

AR16

CODE: 16CE1001

SET-1

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

I B.Tech I Semester Supplementary Examinations, December-2019

BUILDING MATERIALS AND CONSTRUCTION

(Civil Engineering)

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) Compare between clamp burning and kiln burning process during the manufacturing of bricks? 8 M
b) What are the constituents of lime stones? 6 M
(OR)
2. a) Why is artificial seasoning adopted? Describe its various methods 7 M
b) Explain the laboratory tests to be conducted on stones 7 M

UNIT-II

3. a) What are the classification of mortars and Explain them briefly? 7 M
b) Explain the methods for preparation of concrete mix? 7 M
(OR)
4. a) Mention the properties and uses of various types of glass? 8 M
b) Mention the applications of fibre reinforced plastics in building Industry 6 M

UNIT-III

5. a) What are the different types of brick masonry? Explain English bond with neat sketches? 8 M
b) What are the general principles followed in the stone masonry construction? 6 M
(OR)
6. a) What are the different types of shallow foundations? Explain with the help of neat sketches? 8 M
b) Explain in detail about Damp proofing and Water proofing material? 6 M

UNIT-IV

7. a) What do you understand by
i) Ventilation ii) Air Conditioning 6 M
Explain the necessity of each
b) Explain in detail about the king post truss with neat sketch 8 M
(OR)
8. a) Briefly explain the classification of lintels 7 M
b) Explain about the construction of concrete flooring 7 M

UNIT-V

9. a) Briefly explain about the plastering and pointing 7 M
b) Explain about the white washing and distempering 7 M
(OR)
10. a) Write about varnishes, form works? 8 M
b) What do you mean by paints? What are the ingredients of paints? 6 M

AR16

CODE: 16EE1003

SET-1

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

I B.Tech. I Semester Supplementary Examinations, December, 2019

ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, IT Branches)

Time: 3 Hours

Max Marks: 70

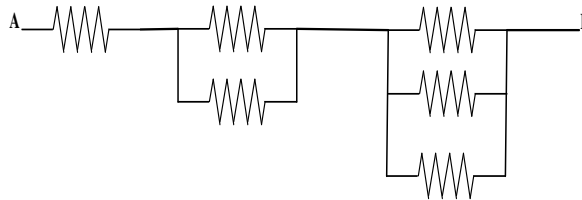
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) State Kirchhoff's laws. 7M
- b) Find the equivalent resistance between A and B terminals for the circuit shown below, if each resistance is of $12\ \Omega$? Also find the power delivered by the voltage source, if the applied voltage across A and B is 120 V? 7M



(OR)

2. a) Derive Star to Delta transformation for a resistive network. 10M
- b) Find the equivalent inductances of a circuit with 'n' inductances each of 'L' Henry are in series and parallel? 4M

UNIT-II

3. a) Draw a neat sketch of a DC generator and explain the function of each part. 10M
- b) Determine the torque of a 4 pole lap wound DC motor with 750 conductors, flux of 0.02 Wb/pole and total armature current is 40A. 4M

(OR)

4. a) A 6-pole lap wound armature has 840 conductors and flux/pole of 0.018 Wb. Calculate EMF generated when machine is running at 600 rpm. 6M
- b) Derive an expression for torque developed in a DC motor. 8M

UNIT-III

5. a) Discuss various losses that occur in a transformer. 8M
b) A 3-phase induction motor is wound for 4-pole and it is supplied from 50 Hz system. Calculate the synchronous speed and speed of the rotor when slip is 5%. 6M

(OR)

6. Define efficiency? Describe the method of calculating efficiency of a single phase transformer by open circuit and short circuit tests. 14M

UNIT-IV

7. a) Explain the principle of operation of alternator. 6M
b) Write a short note on deflecting torque, controlling torque and damping torque. 8M

(OR)

