

SATHYABAMA UNIVERSITY

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Course & Branch: B.Arch

Title of the paper: Applied Mechanics

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Max. Marks: 80

Time: 3 Hours

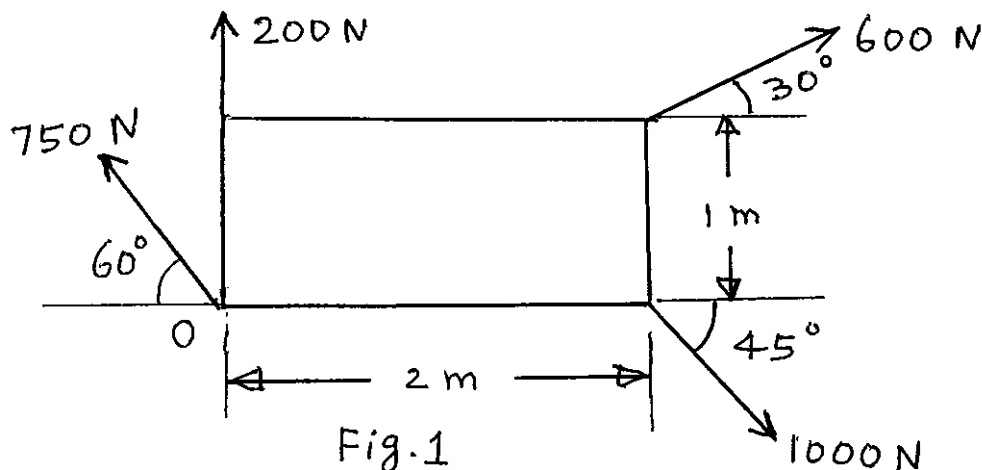
Session: FN

PART – A

(8 x 4 = 32)

Answer All the Questions

1. Determine the resultant of the four forces acting on a plate shown in fig.1



2. Differentiate between perfect and imperfect frames. Also list out the assumptions that are made in analyzing a frame.
3. Draw the stress-strain curve of a ductile material and explain.
4. Define:
 - a) Shear modulus
 - b) Hooke's law
 - c) Poisson's ration
 - d) Bulk modulus

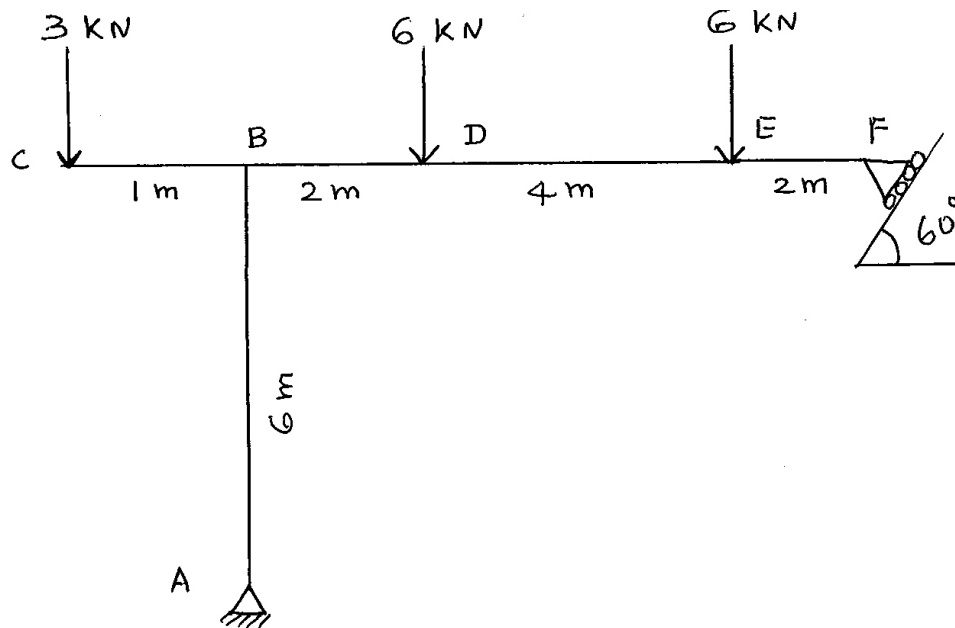


Fig. 3

11. (a) Derive the relation $E = 2G \left(1 + \frac{1}{m}\right)$
 (b) Differentiate between stress and strain and also obtain the relation between them.
- (or)
12. A rod of length 1 m and diameter 20 mm, is subjected to a tensile load of 20 kN. The increase in length of the rod is found to be 0.30 mm and the decrease in diameter is 0.0018 mm. Calculate Poisson's ratio and the three moduli.
13. Locate C.G. for a channel section of the following dimensions.
- | | | |
|---------------------------|---|-------------|
| (a) Size of top flange | : | 100 x 10 mm |
| (b) Size of web | : | 10 x 200 mm |
| (c) Size of bottom flange | : | 100 x 10 mm |
- (or)
14. Find out I_{xx} and I_{yy} for an I-section of the following dimensions.
- | | | |
|---------------------------|---|-------------|
| (a) Size of top flange | : | 100 x 20 mm |
| (b) Size of web | : | 20 x 180 mm |
| (c) Size of bottom flange | : | 120 x 20 mm |

15. A cantilever beam of span 8 m carries uniformly distributed load of 5 KN/m over its entire span. The beam also carries 2 point loads of 10 KN and 20 KN at the distances of 3 m and 5 m from the free end respectively. Draw SFD and BMD.

(or)

16. A simply supported beam of span 10 m carries 3 point loads of 5 KN, 10 KN and 15 KN at the distances 3 m, 5 m and 7 m respectively from left support. The beam also carries uniformly distributed load of 3 KN/m over a length of 5 m from left support. Draw SFD and BMD.