

AR16

CODE: 16CE1001

SET-1

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

I B.Tech I Semester Supplementary Examinations, April-2021

BUILDING MATERIALS AND CONSTRUCTION

(Civil Engineering)

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) | What are the qualities of good building stone ? discuss them | 8M |
| b) | Explain the qualities of a good timber | 6M |

(OR)

- | | | |
|-------|---|----|
| 2. a) | Explain various methods of manufacture of lime | 8M |
| b) | Discuss briefly characteristics of a good tiles | 6M |

UNIT-II

- | | | |
|-------|--|----|
| 3. a) | Explain the importance of shape,size and texture of coarse aggregate in cement concrete making | 7M |
| b) | Discuss in detail about types of glass and write the advantages and disadvantages of glass. | 7M |

(OR)

- | | | |
|-------|---|----|
| 4. a) | What do you mean by workability ? what are the factors affecting it ? how it can be measured? | 8M |
| b) | Explain about fibre reinforced plastics | 6M |

UNIT-III

- | | | |
|-------|--|----|
| 5. a) | What are the various types of foundations? Explain causes of failures and measures | 8M |
| b) | With the help of sketches, differentiate between English bond and Flemish bond | 6M |

(OR)

- | | | |
|-------|---|----|
| 6. a) | Briefly explain classification of stone masonry | 8M |
| b) | Define a partition wall ? write a note on types of partition walls? | 6M |

UNIT-IV

- | | | |
|-------|---|----|
| 7. a) | With the help of neat sketches, explain types of stairs | 8M |
| b) | Explain panelled and glazed doors with neat sketch | 6M |

(OR)

- | | | |
|-------|--|----|
| 8. a) | Write the requirements of good roof and factors affecting selection of flooring material | 7M |
| b) | Explain types of windows | 7M |

UNIT-V

- | | | |
|-------|--|----|
| 9. a) | What are the main objectives of plastering and requirements of good plastering | 8M |
| b) | Differentiate between form work and scaffolding | 6M |

(OR)

- | | | |
|--------|--|----|
| 10. a) | Differentiate between pointing and plastering | 7M |
| b) | Explain briefly (any two) painting on different surfaces | 7M |

AR16

CODE: 16ME1002

SET-1

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

I B.TECH I Semester Supplementary Examinations, April-2021

ENGINEERING MECHANICS

(Common for EEE, ECE Branches)

Time: 3 Hours

Max Marks: 70

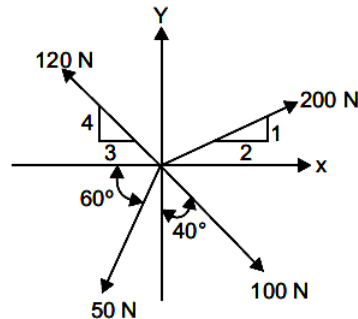
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

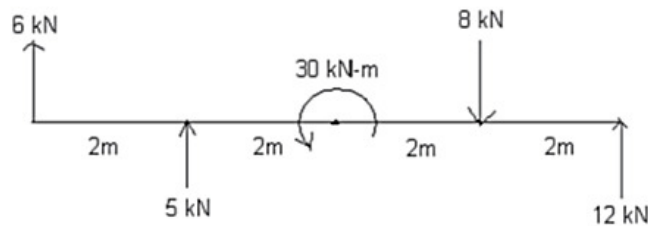
UNIT-I

1. A system of four forces acting on a body is as shown in figure. 14M
Determine the magnitude and direction of resultant.