8. Explain the principle of operation of PMMC instrument with neat sketch. 14M

UNIT-V

9. a) Explain the operation of Half wave rectifier with output wave form. 8M
b) Draw circuit diagrams for different configurations of NPN transistor. 6M

(OR)

10. a) Explain the forward bias and reverse bias of P-N junction diode. 8M
b) Explain the transistor CE configuration with neat diagrams. 6M

AR16

CODE: 16ME1002

SET-2

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

I B.Tech I Semester Supplementary Examinations, December, 2019

ENGINEERING MECHANICS

(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

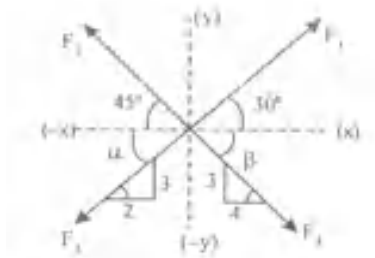
1. a) Two forces equal to $2F$ and F act on a particle. If the first is doubled and the second is increased by 15 N , the direction of resultant remains unaltered. Find the value of F . 7 M

- b) In a concurrent force system, two forces are acting on a point at an angle of 60° . The resultant force is 120 kN and one of the forces is 80 kN . Determine the unknown force 7 M

(OR)

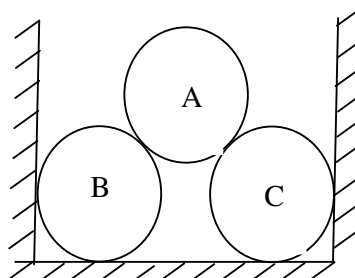
2. a) State the parallelogram law 4 M

- b) Find the magnitude and direction of the resultant R of the four concurrent forces as shown in figure and having the magnitudes $F_1=1500\text{N}$, $F_2=2000\text{N}$, $F_3=3500\text{N}$, $F_4=1000\text{N}$. 10 M



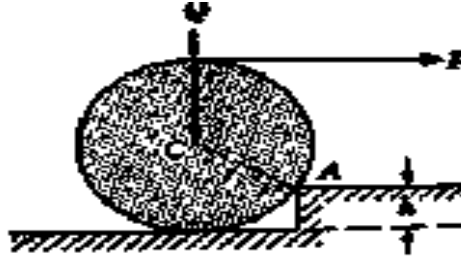
UNIT-II

3. Three spheres each with 2 kg mass and each 350 mm in diameter rests in a box 760 mm wide as shown in Figure. Find (i) reaction of B on A (ii) reaction of the wall on C (iii) reaction of the floor on B. 14 M



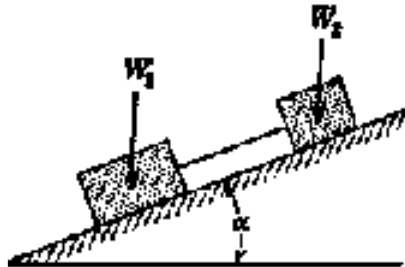
(OR)

4. A roller of radius $r=12\text{m}$ and weight $Q=500\text{N}$ is to be pulled over a block (curb) of height $h=6\text{m}$ by a horizontal force P applied to the end of a string wound around the circumference of the roller as shown figure. Find the magnitude of P required to start the roller over the curb.



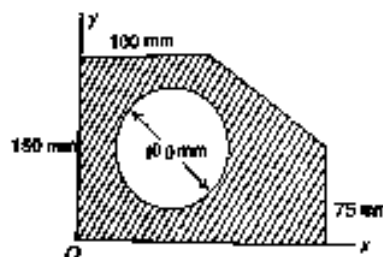
UNIT-III

5. a) What is the difference between centre of mass and centre of gravity. 4 M
- b) Two blocks of weight $W_1 = 50\text{N}$ and $W_2 = 50\text{N}$ rest on a rough inclined plane and connected by a string as shown in the fig. The coefficient of friction between the inclined plane and W_1 and W_2 are $\mu_1 = 0.3$ and $\mu_2 = 0.2$ respectively. Find the inclination of the plane for which slipping will impend. 10 M



