



# Nagarjuna College of Engineering & Technology

(Autonomous Institute Affiliated to VTU)

Second Semester BE Degree SE Examination, June / July- 2024

Introduction to Civil Engineering

Time: 3Hrs.

Max. Marks: 100

Note: Answer any one full questions from each module

## Module - 1

1a Explain the following branches of Civil Engineering.

i. Water Resource and Irrigation Engineering

ii. Environmental Engineering.

b Define different levels in a Residential building and discuss its importance.

c List and explain the type of beams used in the construction.

COs	M	BL
CO1	08	L1

CO1	06	L2
CO1	06	L2

OR

2a Explain,

i. Plain Cement Concrete

ii. Reinforced Cement Concrete. & specify their importance in construction.

b Define mortar. List the qualities of a good mortar.

c Distinguish between shallow foundation and deep foundation.

CO1	08	L2
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CO1	06	L1
CO1	06	L2

## Module - 2

3a State and explain basic principles of mechanics.

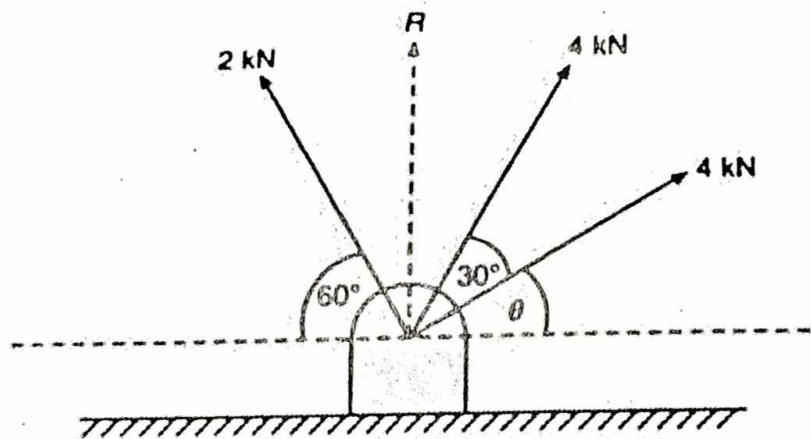
b Derive an expression to find the magnitude and direction of the resultant of two coplanar concurrent forces using parallelogram law.

c The resultant of a force system on a bracket as shown in figure is acting vertically upwards. If the angle  $30^\circ$  between the two 4 kN forces is fixed, find the angle  $\theta$ . Also determine the magnitude of the resultant.

CO2	04	L1
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CO2	08	L2
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CO2	08	L3
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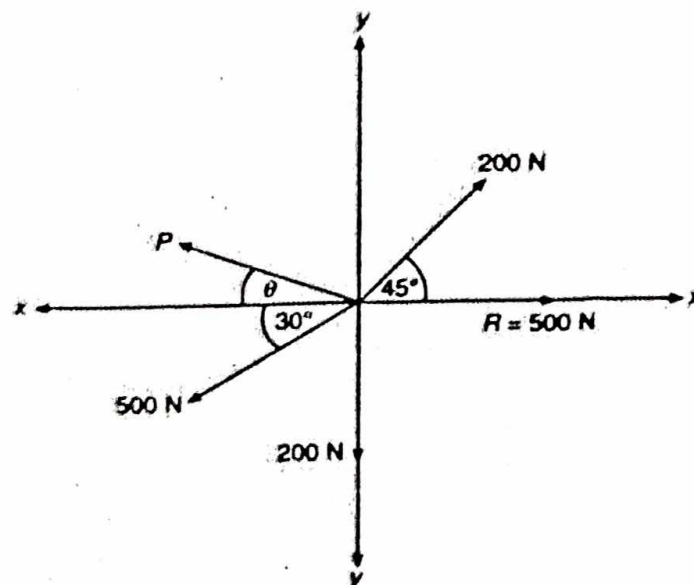
OR

4a State the Newton's laws of motion.

b Four Coplanar forces acting at a point are as shown in the figure. One of the forces is unknown and its magnitude is shown by P. The resultant has a magnitude of 500 N and is acting along X axis. Determine the unknown force P and its inclination with x axis.