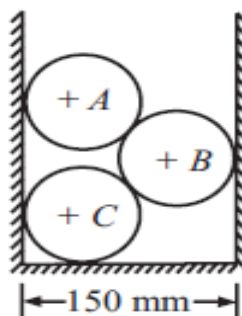
(OR)

2. a) State the parallelogram law 4 M
b) Determine and locate the resultant R of the forces and one couple 10 M
acting on the beam as shown in below diagram



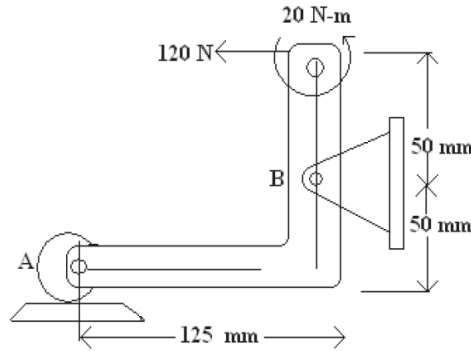
UNIT-II

3. Three spheres A, B, C are placed as shown in figure. The diameter of each sphere is 100mm. Determine the reactions produced at each Contact point. Assume the weight of spheres A, B, C are 1kN. 14M



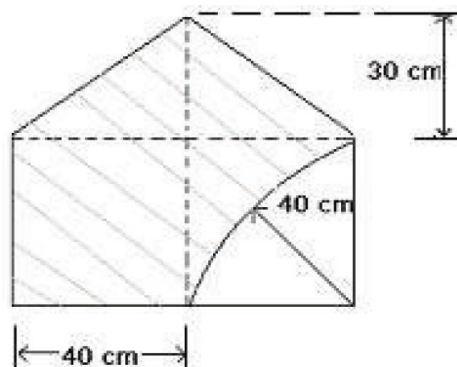
(OR)

4. Calculate the magnitude of the force supported by the pin at B for the 14 M bell crank loaded and supported as shown in Figure.



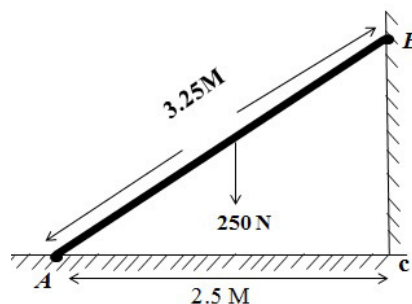
UNIT-III

5. a) Two equal bodies A and B of weight 'W' each are placed on a rough 7 M inclined plane. The bodies are connected by a light string. If $\mu_A = 1/2$ and $\mu_B = 1/3$, show that the bodies will be both on the point of motion when the plane is inclined at $\tan^{-1} (5/12)$.
- b) Find the centroid of the shaded shown in Figure. 7 M



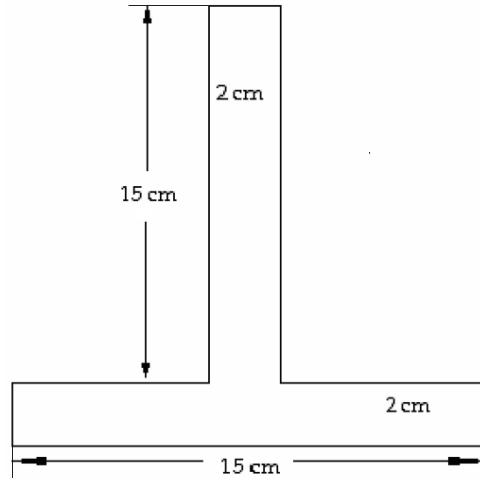
(OR)

6. a) Find the coordinates of centroid of a right angled triangle of base 'b' 6 M and height 'h'.
- b) A uniform ladder of length 3.25 m and weighing 250 N is placed 8 M against a smooth vertical wall with its lower end 1.25 m from the wall. The coefficient of friction between the ladder and floor is 0.3. What is the frictional force acting on the ladder at the point of contact between the ladder and the floor? Show that the ladder will remain in equilibrium in this position



UNIT-IV

7. Calculate the moment of inertia of T section about an axis parallel to the base of the T and passing through its centre of gravity. 14 M



(OR)

