

**Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

**UNIT-I**

1. a) Define a force system. Explain different force systems 3M

- b) The force system as shown in Fig.1 has a resultant of 200 N acting up along y axis. Compute the Values of P and  $\theta$  required to give this resultant. 9M

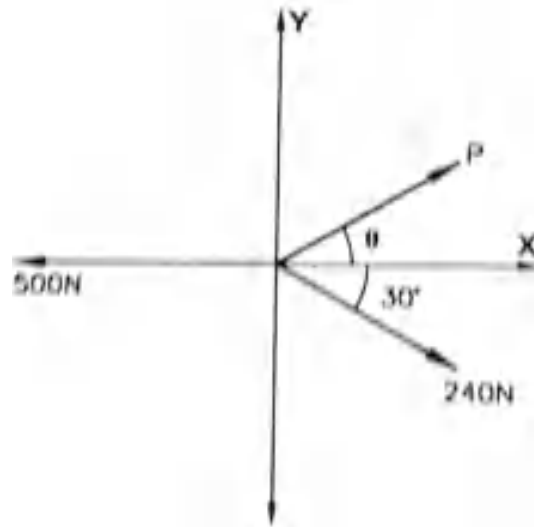


Figure 1

**(OR)**

2. a) The following forces act at a point. 6M

i) 30 kN inclined at  $35^\circ$  towards North to East.

ii) 22 kN towards North.

iii) 30 kN inclined at  $30^\circ$  towards North to West.

iv) 35 kN inclined at  $25^\circ$  towards South to West

Find the magnitude and direction of the resultant force.

- b) A system of parallel forces acting on a lever as shown in Fig. 2. Determine the magnitude and direction and position of the resultant. 6M

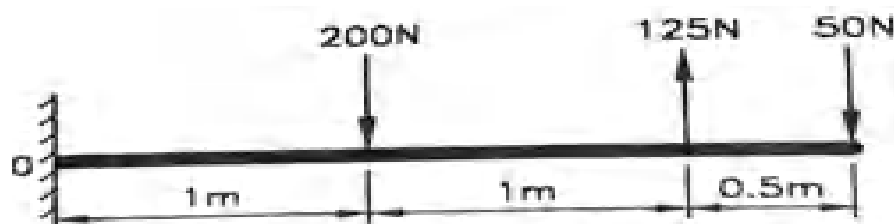


Figure 2

## UNIT-II

3. a) Write the equations of equilibrium of non concurrent system of forces 3M  
b) State and explain Lami's theorem with a neat sketch. 9M

(OR)

4. a) Explain the concept of free body diagram with example. 3M  
b) A cord supported at A and B carries a load of 10 kN at D and a load of W at C as shown in Fig 4. Find the value of W so that CD remains horizontal 9M

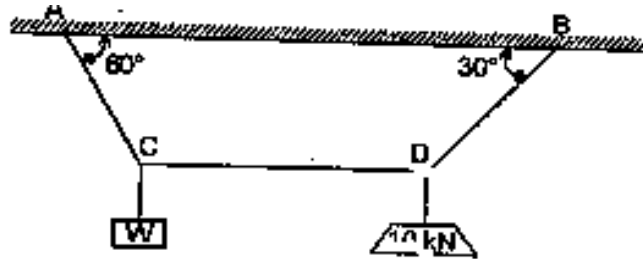


Figure 4

## UNIT-III

5. a) What is a perfect frame? How does it differ from an imperfect frame 3M  
b) A system of two blocks connected by a string which passes over a pulley is shown in Fig 5. The coefficient of friction between block A and the plane and that between the belt and pulley is 0.3. Determine the minimum weight of block required, to keep the system in equilibrium 9M

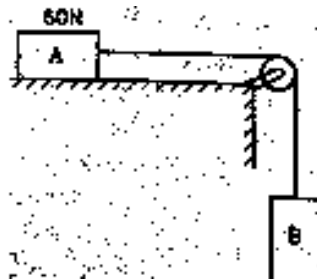


Figure 5

(OR)

6. a) Explain Limiting friction 3M  
b) Fig. 6 shows a truss with a span of 5m and carrying 9M  
load of 5 kN at its apex. Find the forces in all members  
of the truss.

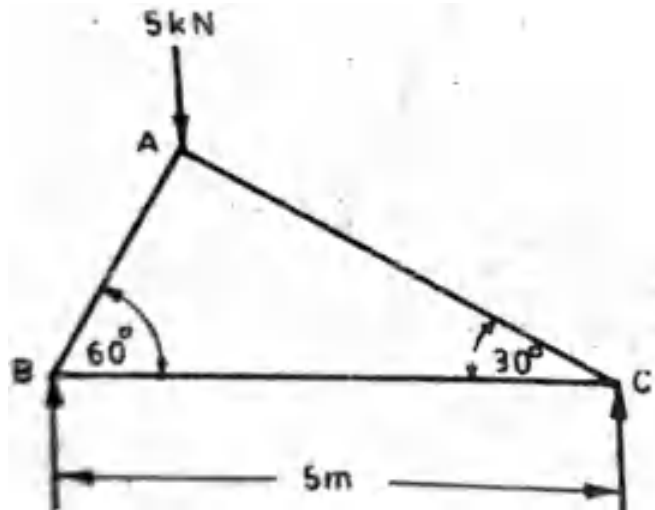


Figure 6

#### UNIT-IV

7. a) Determine the centroid of the rectangle of width ' $b$ ' and 6M  
height ' $h$ ' by integration method.  
b) Find the M.I of T-Section as shown in Fig.7 about 6M  
centroidal horizontal axes

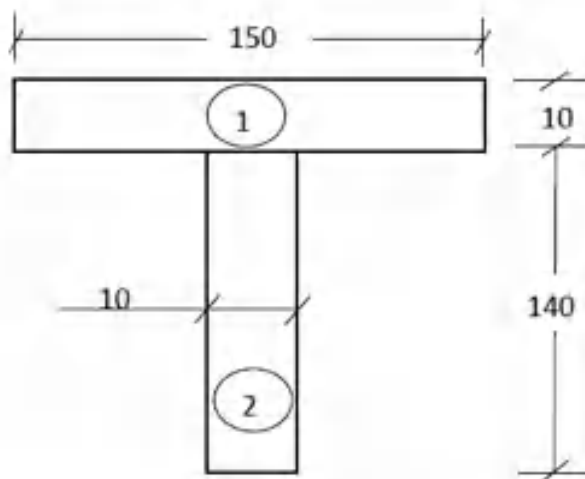


Figure 7

(OR)

