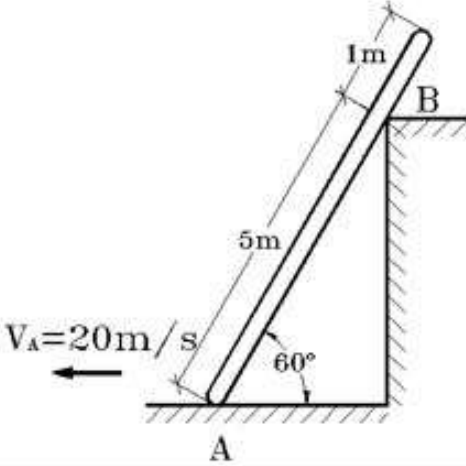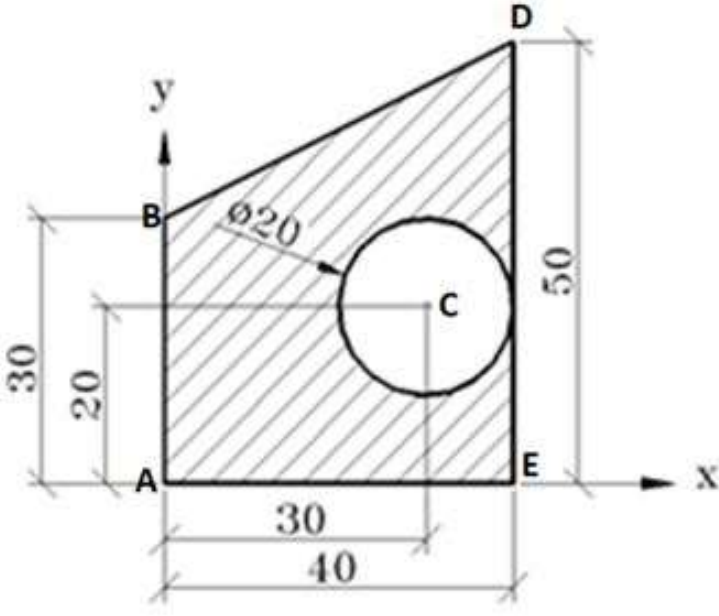| 4	A cantilever beam of span 5m is loaded with a concentrated load of 10 kN at free end. Support reaction(s) at fixed end is/are
Option A:	10 kN
Option B:	25 kN-m
Option C:	5 kN, 25 kN-m
Option D:	10 kN,50 kN-m
5	When a particle moves along a circular path with uniform velocity 12 m/s with radius 9 m, what will be tangential acceleration?
Option A:	12 m/s^2
Option B:	0
Option C:	9 m/s^2
Option D:	16 m/s^2
6	If two forces each equal to 55 N in magnitude act at right angles, their effect may be neutralized by a third force acting along their bisector in opposite direction whose magnitude is equal to
Option A:	55 N
Option B:	110 N
Option C:	77.78 N
Option D:	38.89 N

5.   paste the question

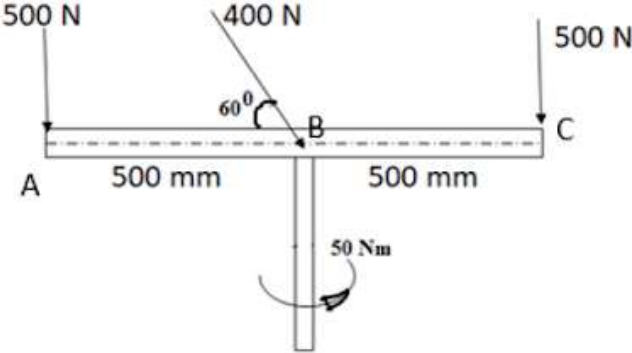| 7	The angular velocity of a vehicle moving with a velocity 72 km/hr having radius of curvature 100 m in circular direction is
Option A:	0.2 rad/s
Option B:	2 rad/s
Option C:	36 rad/s
Option D:	72rad/s
8	What is the magnitude of force F = 6i+3j+2k (N)?
Option A:	49 N
Option B:	11 N
Option C:	36 N
Option D:	7 N
9	What is the distance traveled by an electron in first 8 seconds from its initial position, if velocity time relation is given as v = 4t?
Option A:	128 m
Option B:	125 m
Option C:	40 m
Option D:	100 m
10	Which of the following represents the state of neutral equilibrium?
Option A:	A cube resting on one edge
Option B:	A smooth cylinder lying on a curved surface
Option C:	A smooth cylinder lying on a convex surface
Option D:	A smooth cylinder lying on a plane surface

