

Question Bank For PG Course

Mathematics Paper-10B(ii)(NEW) Special Paper: Applied Mathematics MECHANICS OF SOLIDS : PGMT-XB(NEW)

Question 1

What is the Navier's equation of equilibrium in the case of plane strain?

Question 2

What is the condition when the body is in the state of plane stress parallel to x_1x_2 plane?

Question 3

What are the strain components in the case of axial extension of a beam under the action of a uniform normal stress N acting on the bases along x_1 axis?

Question 4

What is the torsional rigidity in terms of Prandtl stress function?

Question 5

What is the condition for the lines of shear stress?

Question 6

What is the differential form of the Euler's equation associated with variational problem?

Question 7

What is the Euler equation when a stretched string of length l with ends fixed at $(0,0)$ and $(l,0)$ be deflected by a distributed transverse load $f(x)$ per unit length and also suppose that the transverse deflection $y(x)$ is small and that the change in the stretching force T produced by deflection be negligible?

Question 8

What is the expression of velocities of P-wave and S-wave?

Question 9

Which one of the following statement
P: The Love wave is dispersive in nature.
Q: Rayleigh wave is dispersive in nature.
is true?

Question 10

What is the bonding rigidity of a thin plate with thickness h ?

Question 11

What is the differential equation of the transverse vibration of a thin plate?

Question 12

What is the conditions of the simply supported edge for transverse vibration of a thin plate?

Question 13

What are the stress deviators $S_x, S_y, S_z, S_{xy}, S_{yz}, S_{zx}$, (where, σ_j 's are principal stresses and S is the mean of the stress)?

Question 14

What is the behaviour of potential energy when the displacements which satisfy the given boundary conditions and the equilibrium equations?

Question 15

What is the expression for Goursat formula for the biharmonic equation?

Question 16

When the biharmonic function $U = U(x_1, x_2)$ is called the Airy Stress function?

Question 17

What is the condition when the body is in the state of plane strain parallel to x_1x_2 plane?

Question 18

What are the stress components when the beam stretched by its own weight, taking origin at the lower base $x_3 = 0$ of the beam and x_3 axis vertically upward?

Question 19

What are the equations for the Prandtl's stress function satisfies the Dirichlet problem?

Question 20

What is the torsional rigidity for the torsion problem of a long prismatic bar of elliptic cross section?

Question 21

What is the expression for displacement components u_1 and u_2 in terms of two harmonic functions $\phi(z)$ and $\psi(z)$?

Question 22

What is the Euler equation for the deflection of the central line of a beam by transverse load $f(x)$?

Question 23

What are the assumptions made for small deflection?

P: The normal to the middle plane before bending are deformed into normal of the middle surface after bending.

Q: The normal component across each thin layer parallel to xy -plane is small in comparison to other components of the stress and can be neglected.

R: The slope of the deflected middle surface, called the neutral surface, of the plane in any direction is small.

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Question 24

Which one of the following statements is true?

P: The velocity of propagation of Rayleigh is $c = 0.9194\beta$

Q: Rayleigh wave is dispersive in nature.

Question 25

In the torsion problem where is the maximum resultant shearing stress occurs on the rod?

Question 26

What is D in the differential equation

$D\nabla^2 w + \rho \frac{\partial^2 w}{\partial x^2} = q$ of the transverse vibration of a thin plate?

Question 27

What are the conditions of the clamped edge for transverse vibration of a thin plate?

Question 28

What is the Tresca's criterion?

Question 29

What is the behaviour of complementary energy for the equilibrium state of the stress tensor?

Question 30

What is the stress-strain relation of Von Mises?