NCEES
PE-Civil-Construction
1223 PE Civil Construction

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Question: 1

A contractor is performing cut and fill operations on a site where the cut volume is 5,000 cubic yards and the fill volume is 4,500 cubic yards. What is the net cut or fill volume?

A. 500 cy cut
B. 500 cy fill
C. 1,000 cy cut
D. 1,000 cy fill

Answer: A

Explanation:
The net volume is calculated as:
Net Volume = Cut Volume − Fill Volume =
5, 000 cy − 4, 500 cy = 500 cy cut

Question: 2

During the installation of a deep foundation system, a pile driving contractor encounters unexpected boulders at a depth of 15 feet. If the driving resistance increases significantly, what is the recommended course of action?

A. Continue driving with increased force
B. Switch to a larger pile size
C. Use a drilling method to penetrate the boulders
D. Abandon the site

Answer: C

Explanation:
If unexpected boulders are encountered, the recommended course of action is to use a drilling method to penetrate the boulders before continuing with pile installation to avoid damaging the pile and ensuring proper placement.

Question: 3

A construction team is planning to install temporary shoring for a basement excavation. If the excavation is 20 feet deep and the lateral earth pressure is estimated to be 40 lb/ft^2, what is the total lateral force acting on the shoring system at the base of the excavation?

A. 800 lbs
B. 1,600 lbs
C. 2,000 lbs
D. 3,200 lbs

Answer: A

Explanation:
The total lateral force is calculated as:

$$\text{Total Force} = \text{Lateral Pressure} \times \text{Height} = 40\,\text{lb/ft}^2 \times 20\,\text{ft} = 800\,\text{lbs}$$

Question: 4

A construction project requires the installation of a bracing system to support a tall structure during erection. If the anticipated lateral load on the structure is 60 kips and the bracing system is designed with a safety factor of 2, what is the minimum design capacity required for each brace if there are four braces equally sharing the load?

A. 15 kips
B. 30 kips
C. 60 kips
D. 75 kips

Answer: B

Explanation:
The design capacity for each brace is calculated as:

$$\text{Total Load} = \frac{60\ \text{kips}}{4} = 15\ \text{kips}$$

Considering the safety factor:

$$\text{Design Capacity} = 15\ \text{kips} \times 2 = 30\ \text{kips}$$

Question: 5

During the excavation of a site for a new high-rise building, the contractor is implementing a support system to prevent soil collapse. If the excavation is 12 feet deep and the soil is classified as Type B, what is the maximum allowable unbraced height according to OSHA regulations?

A. 4 feet
B. 5 feet
C. 10 feet
D. 12 feet

Answer: D

Explanation:
For Type B soil, OSHA regulations allow a maximum unbraced height of 12 feet. If the excavation exceeds this height, appropriate shoring or bracing must be implemented.

Question: 6

A contractor is planning to erect a steel frame structure that will support a roof load of 100 kips. If the crane used for erection has a maximum lifting capacity of 80 kips at the required radius, what is the maximum additional load the crane can safely lift when considering the weight of the frame itself, which is estimated to be 20 kips?

A. 0 kips
B. 20 kips
C. 40 kips
D. 60 kips

Answer: A

Explanation:
The total load the crane must lift is the sum of the roof load and the weight of the frame:
Total Load = 100 kips + 20 kips = 120 kips
Since the crane can only lift 80 kips, it cannot safely lift this load.

Question: 7

In a construction site, a contractor must assess the impact of construction loads on a permanent structure. If an equipment loading of 30 kips is applied at a distance of 10 feet from the column centerline, what is the moment about the column due to this loading?

A. 150 ft-kips
B. 300 ft-kips
C. 600 ft-kips
D. 900 ft-kips

Answer: B

Explanation:
The moment M about the column can be calculated as:
M = Load × Distance = 30 kips × 10 ft = 300 ft-kips

Question: 8

A site safety manager is implementing an OSHA-compliant safety management plan on a construction site. Which of the following is NOT a requirement under OSHA regulations for safety management in construction?

A. Regular safety inspections
B. Employee safety training
C. Posting safety signs in multiple languages
D. Eliminating all risks associated with construction

Answer: D

Explanation:
While OSHA requires regular safety inspections and employee training, it is not feasible to eliminate all risks associated with construction. The goal is to minimize risks and provide a safe working environment.

Question: 9

During a construction project, a contractor needs to ensure public safety while maintaining traffic flow around the work zone. If the work zone is set up on a road that carries 10,000 vehicles per day, what is the minimum width of the travel lane that must be maintained to ensure safety, according to typical highway standards?

A. 10 feet
B. 11 feet
C. 12 feet
D. 14 feet

Answer: B

Explanation:
According to typical highway standards, a minimum travel lane width of 11 feet should be maintained in work zones to ensure safe passage of vehicles.

Question: 10

A bracing system is implemented to support a temporary structure during construction. If the bracing must withstand a horizontal load of 25 kips and the angle of the brace is 30 degrees from the horizontal, what is the vertical component of the force acting on the brace?

A. 12.5 kips
B. 21.65 kips
C. 25 kips
D. 28.87 kips

Answer: A

Explanation:
The vertical component Fv can be calculated using:
$F_v = F \cdot \sin(\theta) = 25 \text{ kips} \cdot \sin(30^\circ) = 25 \text{ kips} \cdot 0.5 = 12.5 \text{ kips}$

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