8. a) Determine the centroid of following plane area as shown in Fig.8 8M

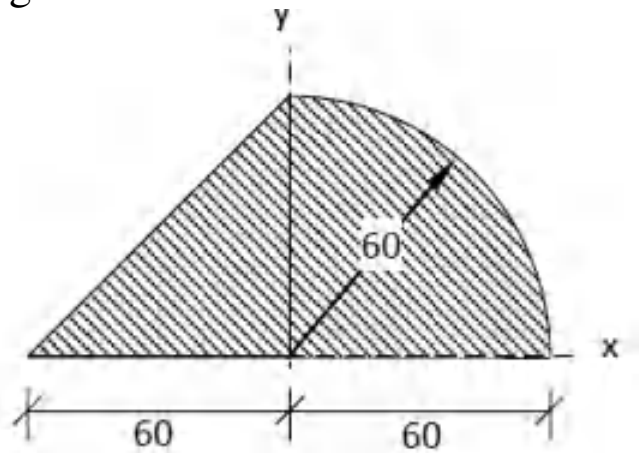


Figure 8

- b) State and explain the concepts of Pappus and Guldinus theorems with example 4M

### UNIT-V

9. a) A stone dropped into a well is heard to strike the water in 4 seconds. Find the depth of the well assuming the velocity of sound to be 335 m/sec. 6M
- b) A motorist travelling at a speed of 70 kmph suddenly applies brakes and halts after skidding 50 m. Determine: i) The time required to stop the car. 6M  
ii) The coefficient of friction between the tires and the road.

(OR)

10. a) A particle moves along a straight line with a velocity given by the equation  $v=2t^3-t^2-2t+4$ . Where  $v$  is the velocity in m/s and  $t$  is the time in seconds. When  $t = 2$  seconds, the particle is to be at a distance of 10 m from a station A. Determine the acceleration and displacement of the particle after 6 seconds. 6M
- b) Explain following terms for rotating rigid body i) angular displacement ii) angular velocity iii) angular acceleration 6M

# AR18

**CODE: 18EST102**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B.Tech II Semester Supplementary Examinations, July, 2019**

**PROGRAMMING FOR PROBLEM SOLVING**

**(Common to EEE, ME Branches)**

**Time: 3 Hours**

**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

## UNIT-I

1. a) Explain the structure of a C program with an example. 7M
- b) Write an algorithm for finding the roots of quadratic equation. 5M

**(OR)**

2. a) List out C tokens. Give examples for any six. 6M
- b) Define Flowchart. Draw flowchart to find the area of a circle. 6M

## UNIT-II

3. a) Explain for loop structure with sample code. 6M
- b) Write a c program to display sum of first n natural numbers. 6M

**(OR)**

4. a) Differentiate between break and continue statements. 6M
- b) Write a c-program to print Fibonacci series. 6M

## UNIT-III

5. a) What is an array? How can we declare, initialize, access and display one dimensional array with an example program. 6M
- b) Write a C program for subtraction of two matrices. 6M

**(OR)**

6. a) Illustrate with suitable example passing of an array to a function. 6M
- b) What is recursion? Write a C program using a recursive function to find the factorial of a given positive number. 6M

## UNIT-IV

7. a) What is dynamic memory allocation? Discuss different dynamic memory management functions in C. 8M
- b) What is a Pointer? Explain pointer arithmetic. 4M

**(OR)**

8. a) Distinguish between parameter passing by value and by address with suitable example and programs. 8M
- b) Illustrate the chain of pointers with an example program. 4M

## UNIT-V

9. a) What is a structure? Explain structure declarations with example. 6M
- b) Write a C-Program to create a file and also explain the file operations used in this program. 6M

**(OR)**

10. a) Write a C program to store and print name, address, department and marks using structure. 6M
- b) What is meant by random access to files? Explain fseek() and ftell() functions in detail. 6M

# AR18

**CODE: 18ECT102**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B.Tech II Semester Supplementary Examinations, July, 2019**

**NETWORK THEORY  
(Electronics and Communication Engineering)**

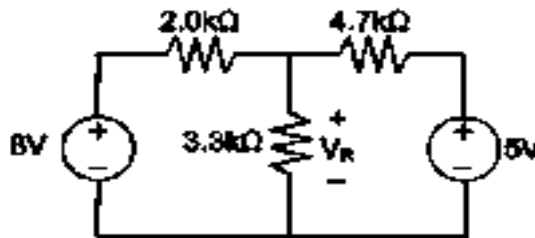
**Time: 3 Hours**

**Max Marks: 60**

Answer ONE Question from each Unit  
All Questions Carry Equal Marks  
All parts of the Question must be answered at one place

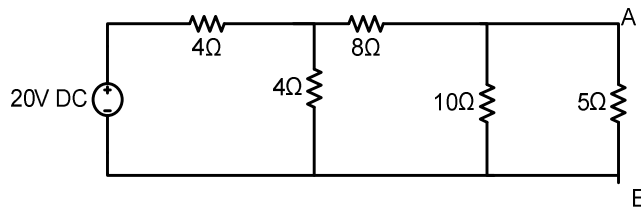
## UNIT-I

1. a) Using the superposition theorem, determine the voltage drop and current across the resistor  $3.3\text{k}\Omega$  as shown in figure below.



6M

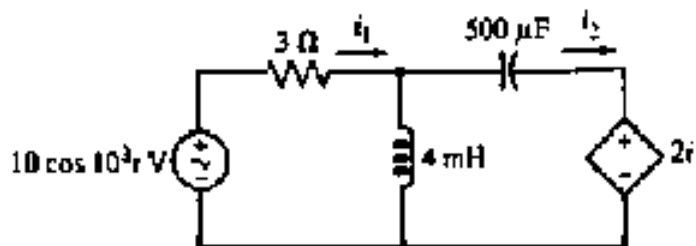
- b) Apply Thevenin's theorem to calculate the current flowing through  $5\Omega$  resistor across A-B in the below figure.



