

MCQ Continuum Mechanics

Choose the correct option:

1. The continuum hypothesis assumes that matter is
 - (A) composed of discrete particles only
 - (B) continuously distributed throughout the region
 - (C) incompressible in all cases
 - (D) perfectly rigid

Answer: (B)

2. Which of the following represents a body force?
 - (A) Pressure force
 - (B) Frictional force
 - (C) Gravitational force
 - (D) Shear force

Answer: (C)

3. According to Cauchy's law, the traction vector on a surface depends linearly on
 - (A) displacement vector
 - (B) velocity vector
 - (C) unit normal vector
 - (D) strain tensor

Answer: (C)

4. The stress tensor in continuum mechanics is generally
 - (A) a scalar quantity
 - (B) a vector quantity
 - (C) a second-order tensor
 - (D) a fourth-order tensor

Answer: (C)

5. Principal stresses are obtained when
 - (A) shear stresses are maximum
 - (B) normal stresses vanish
 - (C) shear stresses vanish on the plane
 - (D) body forces are neglected

Answer: (C)

6. Body force acts on
 - A) Surface only
 - B) Volume of the body
 - C) Line
 - D) Point

Answer: (B)

7. Cauchy's stress principle relates
 - A) Force and displacement
 - B) Energy and work
 - C) Stress and strain

D) Stress vector and normal vector

Answer: (D)

8. Lagrangian description tracks

A) Fluid particles

B) Pressure only

C) Density only

D) Fixed point in space

Answer: (A)

9. Compatibility conditions ensure

A) Force balance

B) Energy conservation

C) Continuous deformation

D) Velocity field

Answer: (C)

10. Circulation is

A) Line integral of velocity

B) Surface integral

C) Volume integral

D) Scalar field

Answer: (A)

11. Continuity equation represents

A) Force balance

B) Energy conservation

C) Mass conservation

D) Momentum conservation

Answer: (C)

12. The trace of the stress tensor represents

(A) shear stress

(B) volumetric stress component

(C) stress deviator

(D) principal shear stress

Answer: (B)

13. In the Eulerian description of motion, the observer focuses on

(A) individual material particles

(B) fixed points in space

(C) initial configuration only

(D) principal strains only

Answer: (B)

14. The deformation gradient tensor is commonly denoted by

(A) σ

(B) ε

(C) F

(D) τ

Answer: (C)

15. The infinitesimal strain tensor is valid when

- (A) deformations are very large
- (B) rotations are infinite
- (C) deformations and rotations are small
- (D) stresses vanish

Answer: (C)

16. Compatibility conditions in elasticity ensure that

- (A) stresses are symmetric
- (B) strains correspond to a continuous displacement field
- (C) body forces vanish
- (D) the material remains rigid

Answer: (B)

