

No. of Printed Pages : 4

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Roll No.

4th Sem / Branch : Civil
Subject:- Structural Mechanics

Time : 3Hrs.

M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory
(10x1=10)

- Q.1 Hooke's law is hold good within (CO-2)
a) Plastic limit b) Yield limit
c) Euler's limit d) Elastic limit
- Q.2 Ductile materials fails mainly due to (CO-1)
a) Direct stress b) Bending
c) Shear d) None of these
- Q.3 If $n < 2$ J-3, then the frame is called (CO-9)
a) Perfect frame b) Deficient frame
c) Redundant frame d) None of these
- Q.4 A member of structure carrying axial compressive load is called (CO-8)
a) tie b) shaft
c) strut d) None of these
- Q.5 In a cantilever beam maximum deflection occurs at (CO-7)
a) fixed end
b) free end
c) middle of the beam
d) depends upon loading pattern
- Q.6 At the neutral axis of a beam the shear stress is (CO-6)
a) Zero b) minimum
c) maximum d) None of these
- Q.7 The theorem of perpendicular axis is used to obtain the moment of inertia of a : (CO-4)
a) rectangular lamina b) square lamina
c) triangular lamina d) circular lamina
- Q.8 When shear force at a point is zero the bending moment at that point will be (CO-3)

- a) Zero b) minimum
c) maximum d) infinity

- Q.9 The ratio of lateral strain to linear strain is known as (CO-2)
a) elastic limit
b) young's modulus
c) modulus of rigidity
d) poisson's ratio
- Q.10 Buckling load is maximum when a column has (CO-8)
a) both end hinged
b) both end fixed
c) one end fixed and other free
d) None of these

SECTION-B

Note: Objective type questions. All questions are compulsory.
(10x1=10)

- Q.11 A frame in which number of members are more than $2J-3$ is called _____ frame. (CO-9)
- Q.12 Euler's formula is applicable for _____ columns only (CO-8)
- Q.13 Neutral axis of a section always passes through its _____ (CO-5)
- Q.14 Gold is _____ material (Ductile/Brittle) (CO-1)
- Q.15 The ratio of change in volume to original volume is known as _____ (CO-2)
- Q.16 The moment of inertia of a triangle about its vertex is _____ (CO-4)
- Q.17 The bending moment at supports in case of simply supported beam is always _____ (CO-3)
- Q.18 The ratio of maximum deflection of a beam to its span is known as _____ (CO-7)
- Q.19 The shear stress distribution diagram for a rectangular section is _____ curve (CO-6)
- Q.20 The beam which is fixed at one end and free at other end is called _____ (CO-3)

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

- Q.21 Describe the assumptions made in finding out the forces in the frame (CO-9)

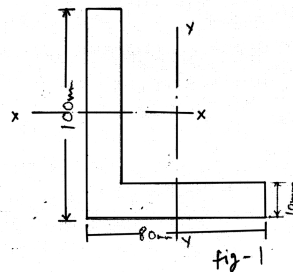
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- Q.22 A bar of 60mm diameter and 4 m length is elongated by 6 mm under a pull of 60 kN. Calculate the buckling load if both ends are fixed. (CO-8)
- Q.23 Draw the stress - strain curve for a mild steel specimen (CO-1)
- Q.24 A steel bar 2m long and 30 mm diameter is subjected to an axial pull of 30 kN. If the young's modulus of elasticity of the material is $2 \times 10^5 \text{ N/mm}^2$ find stress, strain and elongation of the bar. (CO-2)
- Q.25 State the theorem of parallel axis (CO-4)
- Q.26 What do you mean by slope and deflection (Co-7)
- Q.27 A simply supported beam of 40 mm width and 60mm depth in section and 4 m length, carries a point load of 30 kN at the centre. calculate the maximum bending stress induced in the beam (CO-5)
- Q.28 Define the type of loads (CO-2)
- Q.29 Find the moment of inertia of L-section 100' 80' 10mm about x-x axis and y-y axis as shown in fig. 1 (CO-4)



- Q.30 Explain the classification of column (CO-8)
- Q.31 What is shear force diagram and Bending Moment Diagram? describe briefly. (CO-3)
- Q.32 A circular beam of 150mm diameter is subjected to shear force of 140 kN. calculate the maximum and minimum shear stress on the section of the beam. Also sketch on the section of the beam. Also sketch the variation of the shear stress along the depth of the beam. (CO-6)
- Q.33 Determine Euler's buckling load for an I-section joist 300mm' 150mm' 125mm and 6m long which is used as a strut with the both ends fixed. Take $E=2 \times 10^5 \text{ N/mm}^2$ (CO-2)
- Q.34 Define Hook's law and poisson's ratio (CO-2)

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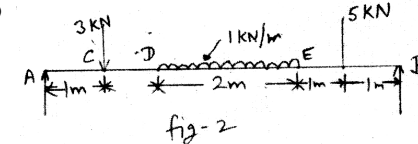
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- Q.35 Derive the bending equation (CO-5)

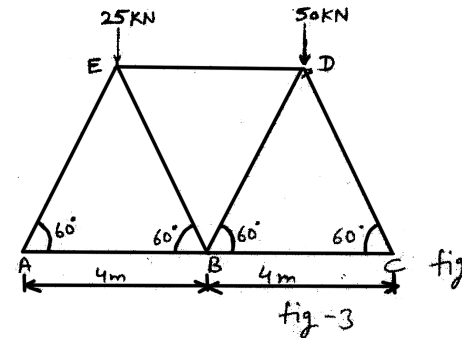
SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

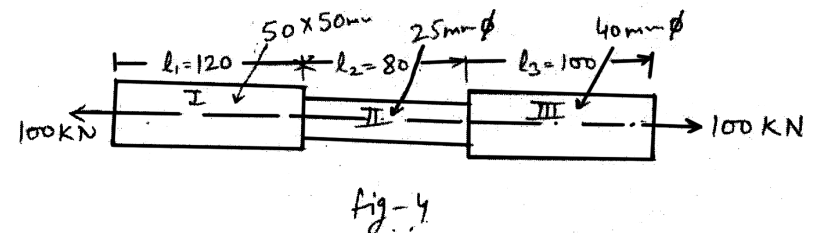
- Q.36 A simply supported beam is loaded by u.d.l. and two point loads as shown in fig.-2 Draw the shear force and bending moment diagram. Determine the value of maximum bending moment also (CO-3)



- Q.37 Find the forces in three members of the given truss by any method as shown in fig.-3 (CO-9)



- Q.38 A bar 300mm long carries tensile force of 100 kN as shown in fig.-4 calculate maximum and minimum stresses developed in it. Also calculate the total elongation when young's modulus $E=200 \text{ GN/m}^2$ and uniform distribution of load over the cross - section is assumed (CO-2)



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