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### Question: 594

A traffic engineer is tasked with developing a signal phasing plan for a complex intersection. If the left-turn phase is protected and is followed by an all-red phase, what is the purpose of the all-red phase in this context?

- A. To allow vehicles to clear the intersection
- B. To optimize signal timing
- C. To minimize vehicle delays
- D. To provide a buffer for pedestrian crossings

**Answer:** D

**Explanation:** The all-red phase provides a buffer for pedestrian crossings, ensuring that the intersection is clear of vehicles before pedestrians begin crossing, enhancing safety.

### Question: 595

At a roundabout, an engineer notes that the entry width is designed to be 10 feet, while the circulating roadway width is 15 feet. If the design vehicle is a large truck, what should be the minimum central island radius to ensure safe navigation?

- A. 50 feet
- B. 40 feet
- C. 30 feet
- D. 60 feet

**Answer: A**

**Explanation:** For a large truck navigating a roundabout, a minimum central island radius of 50 feet is recommended to ensure that the vehicle can make the turn without encroaching on the circulating roadway.

**Question: 596**

A pedestrian crossing at a signalized intersection has a crosswalk length of 70 feet. If the average walking speed is 4 feet per second, what is the minimum pedestrian crossing time that should be allocated during the signal phase?

- A. 15 seconds
- B. 17 seconds
- C. 20 seconds
- D. 25 seconds

**Answer: C**

**Explanation:** The minimum pedestrian crossing time can be calculated as

Rounding up, a minimum of 20 seconds should be provided to ensure pedestrian safety.

**Question: 597**

What is the primary reason for using the Highway Capacity Manual (HCM) methodology in capacity analysis, especially for urban intersections?

- A. It emphasizes vehicle speed
- B. It focuses only on free-flow conditions
- C. It simplifies roundabout analysis
- D. It incorporates pedestrian and bicycle traffic

**Answer:** D

**Explanation:** The HCM methodology incorporates various factors, including pedestrian and bicycle traffic, which is crucial for urban intersections where multimodal transport is common.

### Question: 598

During a traffic signal timing analysis, an engineer determines that the total cycle length for the intersection is 90 seconds. If the green time for the main road is set at 60 seconds, what is the maximum allowable clearance interval for the main road, assuming a safe stopping distance for vehicles?

- A. 10 seconds
- B. 30 seconds
- C. 20 seconds
- D. 15 seconds

**Answer:** D

**Explanation:** Assuming a safe stopping distance, the clearance interval for the main road should not exceed 15 seconds to allow adequate time for vehicles to clear the intersection before the opposing traffic receives a green signal.

### Question: 599

During a safety audit of a freeway interchange, it is noted that the sight distance for vehicles merging onto the freeway is inadequate. What immediate action should the engineer

recommend to improve safety?

- A. Increase the speed limit on the freeway.
- B. Extend the length of the acceleration lane.
- C. Reduce the number of lanes on the freeway.
- D. Add more signage on the entrance ramp.

**Answer: B**

**Explanation:** Extending the length of the acceleration lane allows merging vehicles to reach the speed of mainline traffic safely, improving safety and reducing potential conflicts.

**Question: 600**

During a traffic study, an engineer determines that the existing signal timing does not accommodate high pedestrian demand during school hours. What immediate adjustment should be made?

- A. Decrease the green time for vehicles
- B. Increase the total cycle length
- C. Add more pedestrian crossing signals
- D. Implement flashing school zone signals

**Answer: B**

**Explanation:** Increasing the total cycle length can help accommodate high pedestrian demand during school hours, allowing for adequate crossing time without significantly disrupting vehicular flow.

**Question: 601**

A bicycle lane is to be constructed with a physical separation from motor vehicle traffic. According to best practices, what is the minimum recommended width for this separated bike lane to ensure cyclist comfort and safety?

- A. 6 feet
- B. 5 feet
- C. 4 feet
- D. 8 feet

**Answer: A**

**Explanation:** A minimum width of 6 feet for separated bike lanes is recommended to provide adequate space for cyclists, enhancing safety and comfort, particularly when overtaking other cyclists or encountering obstacles.



