

Advanced Civil Engineering Concepts

Civil Engineering · Answer Key · 12 Questions

1. What is the primary purpose of a diaphragm wall in underground construction?

- A) To provide seismic resistance to buildings.
- B) To act as a permanent foundation element for tall structures.
- C) To retain soil and groundwater during excavation.**
- D) To improve the load-bearing capacity of the soil.

2. In the context of traffic engineering, what does the 'Level of Service' (LOS) metric quantify?

- A) The total volume of vehicles on a roadway.
- B) The speed limit of a particular road segment.
- C) The operational conditions and perceived quality of traffic flow.**
- D) The number of traffic signals per kilometer.

3. Which type of concrete is specifically designed to be fluid enough to flow into intricate formwork and self-compact without mechanical vibration?

- A) High-strength concrete
- B) Self-compacting concrete (SCC)**
- C) Lightweight concrete
- D) Shotcrete

4. What is the 'bearing capacity' of a soil, as relevant to foundation design?

- A) The maximum stress the soil can withstand before liquefying.
- B) The ability of the soil to absorb water without swelling.
- C) The maximum pressure the soil can sustain from a foundation without failure.**
- D) The rate at which water can percolate through the soil.

5. In bridge design, what is the primary function of a 'spandrel'?

- A) To connect the deck to the piers.
- B) To support the deck over an arch.**
- C) To anchor suspension cables.
- D) To provide drainage for the roadway.

6. What is the most common method used to determine the unconfined compressive strength of a cohesive soil sample in a laboratory?

- A) Triaxial compression test
- B) Standard Penetration Test (SPT)
- C) Unconfined compression test**
- D) Consolidation test

7. What is the main principle behind 'vacuum dewatering' in construction?

- A) Using high pressure to force water out of the soil.
- B) Creating a vacuum to draw groundwater away from the excavation area.**
- C) Heating the soil to evaporate excess moisture.
- D) Employing chemical additives to bind water within the soil.

8. In hydraulics, what is 'specific energy' related to in an open channel flow?

- A) The velocity of the flow.
- B) The total energy of the flow per unit weight.**
- C) The pressure at the bottom of the channel.
- D) The depth of the flow.

9. What is the 'AASHTO Road Test' most famous for contributing to?

- A) The development of the first traffic signal systems.
- B) The establishment of national standards for concrete strength.
- C) The empirical design methods for flexible pavement thickness.**
- D) The understanding of soil liquefaction during earthquakes.

10. What is the primary purpose of a 'settling basin' in a water treatment plant?

- A) To disinfect the water.
- B) To remove dissolved minerals from the water.
- C) To allow suspended solids to settle out of the water by gravity.**
- D) To aerate the water to improve taste and odor.

11. In structural analysis, what does the 'moment of inertia' of a cross-section represent?

- A) Its resistance to shear forces.
- B) Its ability to resist bending.**
- C) Its capacity to carry axial loads.
- D) Its thermal expansion properties.

12. What is the critical factor for preventing 'settlement' in a properly designed bridge foundation?

- A) Ensuring the piers are watertight.
- B) Distributing the bridge's load over a sufficiently strong soil layer.**
- C) Using the highest possible concrete strength for the foundation.
- D) Minimizing the surface area of the foundation.