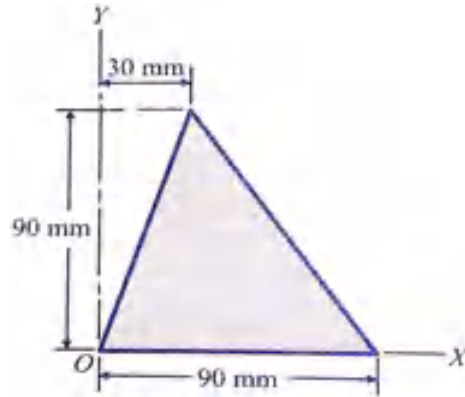
(OR)

6. a) What do you mean by coefficient of friction and cone of friction. 4 M
- b) Referring to the below diagram and axes system, determine the coordinates X_c and Y_c of the center of a 100 mm diameter, circular hole cut in a thin plate so that this point will be the centroid of the remaining shaded area. 10 M



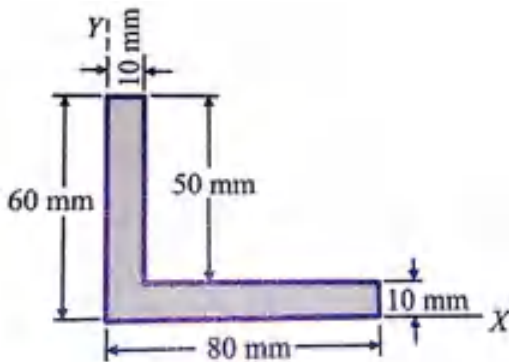
UNIT-IV

7. a) Define the following 6 M
i. Area moment of inertia
ii. Mass moment of inertia
b) Find area moment of inertia of the triangle shown in Fig. 8 M
about X axis



(OR)

8. Find area moment of inertia of L section shown in Fig. about X and Y axis. 14 M



UNIT-V

9. a) 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
b) A 300 kg wheel of diameter 600 mm rolls without slipping down a plane inclined at an angle of 25° with the horizontal. Determine the friction force and the acceleration of the mass centre. 7 M

(OR)

10. a) A stone is dropped into a well and falls vertically with constant acceleration $g = 9.81 \text{ m/s}^2$. The sound of impact of the stone on the bottom of the well is heard 6.5 sec after it is dropped. If the velocity of sound is 340 m/s, find the depth of the well.
- b) The greatest possible acceleration or deceleration that a train may have is a , and its maximum speed is v . Find the minimum time in which the train can get from one station to the next if the total distance is x .

ENGINEERING MECHANICS (STATICS)

(Mechanical Engineering Branch)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

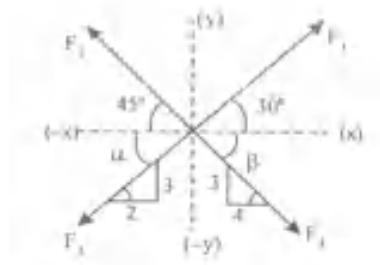
All parts of the Question must be answered at one place

UNIT-I

1. a) Find the magnitude of the two forces, such that if they act at right angles, their resultant is 10 N. But if they act at 60° , their resultant is 13 N
- b) 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° , 60° , 45° and 30° respectively with PS. Find the magnitude, direction and position of the resultant force

(OR)

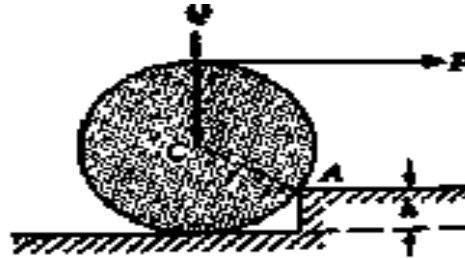
2. Find the magnitude and direction of the resultant R of the four concurrent forces as shown in figure and having the magnitudes $F_1=1500\text{N}$, $F_2=2000\text{N}$, $F_3=3500\text{N}$, $F_4=1000\text{N}$.