6M

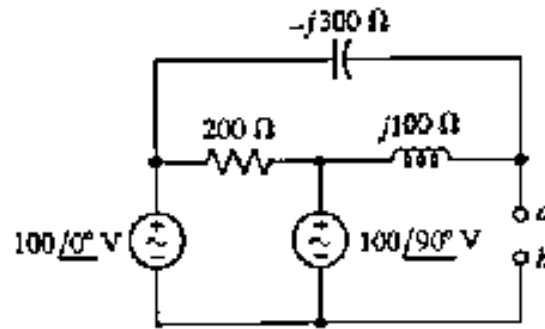
**(OR)**

2. a) Obtain the expressions for the time-domain currents  $i_1$  and  $i_2$  in the circuit



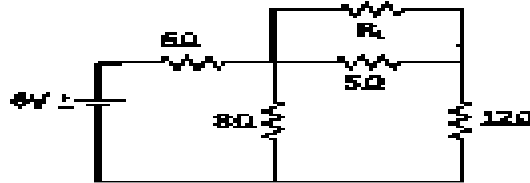
6M

- b) Find the Thevenin's equivalent circuit with respect to terminals a and b

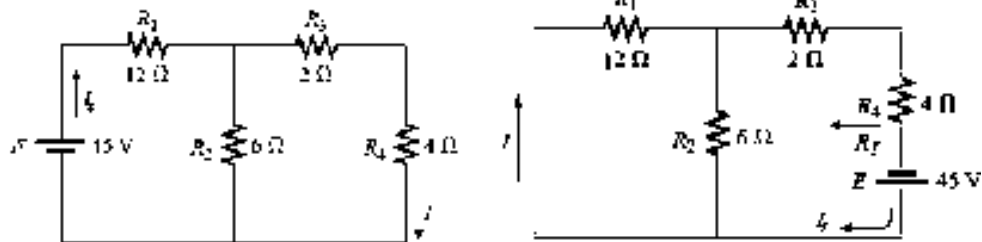


## UNIT-II

3. a) Find the value of  $R_L$  for the given network below such that the power is maximum. And also find the maximum power through load-resistance  $R_L$  by using maximum power transfer theorem.

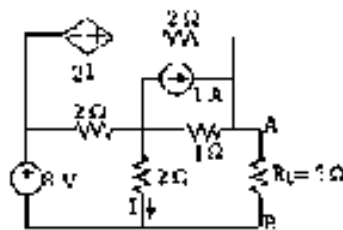


- b) Verify reciprocity theorem for the circuits given below.



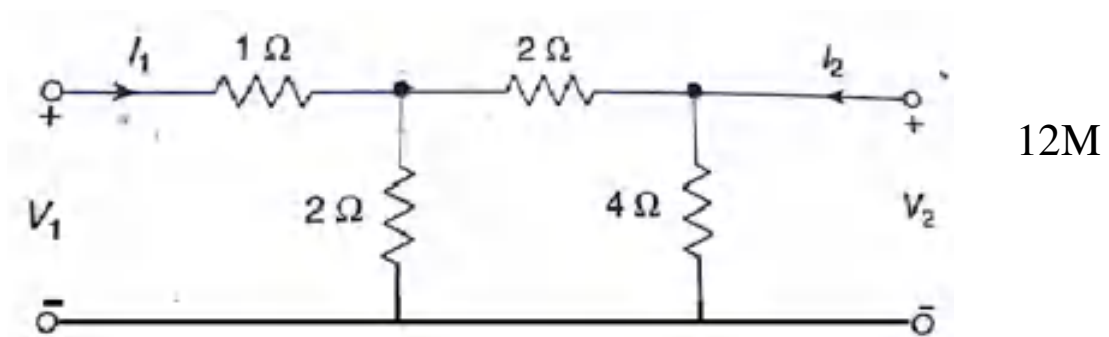
**(OR)**

4. a) State and explain Maximum power transfer theorem. 4M  
b) Determine the current through load resistance  $R_L$  in the Figure using Thevenin's Theorem. Also find maximum power transfer to resistance  $R_L$



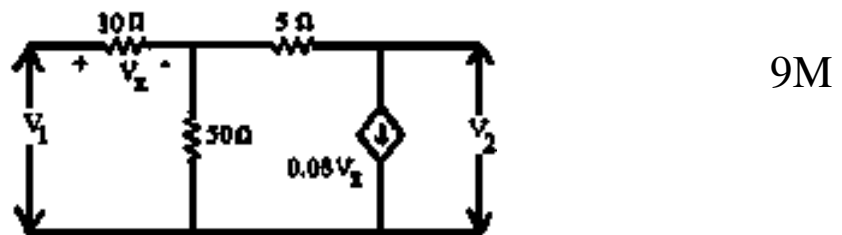
### UNIT-III

5. Determine ABCD parameters and verify the condition for Reciprocity for the network shown below



(OR)

6. a) Express Z-parameters in terms of Y-parameters. 3M  
b) Evaluate ABCD parameters of the network shown in figure.



### UNIT-IV

7. a) Explain the phenomenon of resonance. Derive the formula for the resonant frequency of the series resonance circuit. 6M  
b) For a series resonant circuit with constant voltage and variable frequency, obtain the frequency at which voltage across the inductor is maximum. Calculate this maximum voltage when  $R=50$  ohms,  $L=0.05$ H,  $C=20$   $\mu$ F and  $V=100$  volts. 6M

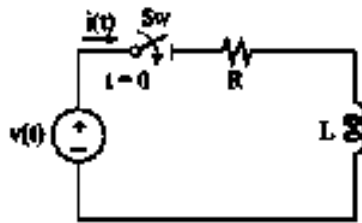
(OR)



8. a) An RLC series circuit consists of  $R=1\text{K}\Omega$ ,  $L=100\text{mH}$ ,  $C=10\mu\text{F}$ . If a voltage of  $100\text{V}$  is applied across the combination, determine resonant frequency, Q-factor and band width. 6M
- b) Derive the expression for bandwidth of series RLC circuit. 6M

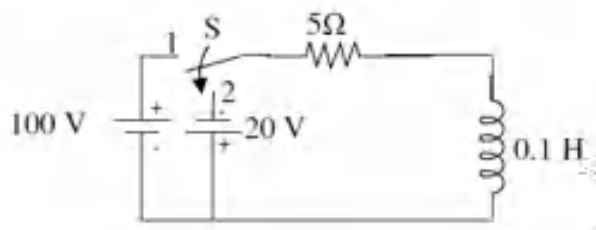
### UNIT-V

9. a) Derive the expression for the current response of a series RC circuit excited by AC. 6M
- b) In an RL circuit of Fig., the switch closes at  $t=0$ . Find the complete current response and sketch its plot, if  $R=10\Omega$ ,  $L=0.01\text{H}$ , and  $V(t) = 120\sqrt{2}\sin(1000t + 15^\circ)\text{V}$  6M



