

Name: _____ Hall Ticket No. _____

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Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.

I Choose the correct alternative:

- When the normal stress is maximum, the shear stress becomes []
a) Maximum b) zero c) half of normal stress d) none
- Principal stresses can graphically studied by []
a) Rayleghs method b) Mohr's method c) Euler method d) Rankine method
- If Increasing the mean area of the fuselage, the torque transmitting capacity []
a) decreases b) increases c) unaffected d) none
- If the displacements shape of a simply supported beam carrying a load of 'W' at mid of its span length is assumed by the equation $v = v_B \sin(\pi z/L)$, then the total potential energy of the beam is given by []
a) $\frac{\pi^4 EI v_B^2}{4L^3} W v_B$ b) $\frac{\pi^4 EI v_B^2}{4L^3} - 2W v_B$
c) $\frac{\pi^4 EI v_B^2}{4L^3} + W v_B$ d) None
- The state of plane-stress at a point is given by σ_I and σ_{II} respectively. The maximum shear stress is equal to []
a) $(\sigma_I + \sigma_{II})/2$ b) $(\sigma_I - \sigma_{II})/2$ c) $(\sigma_I * \sigma_{II})/2$ d) None
- A square bar of side 4 cm and length 100cm is subjected to an axial load P. the same bar is then used as a cantilever beam and subjected to an end load. P. the ratio of the strain energies, stored in the bar is the second case to that stored in the first case, I []
a) 16 b) 400 c) 1000 d) 2500
- Strain energy of a axial bar due to load P is []
a) $P^2 L / AE$ b) $P^2 L / 2AE$ c) $2P^2 L / AE$ d) $P^2 L / 4AE$
- The minimum or minor principal stress theory is given by []
a) $\frac{\sigma_x + \sigma_y}{2} - \frac{1}{2} \sqrt{(\sigma_x - \sigma_y)^2 + 4\tau_{xy}^2}$ b) $\frac{\sigma_x + \sigma_y}{2} + \frac{1}{2} \sqrt{(\sigma_x - \sigma_y)^2 + 4\tau_{xy}^2}$
c) $\frac{\sigma_x + \sigma_y}{2} / \frac{1}{2} \sqrt{(\sigma_x - \sigma_y)^2 + 4\tau_{xy}^2}$ d) None
- Torsion of hollow thin walled closed cells is given by []
a) Euler theory b) Johnson theory c) Bredt-batho theory d) Timoshenko theory
- Torsion of thin walled multicell closed hollow structure is []
a) Statically determinate problem b) statically indeterminate problem
c) Both a and b d) none

II Fill in the blanks:

11. The product of shear stress and thickness of the section is defined as-----
12. If q_1 and q_2 are the shear flows and A_1 and A_2 are the mean areas of thin walled two cell closed structure subjected to torque T , T is given by-----
13. The total potential energy of an elastic system has a stationary value if the system is in -----
14. The total strain energy in the simple supported beam with point load at the centre is given By-----
15. When the Normal stress on the inclined plane is maximum, the shear stress becomes-----
16. The maximum strain energy theory is given by -----
17. If the mean area of a hollow tube is 100 mm^2 and subjected to torque of 2000 Nmm , the shear flow in N/mm is-----
18. If the working stress is 200 N/mm^2 and yield stress is 400 N/mm^2 , the Factor of safety according to maximum principal stress theory is-----
19. If U is the total strain energy due to point load P , the deflection under the load by castiglino's theorem is given by-----
20. If M is the bending moment due to external load, m is the bending moment due to unit load at that section, according to unit load method, the deflection under the load is given by-----

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 a) $\frac{\pi^4 EI v_B^2}{4L^3} W v_B$ b) $\frac{\pi^4 EI v_B^2}{4L^3} - 2W v_B$ []
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- The state of plane-stress at a point is given by σ_I and σ_{II} respectively. The maximum shear stress is equal to
 a) $(\sigma_I + \sigma_{II})/2$ b) $(\sigma_I - \sigma_{II})/2$ c) $(\sigma_I * \sigma_{II})/2$ d) None []
- A square bar of side 4 cm and length 100cm is subjected to an axial load P. the same bar is then used as a cantilever beam and subjected to an end load. P. the ratio of the strain energies, stored in the bar is the second case to that stored in the first case, I
 a) 16 b) 400 c) 1000 d) 2500 []
- Strain energy of a axial bar due to load P is
 a) $P^2 L / AE$ b) $P^2 L / 2AE$ c) $2P^2 L / AE$ d) $P^2 L / 4AE$ []
- The minimum or minor principal stress theory is given by
 a) $\frac{\sigma_x + \sigma_y}{2} - \frac{1}{2} \sqrt{(\sigma_x - \sigma_y)^2 + 4\tau_{xy}^2}$ b) $\frac{\sigma_x + \sigma_y}{2} + \frac{1}{2} \sqrt{(\sigma_x - \sigma_y)^2 + 4\tau_{xy}^2}$ []
 c) $\frac{\sigma_x + \sigma_y}{2} / \frac{1}{2} \sqrt{(\sigma_x - \sigma_y)^2 + 4\tau_{xy}^2}$ d) None
- Torsion of hollow thin walled closed cells is given by
 a) Euler theory b) Johnson theory c) Bredt-batho theory d) Timoshenko theory []
- Torsion of thin walled multicell closed hollow structure is
 a) Statically determinate problem b) statically indeterminate problem []
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- When the normal stress is maximum, the shear stress becomes
 a) Maximum b) zero c) half of normal stress d) none []
- Principal stresses can graphically studied by
 a) Rayleighs method b) Mohr's method c) Euler method d) Rankine method []
- If Increasing the mean area of the fuselage, the torque transmitting capacity
 a) decreases b) increases c) unaffected d) none []

II Fill in the blanks:

11. The total strain energy in the simple supported beam with point load at the centre is given By-----
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17. If M is the bending moment due to external load, m is the bending moment due to unit load at that section, according to unit load method, the deflection under the load is given by-----
18. The product of shear stress and thickness of the section is defined as-----
19. If q_1 and q_2 are the shear flows and A_1 and A_2 are the mean areas of thin walled two cell closed structure subjected to torque T , T is given by-----
20. The total potential energy of an elastic system has a stationary value if the system is in -----

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