CO2	06	L1
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CO2	08	L3
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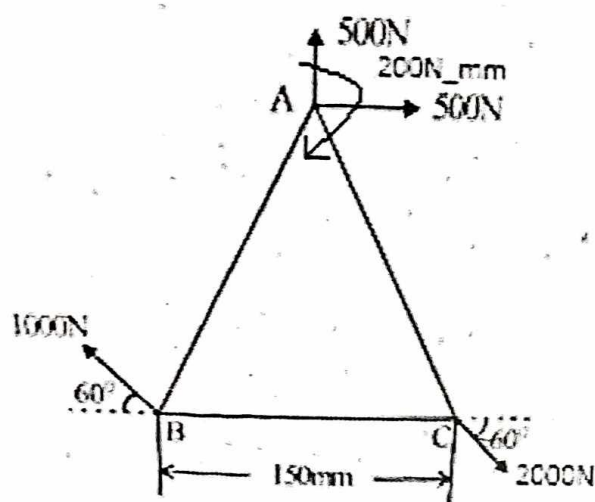


c State and prove Lami's theorem.

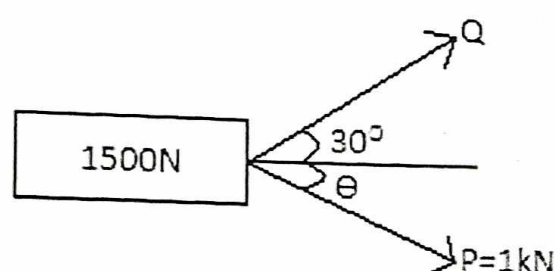
CO2	06	L2
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## Module - 3

- 5a State and prove Varignon's theorem of the moments. CO3 06 L2
- b Reduce the given system of forces acting on an isosceles triangle to a single resultant force and locate the resultant from point A. CO3 08 L3

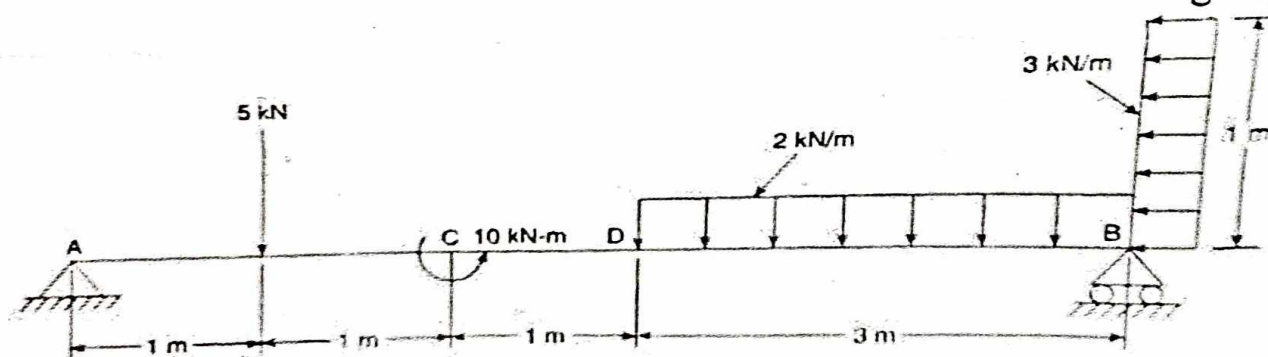


- c A boat of 1500 N is pulled by two strings as shown in fig determine the magnitude of the force and angle. CO3 06 L3