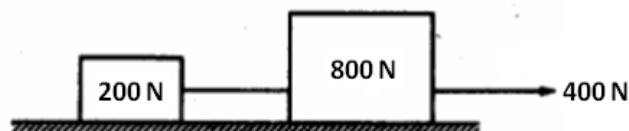
8. a) Define mass moment of inertia and explain Transfer formula for mass moment of inertia. 7M
b) Derive the expression for the moment of inertia of a homogeneous sphere of radius 'r' and mass density 'w' with reference to its diameter. 7M

UNIT-V

9. a) Derive the equations of work -energy for rectilinear motion of a particle. 7 M
b) A vertical lift of total mass 400 kg acquires an upward velocity of 3 m/s over a distance of 2 m with constant acceleration, starting from rest. Calculate the tension in the cable supporting the lift. 7 M

(OR)

10. Two weights 800 N and 200 N are connected by a thread and they move along a rough horizontal plane under the action of a force of 400 N applied to the 800 N weight as shown in figure. The coefficient of friction between the sliding surface of the weights and the plane is 0.3. Using D-Alembert's principle, determine the acceleration of the weights and tension in the thread. 14 M



AR16

CODE: 16ME1003

SET-1

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

I B.TECH I Semester Supplementary Examinations, April-2021

ENGINEERING MECHANICS (STATICS)

(Mechanical Engineering Branch)

Time: 3 Hours

Max Marks: 70M

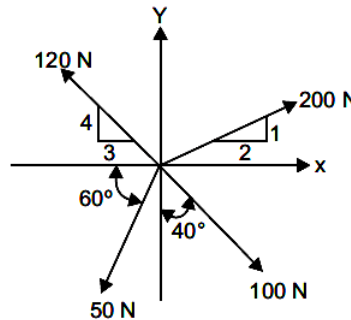
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

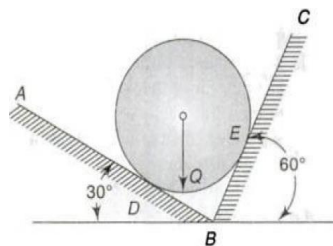
UNIT-I

- 1 A system of four forces acting on a body is as shown **14M**
in Fig. Determine the resultant



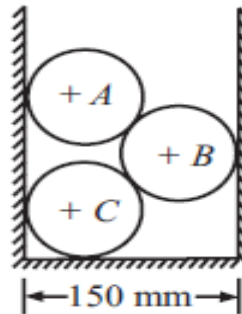
(OR)

2. a Find the angle between two equal forces P , when their resultant is equal to (i) P and (ii) $P/2$. **4M**
- b A ball of weight $Q = 60 \text{ N}$ rests on a right-angled trough, as shown in Fig. Determine the forces exerted on the sides of the trough at D and E if all surfaces are perfectly smooth. **10M**



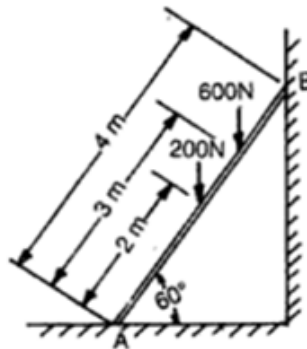
UNIT-II

3. Three sphere A, B, C are placed as shown in figure. **14M**
The diameter of each sphere is 100mm. Determine the reactions produced at each Contact point. Assume the weight of spheres A, B, C are 1kN.