(OR)

10. In the circuit shown in fig the switch S is in position 1 for 0.01 seconds and then changed to position 2. Obtain the current transient and find the time at which the current is zero. 12M



# AR16

**CODE: 16ME1002**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B.Tech II Semester Supplementary Examinations, July, 2019**

**ENGINEERING MECHANICS**

**(For CE, CSE & IT Branches)**

**Time: 3 Hours**

**Max Marks: 70**

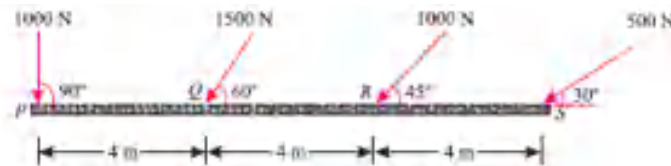
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

## UNIT-I

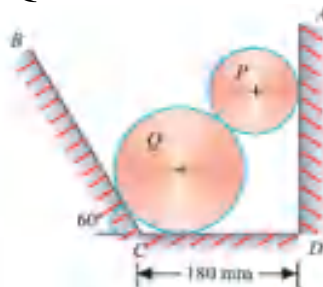
1. a) A horizontal line PQRS is 12 m long, where  $PQ = QR = RS = 4$  m. Forces of 1000 N, 1500 N, 1000 N and 500 N act at P, Q, R and S respectively with downward direction. The lines of action of these forces make angles of  $90^\circ$ ,  $60^\circ$ ,  $45^\circ$  and  $30^\circ$  respectively with PS. Find the magnitude, direction and position of the resultant force.



- b) State and prove the parallelogram law 7M
- (OR)**
2. a) Discuss any method for finding resultant of several coplanar concurrent forces 7M
- b) The forces 20 N, 30 N, 40 N, 50 N and 60 N are acting at one of the angular points of a regular hexagon, towards the other five angular points, taken in order. Find the magnitude and direction of the resultant force. 7M

## UNIT-II

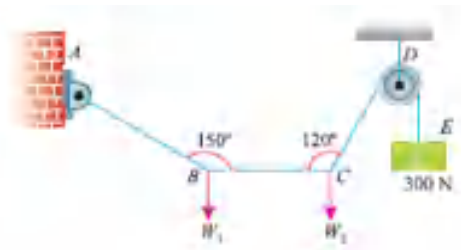
3. Two cylinders P and Q rest in a channel as shown in Fig 14M



The cylinder P has diameter of 100 mm and weighs 200 N, whereas the cylinder Q has diameter of 180 mm and weighs 500 N.

(OR)

4. a) Light string ABCDE whose extremity A is fixed, has weights 7M  
W<sub>1</sub> and W<sub>2</sub> attached to it at B and C. It passes round a small smooth peg at D carrying a weight of 300 N at the free end E as shown in Fig.

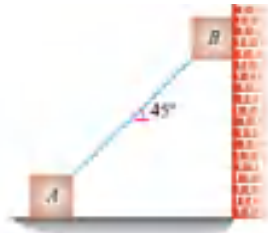


If in the equilibrium position, BC is horizontal and AB and CD make  $150^\circ$  and  $120^\circ$  with BC, find (i) Tensions in the portion AB, BC and CD of the string and (ii) Magnitudes of W<sub>1</sub> and W<sub>2</sub>

- b) State and prove Lami's theorem 7M

## UNIT-III

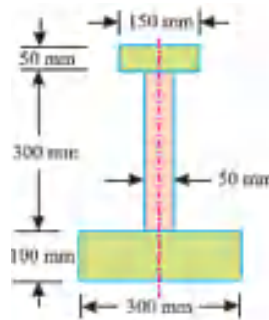
5. a) Two identical blocks of weight W are supported by a rod 14M  
inclined at  $45^\circ$  with the horizontal as shown in Fig



If both the blocks are in limiting equilibrium, find the coefficient of friction ( $\mu$ ), assuming it to be the same at floor as well as at wall.

(OR)

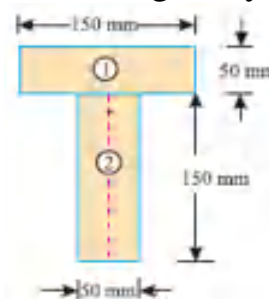
6. a) An I-section has the following dimensions in mm units : 7M  
Bottom flange =  $300 \times 100$ ; Top flange =  $150 \times 50$   
Web =  $300 \times 50$  Determine mathematically the position of centre of gravity of the section



- b) Determine the centroid of a rectangle having base  $b$  and height  $h$  7M

#### UNIT-IV

7. Find the moment of inertia of a T-section with flange as  $150 \text{ mm} \times 50 \text{ mm}$  and web as  $150 \text{ mm} \times 50 \text{ mm}$  about X-X and Y-Y axes through the centre of gravity of the section. 14M

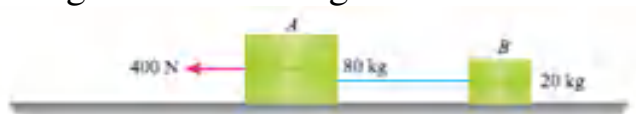


(OR)

8. a) Derive Mass moment of inertia of a solid sphere 7M  
b) Derive Mass moment of inertia of a thin circular ring 7M

#### UNIT-V

9. Two bodies A and B of mass 80 kg and 20 kg are connected by a thread and move along a rough horizontal plane under the action of a force 400 N applied to the first body of mass 80 kg as shown in Fig. 14M



The coefficient of friction between the sliding surfaces of the bodies and the plane is 0.3. Determine the acceleration of the two bodies and the tension in the thread, using D' Alembert's principle.

**(OR)**

10. a) A car moves along a straight line whose equation of motion is given by  $s = 12t + 3t^2 - 2t^3$ , where (s) is in metres and (t) is in seconds. Calculate (i) velocity and acceleration at start, and (ii) acceleration, when the velocity is zero. 7M
- b) A stone, dropped into a well, is heard to strike the water after 4 seconds. Find the depth of well, if velocity of the sound is 350 m/s. 7M

4 of 4

\*\*\*

# AR16

**CODE: 16ME1001**

**SET-2**

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I B.Tech II Semester Supplementary Examinations, July, 2019**

**ENGINEERING DRAWING**

**(Common to EEE & ECE)**

**Time: 3 Hours**

**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

## **UNIT-I**

1. a Draw the hexagon of side 40mm by using inscribed circle method. 7 M
- b Draw an ellipse at major axis 100 mm and minor axis 65 mm using concentric circles method. 7 M

**(OR)**

2. a Construct a scale having R.F = 1:400 to show meters and long enough to measure up to 60 meters. Measure a distance of 44 meters on the scale. 7 M
- b Construct an ellipse when the major axis is 120 mm and the distance between the foci is 108 mm. Determine the length of the minor axis. Use arc and circles method. 7 M

## **UNIT-II**

3. a A point A is 2.5 cm above the H.P. and 3 cm in front of the V.P. Draw its Projections. 7 M
- 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 VP and 40 mm below the H.P. Draw the projections of P and Q keeping the distance between their projectors equal to 90 mm. draw straight lines joining (1) their top views and (2) their front views. 7 M

**(OR)**

4. a Draw the projections of the following points , keeping the distance between the projectors as 25mm on the same reference line. i) P- 25mm above HP and 45 in front of VP ii) Q- on HP and 25 mm behind VP. iii) R- 45mm below HP and on VP iv) S- 30mm below HP and 40 mm in front of VP 7 M
- b A line AB 25mm long is parallel to VP and perpendicular to HP. Point A is 35mm above HP and 20mm in front of VP. Point B is 10mm above HP. Draw the projections of the line AB. 7 M

### UNIT-III

5. Draw the projections of a circle of 50mm diameter resting on the HP on a point A on the circumference, its plane inclined  $45^\circ$  to the HP draw the projections.

**(OR)**

6. Draw the projections of a rhombus, having diagonals 120 mm and 60 mm long, the smaller diagonal of which is parallel to both the planes, while the other is inclined to  $30^\circ$  to HP.

## UNIT-IV

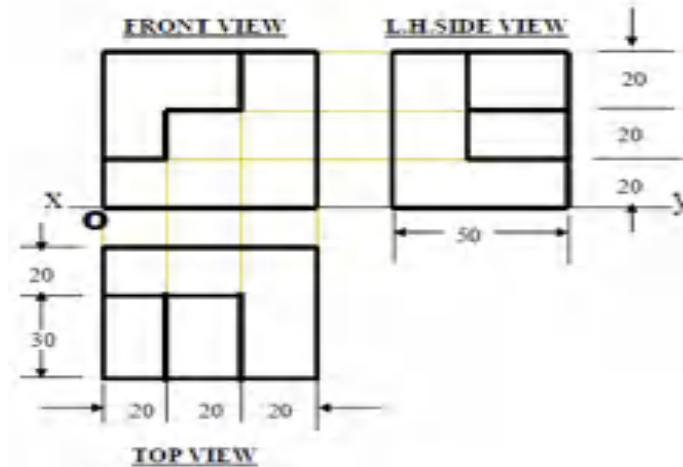
7. Draw the projections of the cone, base 75mm diameter and axis 14 M 100mm long lying on the HP on one of its generators with the axis parallel to the VP.

**(OR)**

8. Draw the projections of the cylinder base 30 mm diameter and axis 40 mm long resting with a point of its base circle on HP such that the axis is making an angle of  $30^\circ$  with HP and parallel to VP.

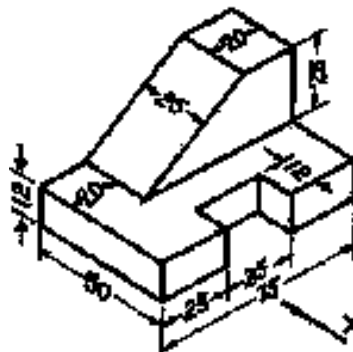
## UNIT-V

9. Draw isometric views of following ortho graphic projections. 14 M



**(OR)**

10. Draw (i) Front view (ii) Side view (iii) Top view of Figure. (All dimensions are in mm) 14 M



Answer ONE Question from each Unit

All Questions Carry Equal Marks

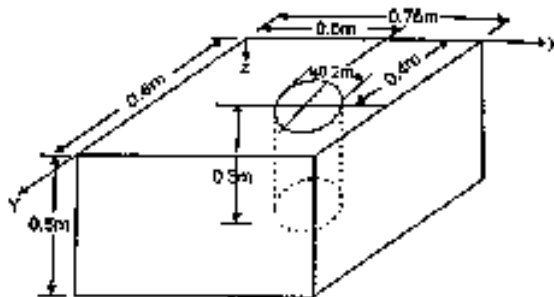
All parts of the Question must be answered at one place

**UNIT-I**

1. a) Derive the expression for a CG of a right circular cone. 10
- b) Write a brief note on 'parallel axis theorem' with respect to moment of inertia 4

**(OR)**

2. a) Determine Mass Moment of inertia of a circular ring of uniform cross section 4
- b) A concrete block of size 0.60m x 0.75m x 0.5m is cast with hole of diameter 0.2m and depth 0.3m as shown in below diagram. The hole is completely filled with steel balls weighing 2500N. Locate the Centre of gravity of the body. Take the Weight of concrete as 25000N/m<sup>3</sup>. 10

**UNIT-II**

3. a) The motion of the particle is described by the following equation  $X = 2(t+1)^2$  and  $Y = 2(t+1)^{-2}$ . Show that the path travelled by the particle is rectangular hyperbola. Find also the velocity and acceleration of the particle at time  $t = 0$ . 6
- b) Two adjacent guns having a muzzle velocity of 400 m/s fire simultaneously at an angle of  $\alpha$  and  $\beta$  for the same target at a range of 5000 m. calculate the time difference between the hits. 8

**(OR)**

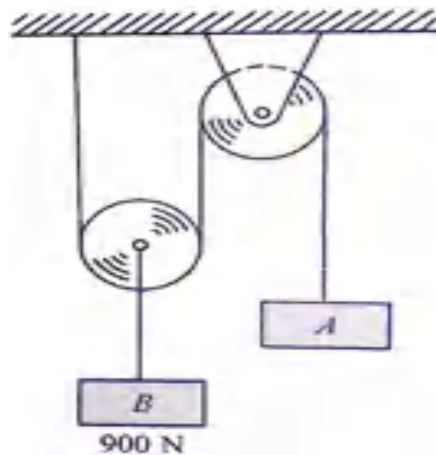
4. a) The acceleration of a particle is defined by the relation  $a = 12x - 24$ , where 'a' and 'x' are expressed in m/s<sup>2</sup> and meters, respectively. When  $x = 0$ ,  $v = 6$  m/s, determine the velocity when the particle has travelled a total distance of 3m. 6



- b) From the top of a tower 49.05 m, a stone is projected upwards with velocity of 19.62 m/s. Find 8
- The time required for stone to reach the ground
  - The time required for reaching maximum elevation.
  - The velocity with which the stone strikes the ground.
  - The time required for the velocity to attain a magnitude of 9.81 m/s.

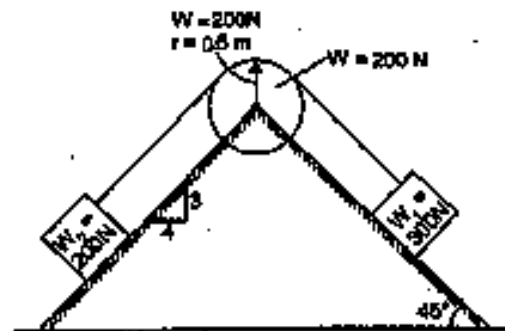
### UNIT-III

5. a) Explain the concept of dynamic equilibrium and D'Alembert's principle for dynamics. 6
- b) In the system of connected bodies shown in figure, the pulleys are frictionless and of negligible weight. Determine the weight of A to give B, a downward acceleration of  $6\text{m/s}^2$ . Use work energy method. 8



(OR)

6. a) Write a short note on moment-impulse method 4
- b) In what distance the body 1 shown in figure attain a velocity of 3 m/s starting from rest? Take coefficient of friction between the blocks and the plane as 0.2. Assume pulley is smooth and its weight is 200 N. What is the tension in the chord? Use work energy method. 10



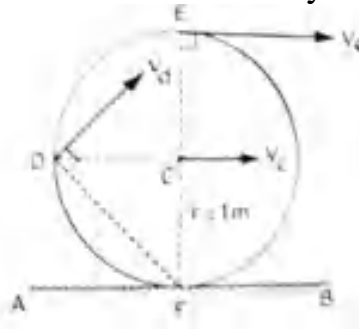
### UNIT-IV

- 7 A solid uniformly thick wheel of radius 1 m and mass 40 kg is released with no initial velocity at the top of an inclined plane, which makes an angle of  $30^\circ$  with the horizontal. It rolls down without slipping. Determine 14

- (i) the minimum value of coefficient of friction,  
(ii) the velocity of the centre of the wheel after it has travelled a distance 4 m down the inclined plane.

**(OR)**

8. a) Write short notes on relative velocity and instantaneous centre. 4  
b) A cylinder of radius 1 m rolls without slipping along a horizontal plane AB. Its center has a uniform velocity of 20 m/s. find the velocity of point D and E on the rim of cylinder. 10



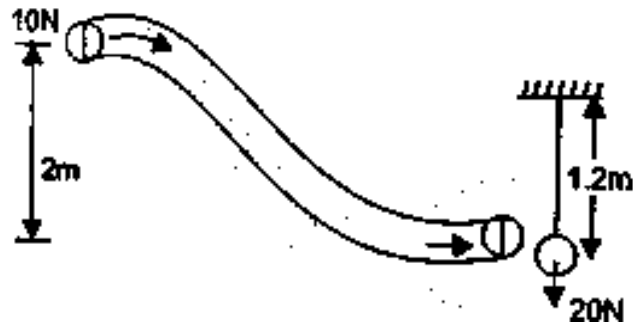
### UNIT-V

9. a) Explain about law of conservation of momentum for collision of two bodies 4  
b) A grinding wheel is attached to the shaft of an electric motor of rated speed of 1800 rpm. When the power is switched on the unit attains the rated speed in 5 seconds and when the power is switched off the unit coasts to rest in 90 seconds. Assuming the uniformly accelerated motion, determine number of revolutions the unit runs to (a) attain a rated speed (b) to come to rest. 10

**(OR)**

10. a) A ball of mass 1 kg moving with a velocity of 2 m/s impinges directly on a ball of mass 2 kg at rest. The first ball, after impinging, comes to rest. Find the velocity of the second ball after the impact and the coefficient of restitution. 4

- b) A 10N ball traverses a frictionless tube as shown in figure falling through a height of 2m. It then strikes a 20 N ball hung from a rope of 1.2 m long. Determine the height to which the hanging ball will rise
- (i) if the collision is perfectly elastic
  - (ii) if the coefficient of restitution is 0.7



4 of 4  
\*\*\*

# AR13

CODE: 13ME1003

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July, 2019

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) Define the term 'couple'
- b) What is law of transmissibility?
- c) What is free body diagram?
- d) What are equations of equilibrium for coplanar concurrent force system?
- e) Define 'angle of friction'.
- f) Centroid is the ..... point of two symmetric lines of a plane area.
- g) State 'polar moment of inertia'.
- h) State 'transfer formula' for plane areas.
- i) What is curvilinear motion?
- j) What is equation of motion for fixed axis rotation?

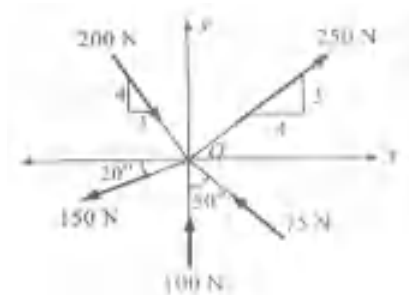
## PART-B

Answer one question from each unit

[5x12=60M]

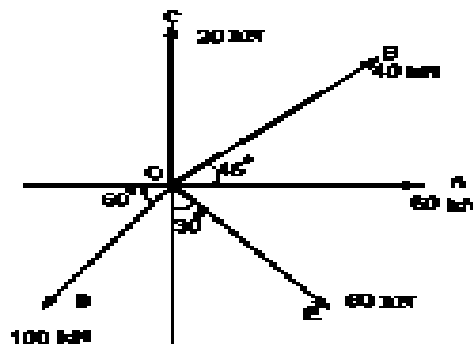
### UNIT-I

2. a) Discuss the graphical methods for finding the resultant of coplanar concurrent forces
- b) Find the magnitude and direction of the resultant of force system shown in Figure.



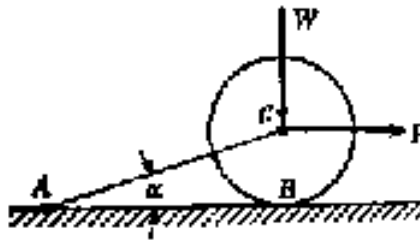
(OR)

3. a) Discuss the analytical methods for finding the Resultant of coplanar concurrent forces
- b) Determine the magnitude and direction of the resultant of the force system as shown in figure below.