6.   paste the question

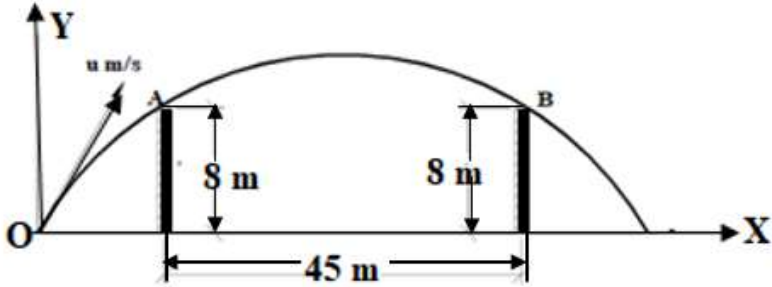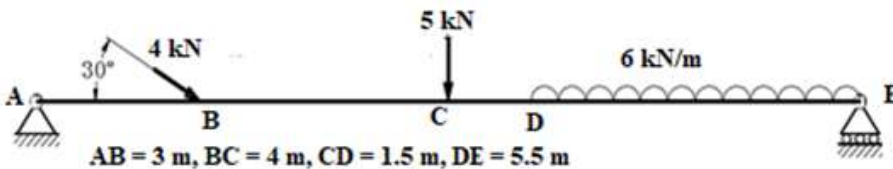| Q2 (20 Marks)	Solve any four questions out of six 5 marks each
A	Convert the given force system into a force and a couple at point A.
B	A block weighing 500 N is resting on another block of 2000 N weight. The upper block is tied to a vertical wall by a wire. Determine the horizontal force P required to pull the lower block. The coefficient of friction between all surfaces of contact is 0.3.
C	There identical right circular cylinders A, B and C, each of weight W=1150N are arranged on smooth inclined surfaces as shown in the figure. Determine the least value of angle "θ" that will prevent the arrangement from collapsing.

7. Q2 Contd.

D	Velocity of point A on rod is 20 m/s at the instant shown in figure. Locate ICR and determine velocity of point B on the rod.
E	Determine the time required for a car to travel 1 km along a road, if the car starts from rest, reaches a maximum speed at some intermediate point, and then stops at the end of the road. The car can accelerate at 1.5 m/s^2 and decelerate at 2 m/s^2.
F	Determine the centroid about given x and y axes.

8.   paste the question

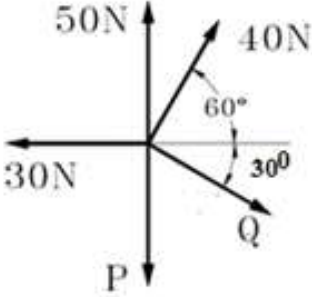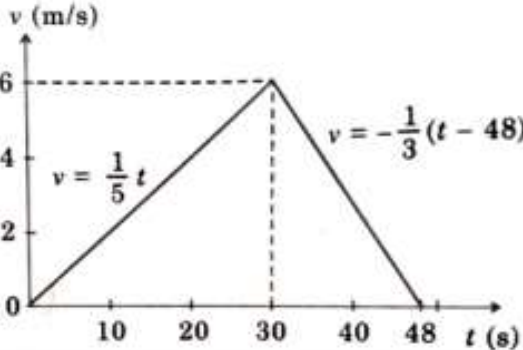| 3. (20 Marks)	Solve any two questions out of three	10 marks each
A	A bracket is subjected to coplanar force system as shown in figure. Determine the magnitude and the line of action from A of the single resultant of the system and calculate the magnitude and direction of force acting from A to keep the system in equilibrium 	

9.   Q3 Contd.

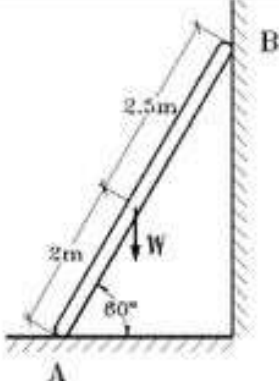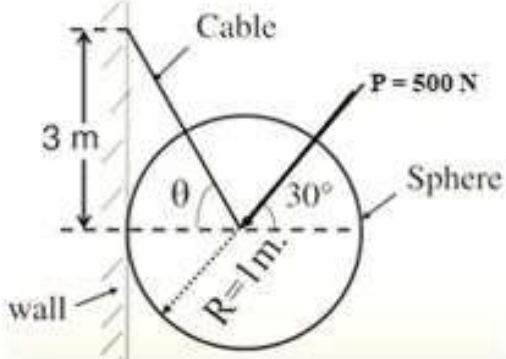|	
B	An object is projected so that it just clears two obstacles each of **8 m** height, which are situated **45 m** from each other. If the time of passing between the obstacles is **3 s**, calculate the complete range of projection, angle of projection and the initial velocity of the projectile.
C	Determine reactions at the supports A and E

Mark only one oval.

◯ Option 1

10.   paste the question

Q4. (20 Marks)	Solve any four questions out of six 05 marks each
A	Find the forces P & Q, such that the resultant of the given system is zero.
B	The lines of actions of three concurrent forces at the origin Q passing through points A (1,2,4), B (3,0, -3) and C (2, -2,4) are having magnitudes F_A = 40 N, F_B = 10 N and F_C = 30 N. respectively. Find the magnitude and direction of their resultant.
C	A car travels along a straight road with speed shown by v-t graph. Determine the total distance the car travels until it stops when t=48s. Also plot x-t and a-t graphs.

11.   Q4 Contd.

D	 A homogeneous ladder shown in figure rests against a smooth wall at B and a rough horizontal floor at A. The mass of the ladder is 30 kg and is concentrated at a location 2 m from bottom, as shown in the figure. The coefficient of static friction between the ladder and the floor is 0.35. Will the ladder stand in 60° position? Justify your answer.
E	A car travels along a depression in a road, the equation of depression being $x^2 = 400y$. The speed of the car is constant and being equal to 54 km/hr. Find the acceleration, when the car is at the deepest point in the depression. What is the radius of curvature at the depression at this point?
F	A sphere of weight 850 N is supported by cable as shown in figure. Find tension in the cable and reaction at the point of contact with the wall, if the system is in equilibrium.

12.   Upload all your answers as a single pdf file *

      Files submitted: