AR13

CODE: 13ME1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, June-2017

ENGINEERING MECHANICS
(Common to CE, CSE & IT)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) State parallelogram Law of force?
   b) Which principle is used to replace a force from one point to another point along its line of action without changing the end effect?
   c) State varignon's theorem?
   d) Why is the coefficient of static friction is greater than the coefficient of kinetic friction.
   e) State perpendicular axis theorem with a neat sketch?
   f) State D'Alemberts principle.
   g) A car starts from rest with a constant acceleration of 4m/sec^2. Determine the distance travelled in the 7th second.
   h) What is the acceleration of a body of mass 'm' when it is sliding on a smooth plane and inclined at an angle θ to the horizontal?
   i) Define the term Polar Moment of Inertia.
   j) What is the relation between coefficient of friction and friction angle?

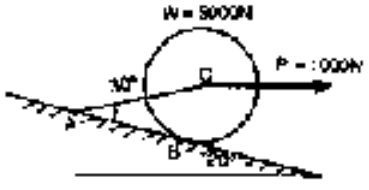
PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

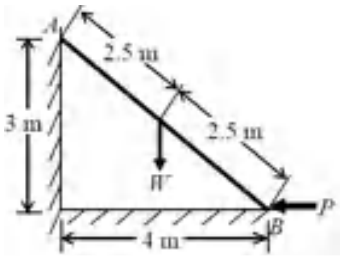
2. (a) State the principle of Transmissibility & Law of Super-position with the help of neat sketches **4M**

   (b) A right circular roller of weight 5000N rests on a smooth inclined plane and is held in position by a chord AC as shown in fig .Find the tension in the chord and reaction at B, if there is a horizontal force P=1000N acting at C. **8M**



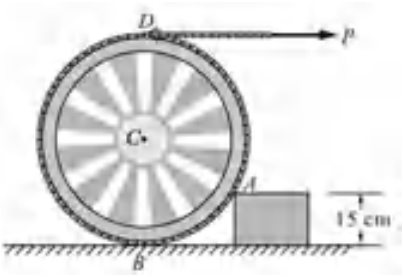
(OR)

3. A ladder *AB* of length 5 m and weight (*W*) 600 N is resting against a wall. Assuming frictionless contact at the floor (*B*) and the wall (*A*), Find out the magnitude of the force *P* (in Newton) required to maintain equilibrium of the ladder.



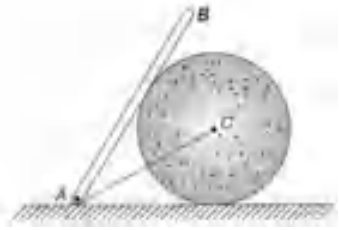
UNIT-II

4. A uniform wheel of 60 cm diameter and weighing 1000 N rest against a rectangular block 15 cm high lying on a horizontal plane as shown in figure. It is to be pulled over the block by a horizontal force P applied to the end of a string wound round the circumference of the wheel. Find the force P when the wheel is just about to roll over the block.



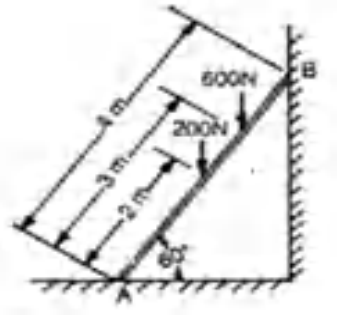
(OR)

5. A smooth right circular cylinder of radius r rests on a horizontal plane and is kept from rolling by an inclined string AC of length 2r (Fig.). A prismatic bar AB of length 3r and weight Q is hinged at point A and leans against the roller as shown. Find the tension S that will be induced in the string AC.



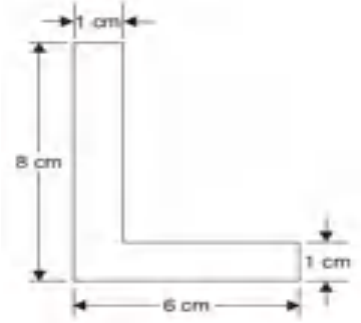
UNIT-III

6. Determine the minimum horizontal force to be applied at A to prevent slipping. $\mu = 0.2$ between the wall and ladder, $\mu = 0.3$ between the floor and ladder. The ladder weighs 200 N and a man weighing 600 N is at 3m from A.



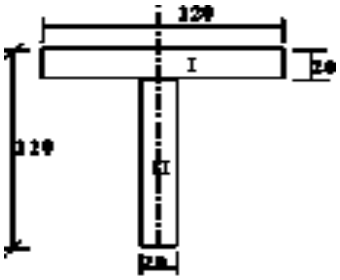
(OR)

7. Determine the coordinates Xc and Yc of the centroid 'C' of the L section as shown below



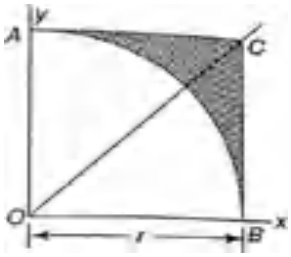
UNIT-IV

8. Calculate the Moment of Inertia of T - section about centroidal X – axis all dimensions are in cms.



(OR)

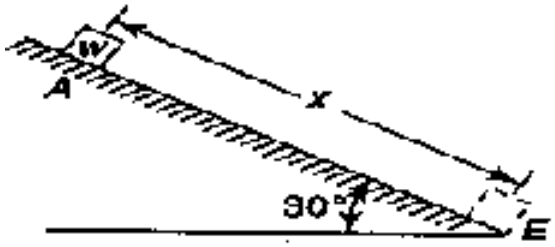
9. Find the Polar Moment of Inertia of angle section about centroidal axis parallel to Y–axis.



UNIT-V

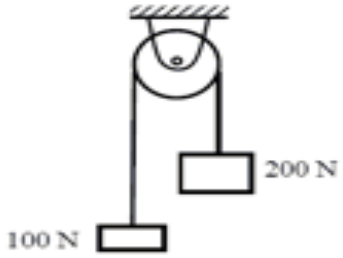
10. (a) A stone is dropped from the top of a tower 60 m high. At the same instant, another stone is thrown vertically upwards from the foot of tower to meet the first stone at a height of 18 m. Determine (i) the time when the two stones meet, (ii) the velocity with which the second stone was thrown up. **4M**

(b) A small block of weight W=44.5N is given an initial velocity u=3m/s down the inclined plane shown in figure. If the coefficient of friction between the plane and the block is μ=0.3, find the velocity v of the block at B after it has travelled a distance x=15m. **8M**



(OR)

11. (a) An inextensible mass less string goes over a frictionless pulley. Two weights of 100 N and 200 N are attached to the two ends of the string. The weights are released from rest, and start moving due to gravity. Find the tension in the string (in N). **7M**



(b) The wheel of a small gyroscope is set spinning by pulling on a string wound around the shaft. Its moment of inertia is I=5562.5 kg-mm^2 and the diameter of the shaft on which the string is wound is 12.5mm. If 750mm of string is pulled off with a constant force of 53.4N, what angular velocity will be imparted to the wheel? **5M**

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CODE: 13ME1001 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, June-2017

ENGINEERING DRAWING
(Common to EEE & ECE)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define eccentricity
   b) What is representative fraction?
   c) What are the possible positions of a straight line with respect to the planes of projection?
   d) List out the main differences between first angle projection and third angle projection
   e) When a plane is perpendicular to a reference plane its projection on that plane is _____
   f) What are the solids of revolution?
   g) What is an oblique plane?
   h) What are the dimensions of the solid that can be seen in the side view?
   i) How are the invisible features of an object represented in orthographic projection?
   j) What is the difference between Isometric view and Isometric projection?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. Construct a diagonal scale to read upto $1/100^{th}$ of a meter given R.F. = 1/50 and to measure upto 7 m. Indicate a distance of 5.45 m [12 M]

(OR)

3. Draw an ellipse by concentric circles method by taking major axis as 100 mm and minor axis as 70 mm. [12 M]

UNIT-II

4. The distance between the projectors of two ends of straight line is 40 mm. The lower end is 15 mm above HP and 10 mm in front of VP. The upper end is 40 mm above HP and 40 mm in front of VP. Find true length and true inclination [12 M]

(OR)

5. a) A Point P is 35 mm from H.P and V.P. draw the projections of the point when it is in the first, second, third, and fourth quadrants. [6M]
   b) A Point P is 15 mm above the H.P. and 20 mm in front of the V.P. Another point Q is 25 mm behind the V.P. and 40 mm below the H.P. Draw projections of P and Q keeping the distance between their projectors equal to 90 mm. draw straight lines joining (i) their top views and (ii) their front views [6M]

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UNIT-III

6. A regular pentagon of 30 mm side, has one of its corner on VP and its surface is inclined at 60^0 to VP. The edge, opposite to corner on VP, makes an angle of 45^0 with HP. Draw the projections of the plane. [12 M]

(OR)

7. A thin $30^0 - 60^0$ set square has its longest edge in VP and inclined at 30^0 to HP. Its surface makes an angle of 45^0 with VP. Draw its projections. [12 M]

UNIT-IV

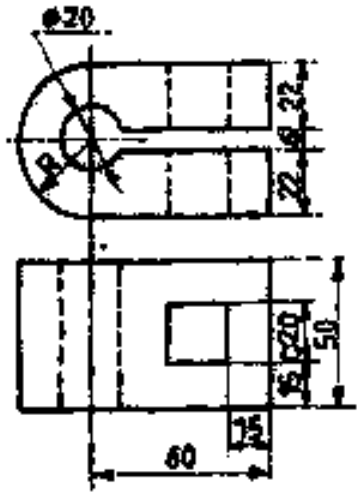
8. An equilateral triangular prism of side of base 25 mm and axis 50 mm long, is resting on an edge of its base on HP. The face containing that edge is inclined at 30^0 to HP. Draw the projections of the prism, when the edge on which the prism rests, is inclined at 90^0 with V.P. [12 M]

(OR)

9. A tetrahedron of side 40 mm lies with its base on HP. Draw its projections (a) when one of its edges is perpendicular to VP and (b) when one of its edges is parallel to and 10 mm in front of VP. [12 M]

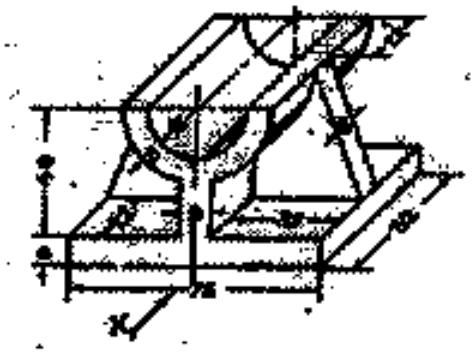
UNIT-V

10. Two views of a casting are shown below. Draw the isometric projection of the casting. [12 M]



(OR)

11. Draw the front view, top view and right side of the object shown below. [12 M]



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CODE: 13ME1002 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, June-2017

CLASSICAL MECHANICS

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

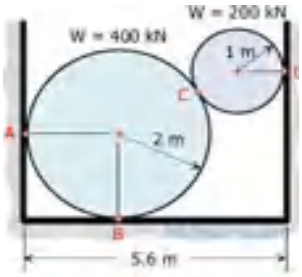
1. a) Define Moment of force.
   b) Define free-body diagram.
   c) State Lami's theorem.
   d) State principle of virtual work.
   e) Define polar moment of inertia.
   f) State perpendicular axis theorem.
   g) State pappus theorem.
   h) Define absolute motion.
   i) What is impulse.
   j) Define projectile.

PART-B

Answer one question from each unit **[5x12=60M]**

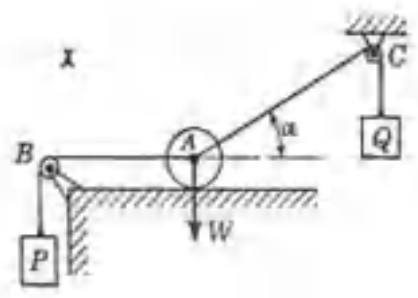
UNIT-I

2. a) State and prove Lami's theorem. **4M**
   b) Two cylinders are in contact as shown in **Figure below.** Find the contact forces at A,B,C and D. **8M**



(OR)

3. A ball of weight 'W' rests upon a smooth horizontal plane and has attached to its center two strings AB and AC which pass over frictionless pulleys at B and C and carry loads P and Q, respectively, as shown in Figure. If the string AB is horizontal, find the angle α that the string AC makes with the horizontal when the ball is in a position of equilibrium. Also find the pressure R between the ball and the plane. **12M**



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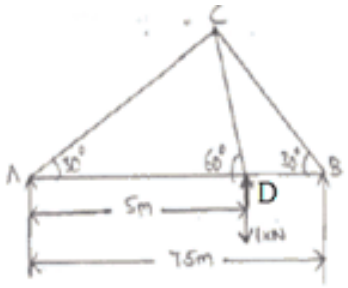
CODE: 13ME1002 **SET-2**

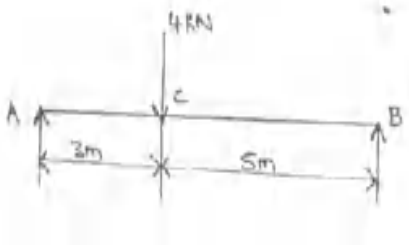
UNIT-II

4. A truss of span 7.5 m carries a point load of 1 kN at joint 'D' as shown in figure below. Find the reactions and forces in the members of truss. **12M**



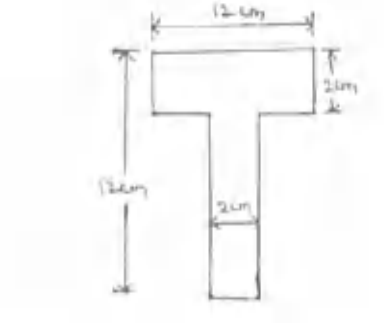
(OR)

5. Using the principle of virtual work determine the reactions of a beam AB of span 8m. The beam carries a point load of 4kN at a distance of 3 m from A **12M**



UNIT-III

6. Find the center of gravity of the T-Section shown in fig below. **12M**



(OR)

7. Derive the mass moment of inertia of cone from first principle. **12M**

UNIT-IV

8. A flywheel is rotating at 200 rpm and after 10s it is rotating at 160 rpm. If the retardation is uniform, determine number of revolutions made by the flywheel and the time taken by the flywheel before it comes to rest from the speed of 200 rpm **12M**

(OR)

9. a) A particle moves along a straight line with an acceleration described by the equation **6M**
$a = -8S^{-2}$, where 'a' is in m/s^2 and 'S' in 'mts' when t = 1 sec, s = 4m, v = 2m/s. determine acceleration when 't'=2 sec

   b) A particle is projected in air with a velocity 100 m/s and at an angle of 30^o with horizontal. Find (i) Horizontal range (ii) Maximum height by the particle (iii) Time of flight **6M**

AR13

CODE: 13ME1002 **SET-2**

UNIT-V

10.	a)	Explain the principle of linear impulse and momentum	**4M**
	b)	Two rigid bodies of weights W1 and W2 are connected by an inextensible string and pulled by a force P. The paths of motion of the bodies are at an angle to each other. Derive the work energy equation for the system	**8M**

(OR)

11.	a)	A car of weight 10000 N accelerates from rest to a speed of 65 kmph in a distance of 50 m against a resistance of 100 N. Find the average driving force acting on the car. Using the average force find the greatest power developed by the engine	**6M**
	b)	A block weighing 200 N is pulled up a 300 plane by a force 'P' producing a velocity of 5 m/s in 5 s. If coefficient of friction is 0.2, determine the magnitude of force P. At this stage if force P is removed how much more time it will take to come to rest	**6M**

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