UNIT-II

3. a) Discuss the classification of couples and explain clearly the differences between a positive couple and negative couple?
- b) A machine component of length 2.5 metres and height 1 metre is carried upstairs by two men, who hold it by the front and back edges of its lower face. If the machine component is inclined at 30° to the horizontal and weighs 100 N, find how much of the weight each man supports?

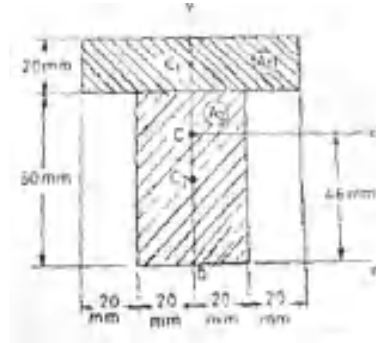
(OR)

4. A roller of radius $r=12\text{m}$ and weight $Q=500\text{N}$ is to be pulled over a block (curb) of height $h=6\text{m}$ by a horizontal force P applied to the end of a string wound around the circumference of the roller as shown figure. Find the magnitude of P required to start the roller over the curb. 14m



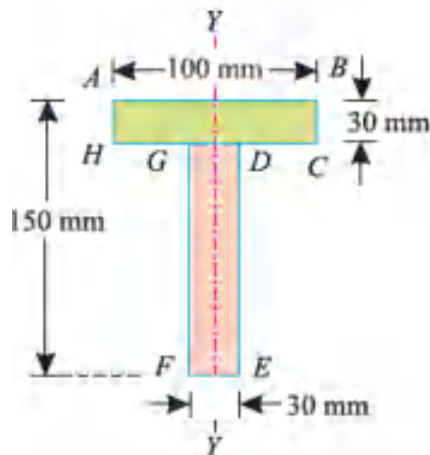
UNIT-III

5. Determine the MI of an I-section as shown in Figure – 3 about centroidal X and Y-Axis 14m

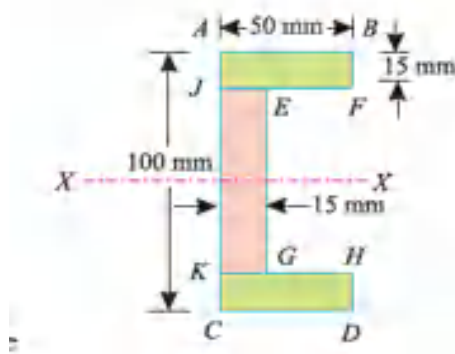


(OR)

6. a) Find the centre of gravity of a $100\text{ mm} \times 150\text{ mm} \times 30\text{ mm}$ T-section. 7m

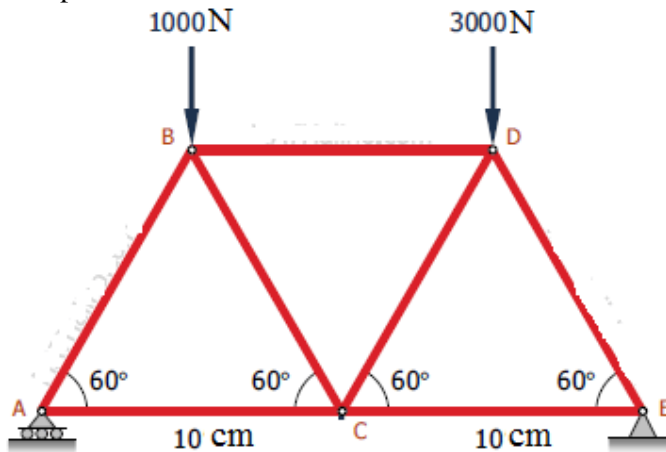


- b) Find the centre of gravity of a channel section $100 \text{ mm} \times 50 \text{ mm} \times 15 \text{ mm}$. 7m