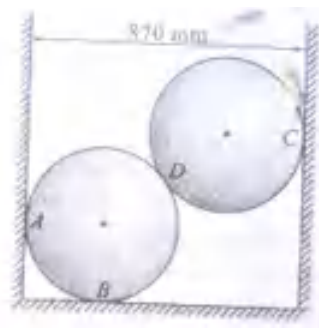
## UNIT-II

4. a) State and prove Varignon's theorem.
- b) Determine the reaction forces at the supports B of the roller loaded as shown in figure.



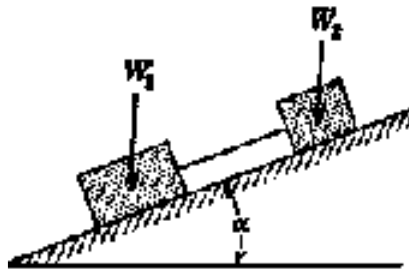
(OR)

5. a) What are the applications of equations of equilibrium? Explain.
- b) Two smooth spheres of weight 100 N and radius 250 mm each are in equilibrium in a horizontal channel of width 870 mm as shown in figure. Find the reactions at the surfaces of contact A, B, C and D assuming all the surfaces to be smooth.



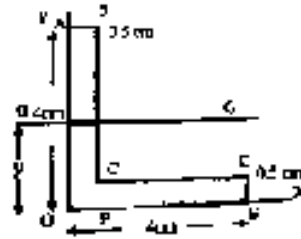
## UNIT-III

6. a) Explain different types of friction.
- b) Two blocks of weight  $W_1$  and  $W_2$  rests on rough inclined plane and connect by string as shown in figure -5. If the coefficient of friction are  $\mu_1 = 0.2$  and  $\mu_2 = 0.3$  respectively. Find the angle of inclination of the plane for which sliding will impend.



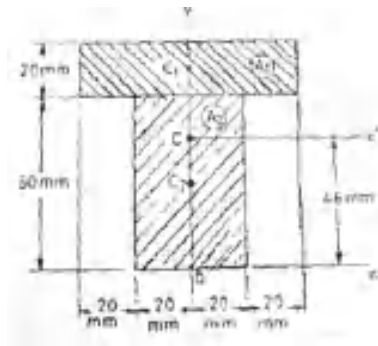
(OR)

7. a) What are theorems of Pappus? Explain.
- b) Determine the centroid of an L-section as shown in figure and further calculate MI about centroidal X-axis



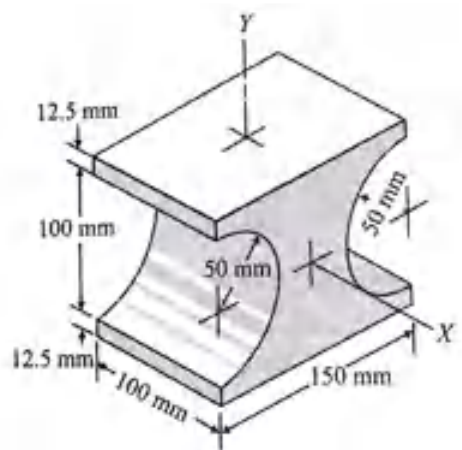
#### UNIT-IV

8. a) What is area moment of Inertia? Explain.
- b) Determine the MI of an I-section as shown in Figure below, about centroidal axis



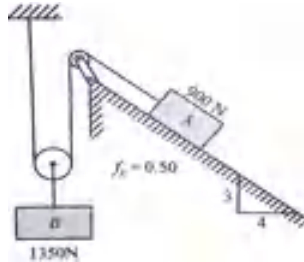
(OR)

9. a) What is radius of gyration of masses? Explain.
- b) Determine mass moment of inertia of steel casting shown in figure about X -axis.

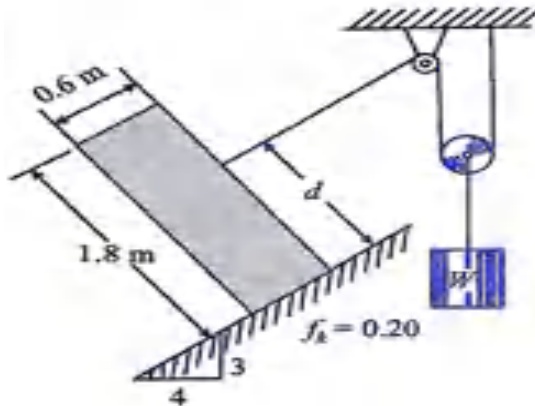


**UNIT-V**

10. a) The acceleration of a particle is defined by the relation  $a = 12x - 24$ , where 'a' and 'x' are expressed in  $\text{m/s}^2$  and meters, respectively. When  $x = 0$ ,  $v = 6 \text{ m/s}$ , determine the velocity when the particle has traveled a total distance of 3 m.
- b) Find the acceleration of each body in the system shown in figure.

**(OR)**

11. a) State and explain D'Alembert's principle.
- b) The uniform crate shown in figure weighs 900 N. It is pulled up the incline by a counterweight  $W$  of 1800 N. Find the maximum and minimum values of  $d$  so that the crate does not tip over as it slides up the plane.



**I B.Tech II Semester Supplementary Examinations, July, 2019**  
**ENGINEERING DRAWING**  
**(Common to EEE & ECE)**

**Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Differentiate between first angle and third angle projections. **1 M**
- b) Bisect an angle between two lines. **1 M**
- c) A line PQ 75mm long is on the VP. Draw the front view. **1 M**
- d) A line AB 60mm long is the HP. Draw the top view. **1 M**
- e) A hexagonal plane of side 25mm is resting on its corner passing through the diagonal on HP. Draw the projections. **1 M**
- f) Draw the projection of a circular lamina of diameter 30mm lying on VP and 15 mm above HP. **1 M**
- g) What is auxiliary plane? **1 M**
- h) Draw the front view of the square which is on the VP.. **1 M**
- i) Enumerate the difference between isometric scale and isometric projection. **1 M**
- j) Give a brief note on orthographic projections. **1 M**

**PART-B****Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a Define the following terms: Vernier scale and diagonal scale **4 M**
  - b Divide a line of 110mm long into 12 equal parts. **8 M**
- (OR)**
3. Draw the ellipse having major axis is 100mm, minor axis is 60mm by using concentric circles method. **12M**

