

HGPE TERMINOLOGY — UPDATED

Speechify-ready compilation • Answers updated using the corrections provided in chat

1. A gate is inclined at 45° to the horizontal and submerged in water. The center of pressure lies

- A. Below the centroid
- B. At the centroid
- C. Above the centroid
- D. At the conoid

Answer: A. Below the centroid

2. If the depth below a liquid surface is doubled, the hydrostatic pressure will

- A. Double
- B. Become zero
- C. Stay the same
- D. Halve

Answer: A. Double

3. A balloon filled with hot air has lower density than ambient air. Why does it rise?

- A. Due to buoyancy
- B. Because of surface tension
- C. Because it has a higher pressure
- D. Due to gravity pulling harder on cold air

Answer: A. Due to buoyancy

4. What quantity is conserved in ideal hydrodynamic flow?

- A. Mass
- B. Temperature
- C. Pressure
- D. Viscosity

Answer: A. Mass

5. Which are classifications of flow in fluid mechanics?

- A. Gravity, Pumped, Pressurized
- B. Transitional, Steady, Chaotic
- C. Laminar, Turbulent, Uniform
- D. Steady, Unsteady, Natural

Answer: C. Laminar, Turbulent, Uniform

6. The specific weight of water is 1000 kg/m³. To use this value the water must be

- A. At 4°C temperature
- B. At all of the given conditions
- C. At mean sea level
- D. At normal pressure of 750 mm

Answer: A. At 4°C temperature

7. The property of a fluid which offers resistance to the movement of one layer of fluid over an adjacent layer is called

- A. Viscosity
- B. Surface tension
- C. Adhesion
- D. Cohesion

Answer: A. Viscosity

8. The pressure measured above absolute zero of pressure is called

- A. Gage pressure

- B. Atmospheric pressure
- C. Absolute pressure
- D. Vacuum pressure

Answer: C. Absolute pressure

9. The rise or fall of a liquid surface in a small-diameter tube inserted into the liquid is known as

- A. Buoyancy
- B. Capillarity
- C. Compressibility
- D. Turbulence

Answer: B. Capillarity

10. Flow in a pipe is considered laminar when the Reynolds number is

- A. Greater than 4000
- B. Between 2000 and 4000
- C. Equal to zero
- D. Less than 2000

Answer: D. Less than 2000

11. The maximum dry unit density up to which any soil can be compacted depends upon

- A. Both moisture content and amount of compaction energy
- B. Amount of compaction energy only
- C. Moisture content only
- D. None of the given choices

Answer: A. Both moisture content and amount of compaction energy

12. The neutral stress in a soil mass is

- A. Stress taken up by the pore water
- B. Stress taken up by the soil particles
- C. Force per effective area
- D. Force per neutral area

Answer: A. Stress taken up by the pore water

13. Among the methods for determining the shear strength of soils, which test may NOT accurately represent field conditions?

- A. Triaxial tests
- B. Standard penetration test (SPT)
- C. Unconfined compression tests
- D. Direct shear tests

Answer: B. Standard penetration test (SPT)

14. What laboratory test is commonly used to determine both cohesion and angle of internal friction?

- A. Permeability test
- B. Unconfined compression test
- C. Compaction test
- D. Direct shear test

Answer: D. Direct shear test

15. Which test measures the shear strength of a soil sample under various confining pressure?

- A. Standard penetration test (SPT)
- B. Unconfined compression test
- C. Triaxial tests
- D. Direct shear tests

Answer: C. Triaxial tests

16. What causes the landslide during continuous rainfall?

- A. Cohesion
- B. Increase in pore water pressure
- C. Decrease in permeability
- D. Capillary rise

Answer: B. Increase in pore water pressure

17. Which test is commonly used in the Philippines to determine the in-situ density of compacted soil in roadworks?

- A. Sieve Analysis
- B. Triaxial Test
- C. Direct Shear Test
- D. Sand Cone Method

Answer: D. Sand Cone Method

18. Which best describes why saturated clays fail at lower shear strength under rapid loading?

- A. Pore water cannot drain
- B. Soil particles become denser
- C. Effective stress increases
- D. Pore pressure dissipates

Answer: A. Pore water cannot drain

19. What type of soil typically has the highest angle of internal friction?

- A. Peat
- B. Silt
- C. Clay
- D. Gravel

Answer: D. Gravel

20. A DPWH project has $C_u = 3.5$ and $C_c = 4.0$. How is this soil gradation described?

- A. Poorly graded
- B. Uniformly graded
- C. Gap-graded
- D. Well-graded

Answer: A. Poorly graded

21. Compaction increases a soil's dry unit weight mainly through the expulsion of ____ from its void spaces.

- A. Air
- B. Water
- C. Both air and water
- D. Neither air nor water

Answer: A. Air

22. Which does NOT influence the coefficient of permeability of a soil?

- A. Void ratio
- B. Degree of saturation
- C. Grain size distribution
- D. Specific gravity of solids