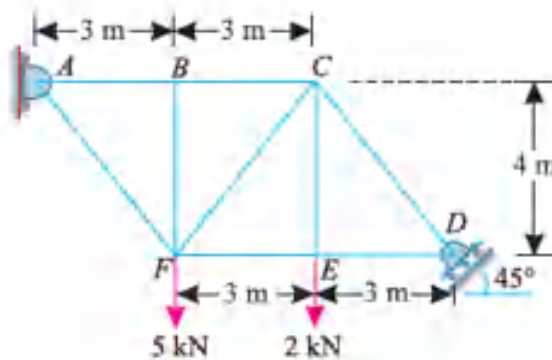
UNIT-IV

7. Compute the force in each member of the truss shown in Figure. 14m



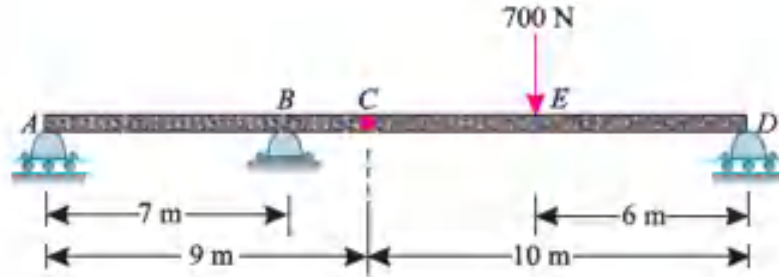
(OR)

8. a) Define the term 'support reaction'. Describe the analytical as well as graphical methods for finding out the support reactions of a beam carrying vertical loads only. 6m
- b) A truss hinged at A, and supported on rollers inclined at 45° with the horizontal at D, is loaded as shown in figure below. Find the reaction at A and D. 8m



UNIT-V

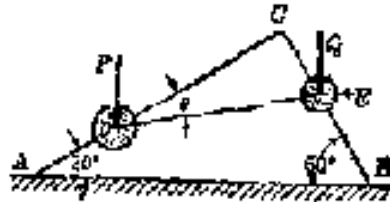
9. a) Two beams AC and CD of length 9 m and 10 m respectively are hinged at C. These are supported on rollers at the left and right ends (A and D). A hinged support is provided at B, 7m from A as shown in figure below. 10m



- b) State the principle of virtual work, and explain how it can be used for solving problems in statics. 4m

(OR)

10. a) Determine the angle defining the configuration for the following problem as shown in Figure using principle of virtual work when it is in equilibrium. 10m



- b) Explain the principle of virtual work. 4m

AR13

CODE: 13BS1002

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, DECEMBER, 2019

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) Write Newton Raphson method
- b) If $y = ax^b$, the first normal equation is $\sum \log y_i =$
- c) $(1 + \Delta)(1 - \nabla) =$
- d) Write Simpson's $\frac{1}{3}$ rule for $\int_a^b f(x)dx$.
- e) If $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 0$ then by Picard's method the value of $y^{(1)}(x)$ is
- f) The first order Runge - Kutta method formula is
- g) Write Change of scale property in Laplace Transform.
- h) $L^{-1}\left\{\frac{8s}{s^2 - 16}\right\}$
- i) The complete integral of $z = px + qy - 2\sqrt{pq}$ is ?
- j) Write One-dimensional heat equation

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Find an approximation root of the equation $x^4 - x - 10 = 0$, by fixed point method. 6M
- b) Find a real root of $xe^x = 2$ using Regula-false method. 6M

(OR)

