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**3rd Sem / Civil, Highway Engg.**

**Subject:- Structural Mechanics**

Time : 3Hrs.

M.M. : 100

**SECTION-A**

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

- Q.1 In SI system of units, the unit of stress is (CO2)  
a)  $\text{Kgf/mm}^2$  b)  $\text{Kg/mm}^2$   
c) Pascal d)  $\text{N/m}^2$
- Q.2 For a compressive material, the value of Poisson's ratio is (CO2)  
a) Equal to zero b) Greater than 0.5  
c) Less than 0.5 d) Greater than 1
- Q.3 Ductility is opposite to (CO1)  
a) brittleness b) malleability  
c) creep d) plasticity
- Q.4 The shear stress at a section in a beam varies along (CO6)  
a) depth b) width  
c) perimeter d) none of these
- Q.5 At the neutral axis of simply supported beam. There is (CO5)  
a) Maximum tensile stress  
b) Minimum compressive stress  
c) Zero stress  
d) All of the above
- Q.6 In case of circular sections, the section modulus is given by: (CO4)  
a)  $Pd^2/16$  b)  $Pd^3/16$   
c)  $Pd^3/32$  d)  $Pd^4/64$

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- Q.7 Slope is the angle in radians which the tangent at the section makes with the (CO7)  
a) Horizontal b) Vertical  
c) Axis d) None of these
- Q.8 Rankine's formula is generally adopted when slenderness ratio lies in between (CO8)  
a) 0 - 100 b) 0 - 140  
c) Less than 80 d) Any value
- Q.9 Euler's formula for long column gives (CO8)  
a) Critical load b) Working load  
c) Failure load d) Ultimate load
- Q.10 For determination of forces in the truss, which method is used from the following methods (CO8)  
a) Method of sections b) Graphical method  
c) Method of joints d) All of these

**SECTION-B**

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

- Q.11 Compression test is performed for \_\_\_\_\_ material. (CO1)
- Q.12 What is the unit of strain \_\_\_\_\_? (CO2)
- Q.13 What is an S.F.D \_\_\_\_\_? (CO3)
- Q.14 Units of section modulus is \_\_\_\_\_ (CO4)
- Q.15 What is unit of moment of Inertia \_\_\_\_\_? (CO4)
- Q.16 What is temperature stress? (CO2)
- Q.17 The shear stress at the N.A. is \_\_\_\_\_ (CO6)
- Q.18 Slope and deflection are both zero in cantilever beam at \_\_\_\_\_ end. (CO7)
- Q.19 Euler's formula is applicable for \_\_\_\_\_ column only. (CO8)
- Q.20 A frame in which number of members are more than  $(2j-3)$  is called \_\_\_\_\_ Frame. (CO9)

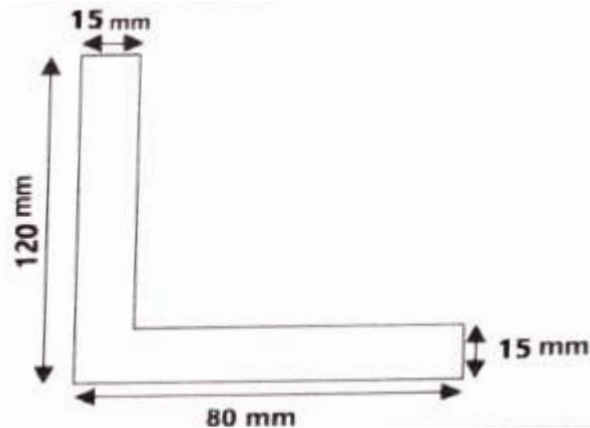
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### SECTION-C

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

- Q.21 What is stress- strain curve? Explain with diagram briefly. (CO2)
- Q.22 Write the name of the tests for mechanical properties of materials and draw the stress-strain diagram for brittle materials. (CO1)
- Q.23 What is a beam? Explain its types. (CO3)
- Q.24 Define types of loads. (CO3)
- Q.25 Describe pure bending equation. (CO5)
- Q.26 What is necessity for calculating deflection for a beam ? (CO7)
- Q.27 State and explain the Hook's law. (CO2)
- Q.28 Determine the moment of Inertia of an angle section 120mm x 80mm x 15mm about xx and yy axis as shown in given figure. (CO4)



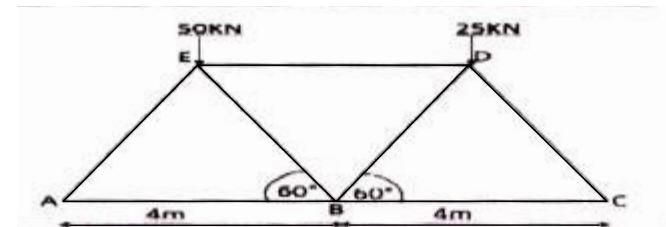
- Q.29 A bar of 15mm diameter and 9m length was found to elongate 12mm under a pull of 40KN. Find the buckling load if both the ends are fixed. (CO8)

- Q.30 Write the name of the different types of end supports of beams along with their diagrams. (CO3)
- Q.31 What are E (Young's modulus of elasticity), G (Modulus of Rigidity), K (Bulk modulus of elasticity). Explain briefly. (CO2)
- Q.32 What are the assumptions made in analysis of truss? Describe briefly. (CO9)
- Q.33 Enlist various types of end support of a beam. (CO3)
- Q.34 Define types of frames. (CO9)
- Q.35 Write the assumptions made in find out the forces in a frame. (CO9)

### SECTION-D

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

- Q.36 A wooden tie is 70mm wide, 120mm deep and 3m long. It is subjected to an axial pull of 60KN. The extension of members is found to be 0.70 mm find young's modulus of the tie material. (CO2)
- Q.37 Find the forces in the members of given truss by any method. (CO9)



- Q.38 Explain the different types of beams along-with their neat sketches. (CO3)