

KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2025

Level : B.E.
Year : I
Time : 2 hrs. 30 mins.

11 April 2025

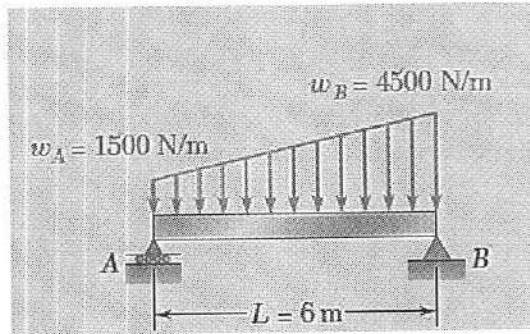
Course : ENGG 111
Semester : I
F. M. : 40

Instructions:

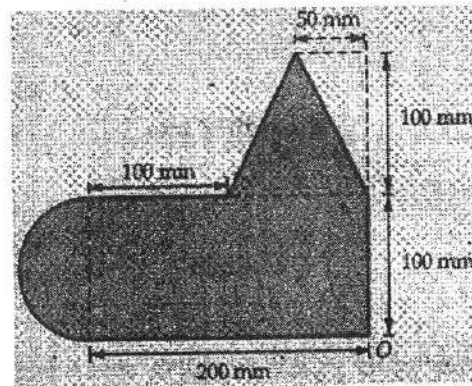
- Students are asked to attempt all questions.
- Assume suitable data if missing
- Use different answer sheets for different sections B, C and D.
- Numbers in the bracket refer to the marks the question carries.

SECTION "B"
[33 marks]

1. Determine the reactions at A and B for the beam subjected to the uniform load distribution. [4]



2. Locate the centroid of the area with respect to O. [4]



3. What does Hook's law state? State the difference in stress-strain curves for ductile and brittle materials (Draw the figure and label them). [1+2]
4. Write short notes on (ANY FIVE): [4 × 1.5 = 6]
- Factor of safety
 - Poisson's ratio
 - Newtonian fluid
 - Entropy
 - Intensive and extensive properties
 - Bulk modulus

P.T.O.

5. State first law of thermodynamics. What were the limitations of first law addressed in second law of Thermodynamics? [4]
6. Differentiate heat pump and refrigerator with suitable diagram [2]
7. What is a no-slip boundary condition? State Newton's law of viscosity. [1+2]
8. The diameter of a pipe at 40 cm conveying water into two pipes of diameter 30 cm and 20 cm respectively. If the average velocity in the 40 cm diameter pipe is 3.5 m/s. Find the discharge in this pipe. Also determine the velocity in 20 cm pipe, if the average velocity in 30 cm diameter pipe is 3 m/s. [4]
9. Define turbomachine. Differentiate between series and parallel pump connection. [1+2]

SECTION "C"

[11 marks]

10. Explain briefly the properties of good bricks. Explain briefly the function of each ingredient of cement. [1+2]
11. What are different requirement of good foundation? Explain different types of deep foundation with neat and labelled sketch. [1+2]
12. Explain briefly different factors that are to be considered during supervision of the stone masonry? Differentiate between stretcher bond and header bond. [2+1]
13. Explain briefly different types of dams. [2]

SECTION "D"

[11 marks]

14. What is the principle of chain surveying? Describe briefly how plane surveying differs from geodetic surveying? [2+2]
15. What do you mean by spatial data and attribute data in GIS? Active and Passive remote sensing are two major types of remote sensing. Explain about these two systems in brief. [2+2]
16. The bearing of the lines OA, OB, OC, OD are $30^{\circ}30'$, $140^{\circ}15'$, $220^{\circ}45'$ and $310^{\circ}30'$ respectively. Find the angles AOB, BOC and COD. [3]