(OR)

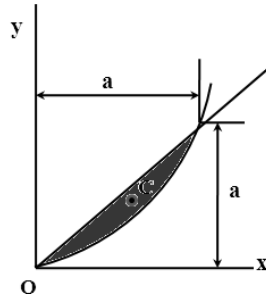
4. a Explain the difference between angle of friction and angle of repose. State the laws of Coulomb friction. **4M**
b Determine the minimum horizontal force to be applied at A to prevent slipping. $\mu = 0.2$ between the wall and ladder, $\mu = 0.3$ between the floor and ladder. The ladder weighs 200 N and a man weighing 600 N is at 3m from A. **10M**



UNIT-III

5. a Define the terms with examples Centroid, Centre of mass and Centre of gravity. **4M**

- b Determine the coordinates X_c and Y_c of the centroid 'C' of the area between the parabola $y = x^2/a$ and the straight line $y = x$. **10M**

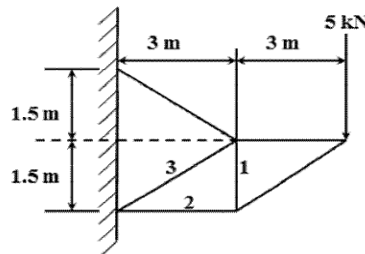


(OR)

6. a State and explain perpendicular axis theorem. **4M**
b Find the Moment of Inertia of a square with sides of length “a” with respect to diagonal. **10M**

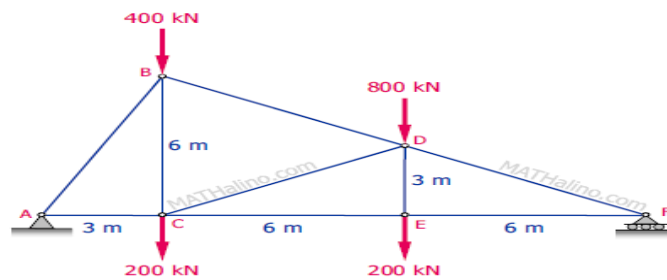
UNIT-IV

7. a Define truss and classify. State the assumptions **4M**
involved in the analysis of a perfect truss.
- b Using the method of sections, find the axial force in **10M**
each of bars 1,2,3 of the plane truss in the figure.



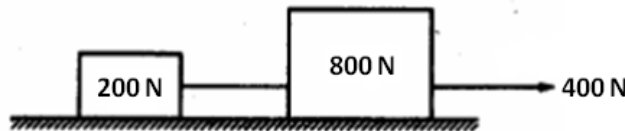
(OR)

8. A truss is loaded as shown in figure. Find the forces in all the members of the truss. **14M**



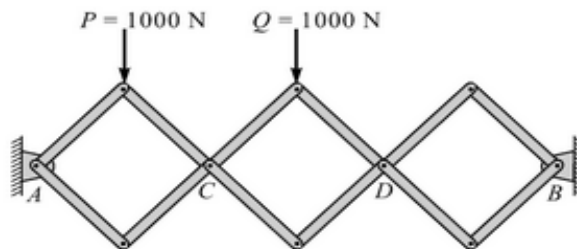
UNIT-V

9. a Explain different types of equilibrium with suitable sketches. **4M**
- b Two weights 800 N and 200 N are connected by a thread and they move along a rough horizontal plane under the action of a force of 400 N applied to the 800 N weight as shown in figure. The coefficient of friction between the sliding surface of the weights and the plane is 0.3. Using D'Alembert's principle, determine the acceleration of the weights and tension in the thread. **10M**



(OR)

10. a Explain the steps for analysing a force system using virtual work principle. **4M**
- b Find the horizontal and vertical components of the reactions at A and B of the frame as shown in fig. The bars form three equal squares. **10M**



4 of 4

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

Answer ONE Question from each Unit

All Questions Carry Equal Marks

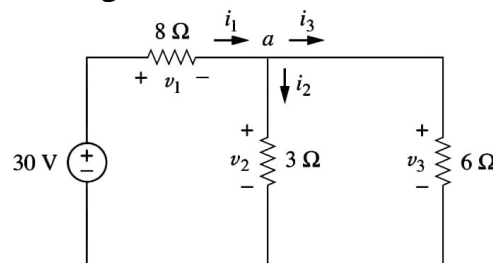
All parts of the Question must be answered at one place

UNIT-I

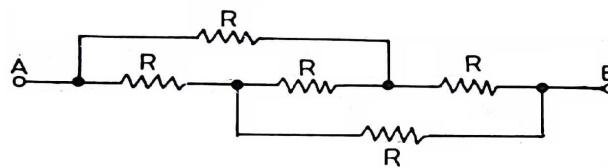
1. a. State and explain Kirchhoff's laws with examples. 8M
- b. Prove that the energy stored in an inductor is $\frac{1}{2}LI^2$ 6M

(OR)

2. a. Find currents and voltages in the circuit shown in Fig.1 7M

**Fig.1**

- b. Calculate the Resistance between terminals A and B of Fig. 2 7M

**Fig.2****UNIT-II**

3. a. Explain the principle operation of DC Motor? 7M
- b. A 4-pole lap-connected dc generator has no-load generated e.m.f. of 500 V when driven at 1200 rpm. Calculate the flux per pole if the armature has 120 slots with 6 conductors per slot. 7M

(OR)

4. a. Describe the constructional details of a dc machine. 7M
- b. Explain and Draw the Internal and external characteristics of DC shunt generator? 7M

UNIT-III

5. a. Explain the principle operation of Single Phase Transformer 4M
b. Explain the procedure to O.C and S.C Tests of Single Phase Transformer. 10M

(OR)

6. a. A 3-phase, 50Hz induction motor has a full-load speed of 1440 r.p.m. For this motor, calculate the following : 6M
(a)Number of Poles (b)Full-Load Slip
b Explain constructional features of slip-ring induction motor. 8M

UNIT-IV

7. a Discuss the synchronous impedance method to determine voltage regulation of an alternator. 7M
b. Derive the generalized expression for an induced EMF per phase in three phase Alternator. 7M

(OR)

8. a Explain the working of PMMC instrument with neat diagram. 7M
b Explain the working of Moving iron Attraction type of Instrument with a neat diagram. 7M

UNIT-V

9. a Explain how transistor is used as an amplifier. 4M
b Draw the circuit diagram of full-wave rectifier and explain its operation with wave forms. 10M

(OR)

10. a Explain the input and output characteristics of a common base configuration. 7M
b Write the difference between full-wave rectifier and half-wave rectifier. 7M

Code: 13BS1002

SET-I

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI (AUTONOMOUS)
I B.Tech I Semester Supplementary Examinations, April-2021
ENGINEERING MATHEMATICS-II
(Common to CIVIL, MECH, CSE, IT)

Time: 3 Hours

Max Marks: 70

PART-A**ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) If the first approximation x_0 for $f(x) = 0$ then the next approximation x_1 by Newton-Raphson method is given by.
- b) If $y = a + bx$ represents a straight line then the normal equations are given by least squares method.
- c) Relation between ∇ and E^{-1} .
- d) The value of $\Delta^3(1+x)(1-3x)(1+5x)$ if $h = 1$.
- e) State Trapezoidal rule.
- f) If $y_0 = 1, h = 0.2, f(x_0, y_0) = 1$ then by Euler's method, the value of y_1 is given by.
- g) Laplace transform of unit step function.
- h) $L^{-1}\left\{\frac{1}{(s-2)^2+9}\right\}$
- i) Write the first order partial differential equation by eliminating a, b from $z = ax + by + ab$.
- j) The solution of the partial differential equation $z = px + qy - 2\sqrt{pq}$ is given by.

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

2. a) Using the method of false position, find the root of $x^3 - x - 4 = 0$. 6 M
- b) Find the positive root of the equation $x e^x - \cos x = 0$ by Newton-Raphson method. 6 M

(OR)

- 3 Fit a second degree parabola of the form $y = a + bx + cx^2$ to the following data by the method of least squares. 12 M

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

UNIT-II

4. a) Find $\sin 48^\circ$ by Newton forward interpolation, Given that $\sin 45^\circ = 0.7071, \sin 50^\circ = 0.7660, \sin 55^\circ = 0.8192, \sin 60^\circ = 0.8660$. 6 M

- b) Using Lagrange's interpolation formula to find $y(10)$ from the following data 6 M

x	5	6	9	11
y	12	13	14	16

(OR)

- 5 Using Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule, evaluate $\int_0^1 \frac{1}{1+x^2} dx$. 12 M

UNIT-III

6. a) Using Taylor's series method to find y at the point $x = 0.1$, given that $y' = x^2 + y^2, y(0) = 1$. 6 M

- b) Using Modified Euler's method, find the solution of the initial value problem $y' = x - y, y(0) = 1$, at $x = 0.1$. Take the step length $h = 0.1$ and carryout three modifications. 6 M

(OR)

- 7 Find the value of y at $x = 0.1$ by using fourth order R-K method for the differential equation $y' = x^2 - y, y(0) = 1$. 12 M

UNIT-IV

8. a) Find the Laplace transform of $t \int_0^t \frac{e^{-t} \sin t}{t} dt$ 6 M

- b) Find the inverse Laplace transform of $\frac{5s+3}{(s-1)(s^2+2s+5)}$ 6 M

(OR)

- 9 Solve by the method of Laplace transforms, the equation $y^{111} + 2y^{11} - y' - 2y = 0$, $y(0) - y'(0) = 0, y^{11}(0) = 6$. 12 M

UNIT-V

10. a) Form the Partial differential equation by eliminating the arbitrary functions f and g from the relation $z = yf(x) + xg(y)$. 6 M

- b) Solve $p \tan x + q \tan y = \tan z$. 6 M

(OR)

11. Solve $x(y^2 + z)p - y(x^2 + z)q = z(x^2 - y^2)$. 12 M

AR13

CODE: 13ME1003

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.TECH I Semester Supplementary Examinations, April-2021

ENGINEERING MECHANICS
(Common to EEE & ECE)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is the difference between the collinear and concurrent forces?
b) Define the term resultant
c) State Varignon's theorem.
d) List different types of supports.
e) What is the centroid of a lamina of a Right angle triangle of base 'b' and height 'h' about its base?
f) What is angle of friction?
g) State parallel axis theorem
h) What is the radius of gyration?
i) Distinguish between kinematics and kinetics
j) Differentiate between rectilinear motion and curvilinear motion

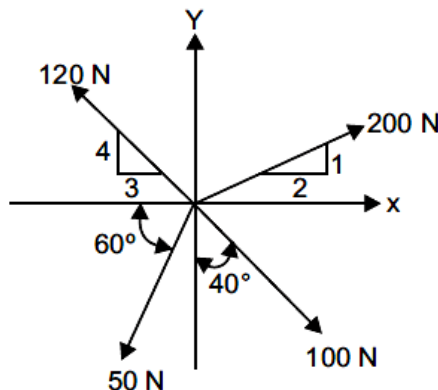
PART-B

Answer one question from
each unit

[5x12=60M]

UNIT-I

2. Determine the magnitude and direction of the resultant of the 12M force system as shown in figure below.

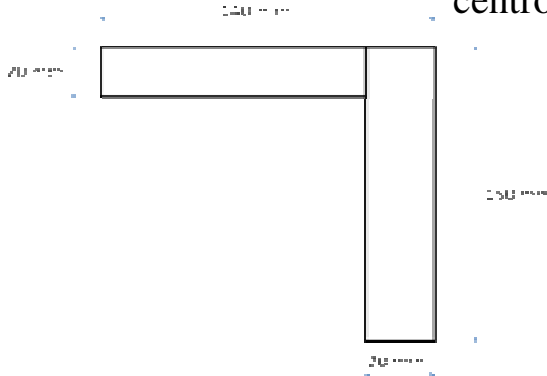


(OR)

3. a) State and prove parallelogram law of forces. 6M
 b) Two forces of magnitude 20N and 40N are acting on a particle such that the angle between the two is 60° . If both forces acting away from the particle. Calculate their resultant and find its direction 6M

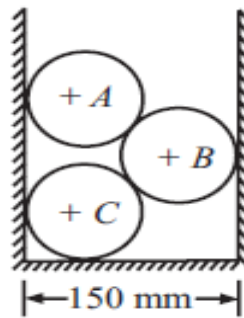
UNIT-II

4. Find the moment of inertia of the area of L-section as shown in Fig. about the centroidal x and y- axis. 12M



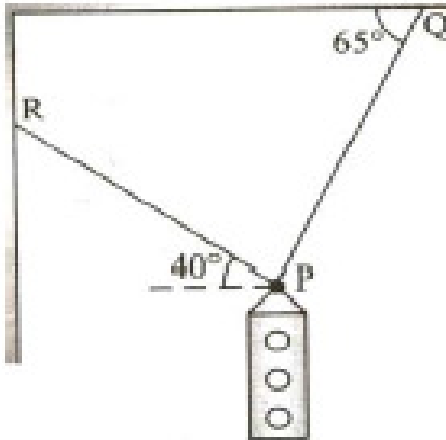
(OR)

5. Three sphere A, B, C are placed as shown in figure. The diameter of each sphere is 100mm. Determine the reactions produced at each Contact point. Assume the weight of spheres A, B, C are 1kN. 12M



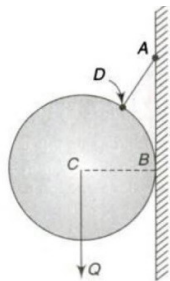
UNIT-III

6. A traffic signal of weight 500N is hung with the help of two strings, as shown in figure below. Find the forces induced in both the strings. 12M



(OR)

7. A ball of weight Q and radius r is attached by a string AD to a vertical wall AB , as shown in Fig. Determine the tensile force S in the string and the reaction R_b against the wall at B if $Q = 60 \text{ N}$, $r = 75 \text{ mm}$, $AB = 100 \text{ mm}$. Neglect friction at wall. 12M

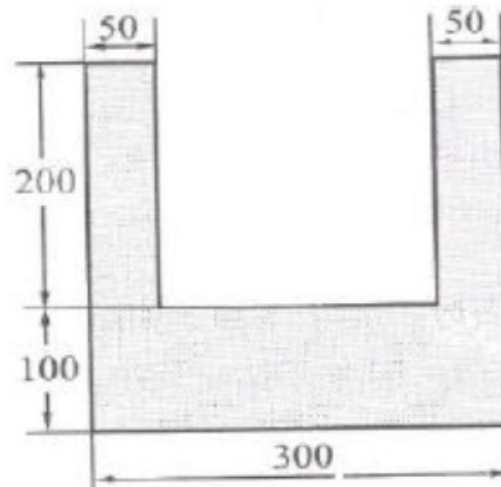


UNIT-IV

8. a) Explain the concept of cone of friction. 4M
b) Prove that the angle of friction is equal to the angle of the inclined plane, when a solid body of weight W placed on the inclined plane is about to slide down. 8M
- (OR)
9. a) Determine the centroid for triangular lamina, having base “ b ” and height “ h ”. 6M

b) Determine the centroid of the following section

6M



Figure

UNIT-V

10. The x and y components of the displacement in meters of a point are given by the equation $x = 4t^2 - 3t$, $y = t^3 - 10$. Determine the velocity and acceleration of the point when $t = 2$ sec. 12M

(OR)

11. Two weights 800 N and 200 N are connected by a thread and they move along a rough horizontal plane under the action of a force of 400 N applied to the 800 N weight as shown in figure. The coefficient of friction between the sliding surface of the weights and the plane is 0.3. Using D'Alembert's principle, determine the acceleration of the weights and tension in the thread. 12M

