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NCEES

NCEES PE Civil: Construction

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Question 333:
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:
$\text{Net Volume} = \text{Cut Volume} - \text{Fill Volume} = 5,000 \text{ cy} - 4,500 \text{ cy} = 500 \text{ cy cut}$

Question 334:
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 335:
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 336:
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 337:
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 338:
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:
$$\text{Total Load} = 100 \text{ kips} + 20 \text{ kips} = 120 \text{ kips}$$
Since the crane can only lift 80 kips, it cannot safely lift this load.

Question 339:
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:
$$M = \text{Load} \times \text{Distance} = 30 \text{ kips} \times 10 \text{ ft} = 300 \text{ ft-kips}$$

Question 340:
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 341:
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 342:
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 F_v can be calculated using:
$F_v = F \cdot \sin(\theta) = 25 \text{ kips} \cdot \sin(30^\circ) = 25 \text{ kips} \cdot 0.5 = 12.5 \text{ kips}$

Question 343:
A contractor is assessing the need for lateral support for an excavation that is 18 feet deep. If the soil is classified as Type C, what is the maximum depth at which the excavation can be left unprotected according to OSHA regulations?
A. 4 feet
B. 5 feet
C. 6 feet

D. 8 feet

Answer: C

Explanation: For Type C soil, OSHA regulations state that the maximum depth for an unprotected excavation is 6 feet. Therefore, any excavation deeper than this must be supported or braced.

Question 344:
In a construction project, a structural engineer is calculating the total load on a beam that supports a roof. If the beam is subjected to a dead load of 20 kips and a live load of 15 kips, what is the total load that the beam must support?
A. 20 kips
B. 30 kips
C. 35 kips
D. 50 kips

Answer: C

Explanation: The total load on the beam is calculated by summing the dead load and live load:
$\text{Total Load} = \text{Dead Load} + \text{Live Load} = 20 \text{ kips} + 15 \text{ kips} = 35 \text{ kips}$

Question 345:

A construction site has established a work zone for maintenance activities on a busy highway. If the speed limit in the work zone is reduced to 45 mph, what is the minimum distance required for advance warning signs according to MUTCD guidelines?
A. 100 feet
B. 200 feet
C. 300 feet
D. 500 feet

Answer: C

Explanation: According to the Manual on Uniform Traffic Control Devices (MUTCD), the minimum distance for advance warning signs in a work zone with a speed limit of 45 mph is typically 300 feet.

Question 346:
A contractor is using a support system to stabilize an excavation for a trench that is 10 feet deep. If the lateral earth pressure is calculated to be 50 lb/ft^2, what is the total lateral force acting at the bottom of the trench?
A. 500 lbs
B. 1,000 lbs
C. 1,500 lbs
D. 2,000 lbs

Answer: A

Explanation: The total lateral force F is calculated as: $F = \text{Lateral Pressure} \times \text{Height} = 50\ \text{lb/ft}^2 \times 10\ \text{ft} = 500\ \text{lbs}$

Question 347:
A safety manager is developing a hazardous materials communication program for a construction site. According to OSHA regulations, what information must be included in the Safety Data Sheets (SDS) provided to workers?
A. Chemical manufacturer's name and address
B. Specific use of the chemical
C. Disposal instructions
D. All of the above

Answer: D

Explanation: OSHA regulations require that Safety Data Sheets (SDS) include comprehensive information, including the chemical manufacturer's name and address, specific use, hazards, and disposal instructions to ensure worker safety.

Question 348:
A construction site is set up adjacent to a busy street. If the contractor needs to implement a maintenance of traffic (MOT)

plan, which of the following elements is essential to include in the plan to ensure public safety?
A. Traffic control devices
B. Work zone signage
C. Temporary barriers
D. All of the above

Answer: D

Explanation: A comprehensive maintenance of traffic (MOT) plan must include traffic control devices, work zone signage, and temporary barriers to ensure the safety of both workers and the public.

Question 349:
During a construction project, it is determined that additional bracing is needed due to increased wind loads. If the wind load increases to 80 lbs/ft² and the structure is 30 feet tall, what is the total horizontal load on the bracing system?
A. 1,200 lbs
B. 1,800 lbs
C. 2,400 lbs
D. 3,600 lbs

Answer: C

Explanation: The total horizontal load H can be calculated as:

$H = \text{Wind Load} \times \text{Height} = 80 \text{ lbs/ft}^2 \times 30 \text{ ft} = 2,400 \text{ lbs}$

Question 350:
A contractor is required to perform a risk assessment on a construction site involving heavy equipment. If one piece of equipment has a total weight of 50,000 lbs and is positioned on a slope of 15 degrees, what is the component of the weight acting parallel to the slope that could cause sliding?
A. 12,500 lbs
B. 16,000 lbs
C. 19,500 lbs
D. 22,500 lbs

Answer: A

Explanation: The component of the weight acting parallel to the slope W can be calculated using:
$W_{\text{parallel}} = W \cdot \sin(\theta) = 50,000 \text{ lbs} \cdot \sin(15^\circ) \approx 12,500 \text{ lbs}$

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