3. a) Using Newton Raphson method, find a real root of $f(x) = x \sin x - 1 = 0$ starting with $x = 1$. 6M
- b) Fit an exponential curve of the form $y(x) = ae^{bx}$ to the following data: 6M

x	1	2	3	4	5
y	2.6	3.3	4.2	5.4	6.9

UNIT-II

4. a) For the following data fit a polynomial, By using Newton's forward difference formula. 6M

x	1	2	3	4
y	2	5	16	41

- b) Find the value of $i(t)$ when $t = 1.6$, by using the Lagrange's interpolation formula from the following data 6M

t	1.2	2.0	2.5	3.0
$i(t)$	1.36	0.58	0.34	0.2

(OR)

5. a) Find $f(1.28)$. If $f(1.15) = 1.0723$, $f(1.20) = 1.0954$, $f(1.25) = 1.1180$, and $f(1.30) = 1.1401$. 6M
- b) Evaluate the first derivative at $x = 0$ from the following data 6M

x	0	2	4	6	8	10
y	0	12	248	1284	4080	9980

UNIT-III

6. a) Evaluate $y(0.1)$ using Taylor's series method given that $y' = x^2 + y^2 + x$, $y(0) = 1$. 6M
- b) Find $y(0.2)$ using Euler's method given that $\frac{dy}{dx} = x - y$, $y(0) = 1$ with $h = 0.1$. 6M

(OR)

7. a) Apply Euler's method with $h = 0.1$ to find the solution of the equation $y' = x + y$ with initial condition $y = 1$ for $x = 0$ in the range $0 \leq x \leq 0.5$. 6M
- b) Find $y(0.1)$ and $y(0.2)$ using 1st order Runge – Kutta method given that $y' = xy + y^2$, $y(0) = 1$. 6M

UNIT-IV

8. a) Find $L \left\{ \int_0^t \sin t \, dt \right\}$. 6M
- b) Solve by the method of Laplace Transform, the equation $y'' + 4y' + 3y = e^{-t}$, $y(0) = y'(0) = 1$. 6M

(OR)

9. a) Find $L\{t \sin t\}$. 6M
- b) Evaluate $L^{-1} \left\{ \frac{1}{(s^2 + 2s + 1)} \right\}$ 6M

UNIT-V

10. a) Solve $p^2 + q^2 = x^2 + y^2$. 6M
- b) Solve $(D^2 + 4DD' - 5D'^2)z = \sin(2x + 3y)$. 6M

(OR)

11. a) Form the partial differential equation by eliminating the arbitrary constants a, b from $2z = (y - x)^2 + b$. 6M
- b) Solve $px - qy = y^2 - x^2$. 6M

ENGINEERING MECHANICS
(Common to EEE & ECE)

Time: 3 Hours

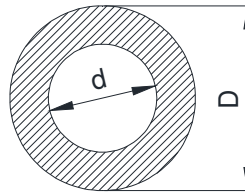
Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is moment of a force?
b) State triangle law of vector addition.
c) Define free body diagram.
d) State Lami's theorem.
e) What is limiting friction?
f) Define centre of gravity.
g) State parallel axis theorem.
h) Write the expression for Polar moment of inertia for the below figure.



- i) Write the equations of rectilinear motion.
j) State D'Alembert's principle.

PART-B

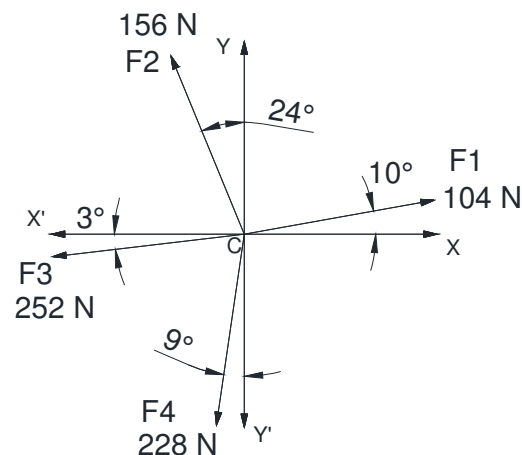
Answer one question from each unit

[5x12=60M]

UNIT-I

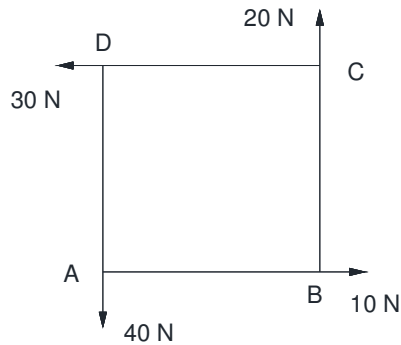
2. Determine the resultant and direction of the force system shown in below figure.