Answer: D. Specific gravity of solids

23. Why is the angle of internal friction important in analyzing bearing capacity?

- A. Controls settlement due to consolidation
- B. Influences bearing capacity factors
- C. Determines the hydraulic gradient
- D. Measures the compressibility of soil

Answer: B. Influences bearing capacity factors

24. The constant-head permeability test is NOT appropriate for testing

- A. Clean sand
- B. Sandy gravel
- C. Uniform coarse sand
- D. Low permeability clay

Answer: D. Low permeability clay

25. Which primary factor LEAST affects seepage force within the soil mass?

- A. Hydraulic gradient
- B. Unit weight of water
- C. Void ratio
- D. Grain size distribution

Answer: D. Grain size distribution

26. What is the most probable reason for choosing a friction pile instead of an end-bearing pile?

- A. Shallow hard stratum present
- B. No firm stratum reachable
- C. Shorter pile length
- D. Avoids shaft friction calculation

Answer: B. No firm stratum reachable

27. What laboratory test is commonly used to classify clay consistency as soft, medium, stiff, and very stiff?

- A. Triaxial Tests
- B. Standard Penetration Test (SPT)
- C. Unconfined Compressive Tests
- D. Direct Shear Tests

Answer: C. Unconfined Compressive Tests

28. Why do fine-grained soils exhibit much slower consolidation settlement than coarse-grained soils under the same load?

- A. Low permeability slows drainage
- B. High permeability drains water faster
- C. More excess pore pressure
- D. Higher soil shear strength

Answer: A. Low permeability slows drainage

29. In USCS, what fines content threshold generally requires a coarse-grained soil to carry a dual symbol such as GW-GM?

- A. Between 5% and 12%
- B. Between 12% and 50%
- C. Less than 5%
- D. More than 50%

Answer: A. Between 5% and 12%

30. A shallow foundation on sand has a water table raised to the footing base and lower bearing capacity. This is most likely due to

- A. Reduced unit weight
- B. Reduced friction angle
- C. Increased pore pressure
- D. Reduced cohesion

Answer: A. Reduced unit weight

31. Which soil type typically undergoes the largest consolidation settlement under a given increase in effective stress?

- A. Dense gravel
- B. Compacted sand fill
- C. Normally consolidated clay

D. Overconsolidated clay

Answer: C. Normally consolidated clay

32. What is the primary factor for the time-dependent settlement of an as-built structure?

- A. Elastic settlement of underlying compressible soil layers
- B. Liquefaction of underlying soil deposits
- C. Vibration
- D. Consolidation of underlying compressible soil layers

Answer: D. Consolidation of underlying compressible soil layers

33. Enumerate three types of shear strength tests commonly used for soil investigation.

- A. Direct shear, Triaxial, and Unconfined compression test
- B. Direct shear, Triaxial, and Plate load test
- C. Triaxial compression, Unconfined compression, and Consolidation test
- D. Direct shear, Field vane test, and Standard Proctor test

Answer: A. Direct shear, Triaxial, and Unconfined compression test

34. Which soil property is most influenced by particle shape and angularity?

- A. Angle of internal friction
- B. Plasticity Index
- C. Specific Gravity
- D. Liquid Limit

Answer: A. Angle of internal friction

35. Why is field density testing important after compacting fill for airport runways?

- A. It prevents birds from nesting near the runway
- B. It determines the type of asphalt to be used
- C. It determines the runway's paint markings
- D. It ensures the required percent compaction is achieved

Answer: D. It ensures the required percent compaction is achieved

36. What is the term for the lowest point of a water surface in a rotating tank? [Updated answer from user's correction: Dead Sea applies to the original item numbered 102 in the prior compilation.]

- A. Rotating free surface
- B. Dead Sea
- C. Hydraulic grade line
- D. Energy grade line

Answer: B. Dead Sea

37. What phenomenon is associated with mercury not wetting glass?

- A. Cohesion
- B. Adhesion
- C. Viscosity
- D. Surface tension

Answer: D. Surface tension

38. Which field test is commonly used to determine in-situ soil density?

- A. Constant head test
- B. Sand cone test
- C. Direct shear test
- D. Hydrometer test

Answer: B. Sand cone test

39. What does option B correspond to for the corrected item 16?

- A. Hydraulic gradient
- B. Hydraulic conductivity
- C. Seepage velocity
- D. Transmissivity

Answer: B. Hydraulic conductivity

40. What is the corrected answer for the item numbered 18 in the previous compilation?

- A. Gross ultimate bearing capacity
- B. Net ultimate bearing capacity
- C. Allowable bearing capacity
- D. Presumptive bearing value

Answer: B. Net ultimate bearing capacity