OR

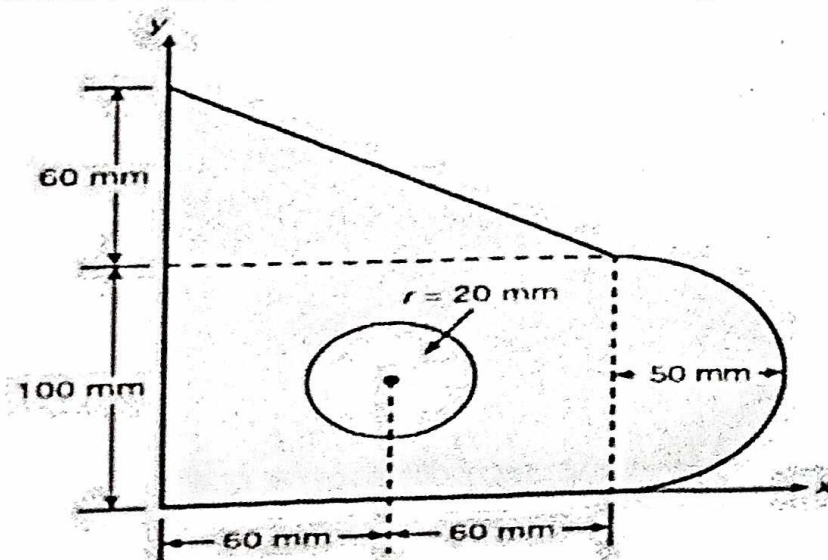
- 6a Define free body diagram. What is its significance CO3 06 L1
- b Find the support reactions at A and B for the beam loaded as shown in figure. CO3 08 L3



- c List and explain the different types of supports. CO3 06 L2

## Module - 4

- 7a Determine the centroid of semicircle when its base is parallel to Y axis. CO4 08 L3
- b Determine the Centroid of the shaded area as shown in figure. CO4 12 L3

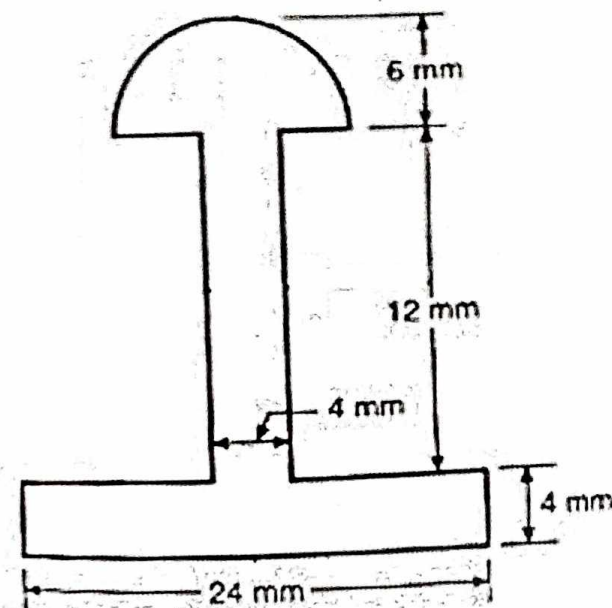


OR

- 8a Find the moment of inertia on the base of the isosceles triangle. CO4 08 L3



- b Find the polar moment of inertia for the section shown in figure.



### Module - 5

- 9a Differentiate between Rectilinear motion and Curvilinear motion. How does it helps in Transportation Engineering. CO4 06 L2
- b The motion of a particle is given by the equation  $x = t^3 - 3t^2 - 9t + 12$ . Determine the time, distance travelled and acceleration of particle when velocity is becomes zero. CO4 08 L3
- c A car is moving with a velocity of 20 m/sec. The car is brought to rest by applying brakes in 6 sec determine,  
 i. Retardation.  
 ii. The distance travelled by the car after applying brakes. CO4 06 L2

OR

- 10a Two cars P and Q accelerates from a standing start. The acceleration of P is  $1.3 \text{ m/sec}^2$  and that of Q is  $1.6 \text{ m/sec}^2$ . If Q was originally 6m behind P, how long it takes to overtake P. CO4 08 L3
- b Explain the terms,  
 i. Velocity  
 ii. Displacement  
 iii. Linear Displacement  
 iv. Acceleration Due to gravity CO4 08 L2
- c State D Alembert's Principle and mentions its applications in plane motion CO4 04 L3

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