[12 M]



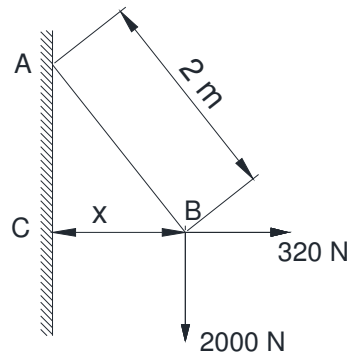
(OR)

3. Four forces of magnitudes 10 N, 20 N, 30 N and 40 N are acting respectively [12 M]
along the four sides of a square ABCD as shown in figure. Determine the
magnitude, direction and position of the resultant force.



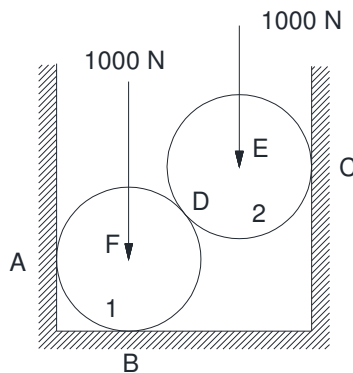
UNIT-II

4. A body weighing 2000 N is suspended with a chain AB, 2 m long. It is pulled by a [12 M]
horizontal force of 320 N as shown in figure. Find the force in the chain and the
lateral displacement, x of the body.



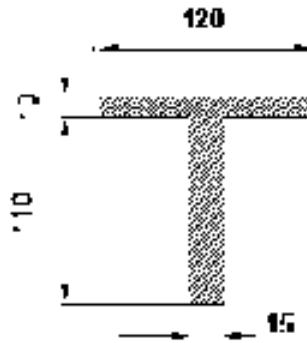
(OR)

5. Two spheres, each of weight 1000 N and of radius 25 cm rest in a horizontal [12 M]
channel of width 90 cm as shown in figure. Find the reactions at the points of
contact A, B and C.



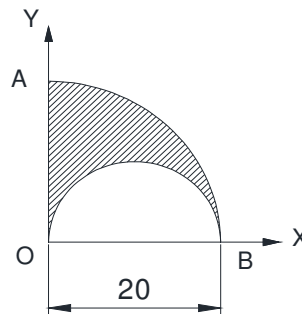
UNIT-III

6. Determine the centroid of the T-Section as shown in figure. All dimensions are in mm. [12 M]



(OR)

7. Find the co-ordinates of the centroid of the area shown in figure. [12 M]

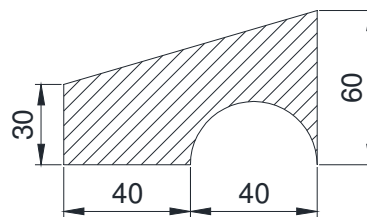


UNIT-IV

8. Derive the expression for moment of inertia of a rectangle about its a) base and b) centroidal axis parallel to the base. [12 M]

(OR)

9. A composit-section is shown in figure. Calculate the M.I. of the section about X-X axis parallel to the base and passing through the centroid. [12 M]



UNIT-V

10. A ball of mass 2kg was thrown vertically upwards and at a height of 5m above the ground, its kinetic energy was equal to its potential energy. How much time does the ball take to get back to the point from where it was thrown? Take $g = 10 \text{ m/s}^2$. [12 M]

(OR)

11. 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 figure. [12 M]