

## GATE 2024 Mechanical (ME) Daily Practice Questions

**Question 1.** Consider a linear elastic rectangular thin sheet of metal, subjected to uniform uniaxial tensile stress of 100 MPa along the length direction. Assume plane stress conditions in the plane are normal to the thickness. The Young's modulus  $E = 200$  MPa and Poisson's ratio  $\nu = 0.3$  are given. The principal strains in the plane of the sheet are

1. (0.35, -0.15)
2. (0.5, 0.0)
3. (0.5, -0.15)
4. (0.5, -0.5)

**Question 2.** A spur gear has pitch circle diameter  $D$  and number of teeth  $T$ . The circular pitch of the gear is

1.  $\pi D/T$
2.  $T/D$
3.  $D/T$
4.  $2\pi D/T$

**Question 3.** Endurance limit of a beam subjected to pure bending decreases with

1. decrease in the surface roughness and decrease in the size of the beam
2. increase in the surface roughness and decrease in the size of the beam
3. increase in the surface roughness and increase in the size of the beam
4. decrease in the surface roughness and increase in the size of the beam

**Questions 4.** A two-dimensional incompressible frictionless flow field is given by  $u = x\hat{i} - y\hat{j}$ . If  $\rho$  is the density of the fluid, the expression for pressure gradient vector at any point in the flow field is given as

1.  $\rho(x\hat{i} + y\hat{j})$
2.  $-\rho(x\hat{i} + y\hat{j})$
3.  $\rho(x\hat{i} - y\hat{j})$

4.  $-r(x^2\hat{i} + y^2\hat{j})$

**Question 5.** *One-dimensional steady-state heat conduction takes place through a solid whose cross-sectional area varies linearly in the direction of heat transfer. Assume there is no heat generation in the solid and the thermal conductivity of the material is constant and independent of temperature. The temperature distribution in the solid is*

1. Linear
2. Quadratic
3. Logarithmic
4. Exponential