**UNIT-II**

4. a A point A is 2.5 cm above the H.P. and 3 cm in front of the V.P. Draw its Projections. **4 M**
  - 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 VP and 40 mm below the H.P. Draw the projections of P and Q keeping the distance between their projectors equal to 90 mm. draw straight lines joining (1) their top views and (2) their front views. **8 M**
- (OR)**
5. A line measuring 80 mm long has one of its ends 60 mm above HP and 20 mm in front of VP. The other end is 15 mm above HP and in front of VP. The front view of the line is 60 mm long. Draw the top view. **12 M**

**UNIT-III**

6. Draw the projection of the Hexagon of 25mm having one of its sides in the HP and inclined at  $60^0$  to the VP and surface making an angle of  $45^0$  with the HP. **12M**
- (OR)**
7. A regular Hexagon of 35 mm sides is resting on HP on one of its sides. Its surface is inclined at  $45^0$  to HP. Draw its projections when the side on which its resting makes  $30^0$  angle with VP. **12 M**



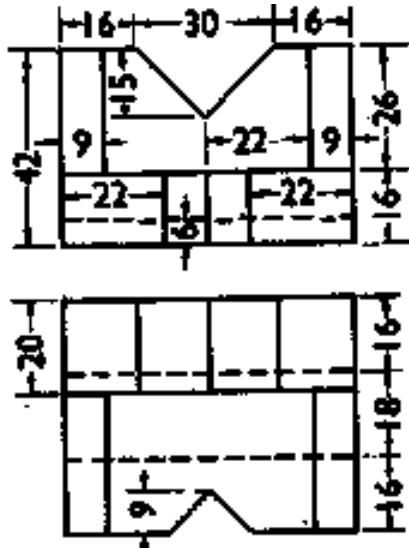
8. Draw the projections of the cone, base 75mm diameter and axis 100mm long lying on the HP on one of its generators with the axis parallel to the VP. **12 M**

(OR)

9. Draw the projections of a hexagonal prism having one of its rectangular faces parallel to the H.P. Its axis is perpendicular to the V.P. and 3.5 cm above the ground. **12 M**

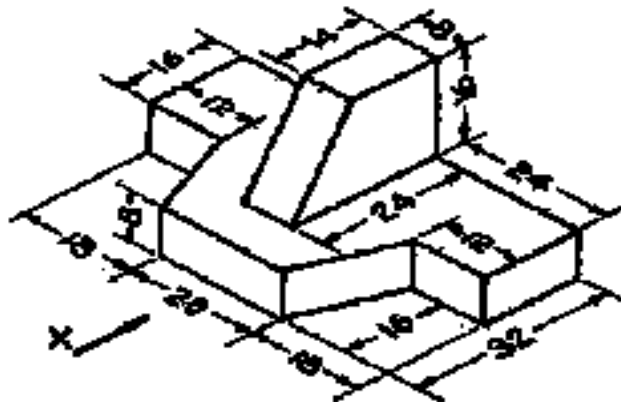
UNIT-V

10. Draw the isometric view of the object whose orthographic projections are shown in figure. All dimensions are in mm. **12 M**



(OR)

11. Draw the following views of the block shown in figure. All dimensions are in mm **12 M**  
(a) Front View.  
(b) Top view



# AR13

CODE: 13ME1002

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, July, 2019

## CLASSICAL MECHANICS (Mechanical Engineering)

Time: 3 Hours

Max Marks: 70

### PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1.	a)	Definition of couple.	1M
	b)	Explanation in one line	1M
	c)	Three Equilibrium equations	1M
	d)	Condition for redundant truss	1M
	e)	Definition of Radius of gyration	1M
	f)	Statement of parallel axis theorem	1M
	g)	Definition of coefficient of restitution	1M
	h)	Statement of De' Alembert's principle	1M
	i)	Definition of moment of momentum.	1M
	j)	Definition of relative motion.	1M

### PART-B

Answer one question from each unit

[5x12=60M]

#### UNIT-I

2.	a	Statement 1M Proof of Varignon's theorem 3M	4M
	b	Given data-1M Diagram -1M Free body diagram-2M Magnitude of P-4M	8M
(OR)			
3.		Given data-1M Diagram -1M Free body diagram of individual rollers-4M Reactions at all the four points of contact-6M	12M

#### UNIT-II

4.		Given data-1M Diagram -1M Free body diagram of truss elements-4M Axial forces S1 and S2 induced in the bars AC and BC -6M	12M
(OR)			

5.	<p>Given data-1M</p> <p>Diagram -1M</p> <p>Free body diagram of truss elements-4M</p> <p>Axial forces induced in the bars -6M</p>	12M
----	---	-----

### UNIT-III

6.	<p>Diagram -1M</p> <p>Given data-1M</p> <p>Step by step procedure carries-6M</p> <p>Centre of gravity of the section-4M</p>	12M
(OR)		
7.	<p>Diagram -2M</p> <p>Step by step procedure carries-8M</p> <p>Mass moment of Inertia of solid cylinder-2M</p>	12M

### UNIT-IV

8.	<p>Give data-1M</p> <p>Acceleration equations-3M</p> <p>(i) the time at which the velocity will be zero-2M</p> <p>(ii) the position and distance traveled by the particle at that time-2M</p> <p>(iii) the acceleration of the particle at that time -2M</p> <p>(iv) the distance traveled by the particle from <math>t=5s</math> to <math>t=7s</math>-2M</p>	12M
(OR)		
9.	<p>Given data-1M</p> <p>Diagram-1M</p> <p>Step by step procedure (soving the problem)-6m</p> <p>Solution -4M</p>	12M

### UNIT-V

10.	<p>Given data-1M</p> <p>Diagram-1M</p> <p>a) In what time; it will reach the maximum height? In the last second of its motion,the object travels a distance of 53.90m.If <math>g=9.80 \text{ m/s}^2</math>,determine</p> <p>(i) the height from which the object falls -2M</p> <p>(ii) total time taken by the object in falling-2M</p> <p>b) How high above the building will the ball rise-3M</p> <p>c) Compute the velocity with which it will strike the ground and the total time it is in motion-3M</p>	12M
(OR)		
11.	<p>Given data-1M</p> <p>Diagram-1M</p> <p>Step by step procedure (soving the problem)-6m</p> <p>Solution -4M</p>	12M