### Question: 602

In capacity analysis of a roundabout, which geometric feature has the most significant effect on the entry capacity?

- A. Entry angle of the approach
- B. Diameter of the roundabout
- C. Number of circulating lanes
- D. Presence of pedestrian crossings

**Answer:** A

**Explanation:** The entry angle significantly affects the yield behavior of vehicles entering the roundabout and thus influences the entry capacity.

### Question: 603

A contractor estimates that the quantity of asphalt needed for a road project is 15,000 tons. If the unit cost of asphalt is \$80 per ton, what is the total estimated cost for asphalt?



- A. \$1 million
- B. \$1.8 million
- C. \$1.2 million
- D. \$1.5 million

**Answer: C**

**Explanation:** The total estimated cost is calculated as Quantity  $\times$  Unit Cost. Thus, Total Cost = 15,000 tons  $\times$  \$80/ton = \$1.2 million.

**Question: 604**

In a study of traffic signal timing, an engineer finds that the yellow signal interval is currently set to 3 seconds. For a speed limit of 35 mph, what should be the minimum yellow interval to ensure safe stopping distances?

- A. 4 seconds
- B. 3 seconds
- C. 5 seconds
- D. 6 seconds

**Answer: A**

**Explanation:** For a speed limit of 35 mph, a minimum yellow interval of 4 seconds is recommended to ensure that drivers have adequate time to react and stop safely before the red light.

**Question: 605**

During a traffic signal design review, an engineer finds that the yellow signal interval is currently set to 3 seconds. If the speed limit is 35 mph, what should be the recommended minimum yellow interval to ensure safe stopping distances?

- A. 4 seconds
- B. 6 seconds
- C. 5 seconds
- D. 7 seconds

**Answer: C**

**Explanation:** For a speed limit of 35 mph, a minimum yellow interval of 5 seconds is recommended to ensure that drivers have adequate time to react and stop safely before the red light.

### Question: 606

If a transportation system experiences an increase in average daily traffic (ADT) from 20,000 to 30,000 users within a year, and the corresponding increase in maintenance costs is estimated at \$150,000 annually, what is the cost per additional user attributed to the increase in traffic?

- A. \$3.00
- B. \$10.00
- C. \$17.50
- D. \$15.00

**Answer:** D

**Explanation:** The increase in users is  $30,000 - 20,000 = 10,000$ . The cost per additional user is calculated as  $\$150,000 / 10,000 = \$15.00$ .

### Question: 607

A city is updating its bicycle facility design standards. If a bike lane is to be separated from vehicle traffic by a vertical barrier, what is the minimum recommended width for the bike lane to

ensure cyclist comfort and safety?

- A. 4 feet
- B. 5 feet
- C. 6 feet
- D. 8 feet

**Answer: C**

**Explanation:** A minimum width of 6 feet for separated bike lanes is recommended to provide adequate space for cyclists, enhancing safety and comfort, especially when overtaking other cyclists or encountering obstacles.

**Question: 608**

For a two-way street experiencing heavy congestion, which traffic management strategy is most effective in improving flow without significant infrastructure changes?

- A. Implementing a one-way street system
- B. Adjusting signal timings to optimize green phases
- C. Increasing the number of lanes
- D. Introducing tolls for peak-hour use

**Answer: B**

**Explanation:** Adjusting signal timings can significantly improve traffic flow and reduce congestion without requiring major infrastructure investments.

**Question: 609**

What is the primary consideration in the design of a freeway exit ramp to ensure safe deceleration for vehicles exiting the highway?

- A. The length of the deceleration lane.
- B. The width of the ramp.
- C. The slope of the ramp.
- D. The signage provided.

**Answer: A**

**Explanation:** The length of the deceleration lane is critical for allowing vehicles to slow down safely without causing conflicts with other traffic on the freeway.

### Question: 610

In a freeway merge area, what is the recommended design speed for the merging section to minimize conflicts between entering and existing vehicles?

- A. The speed limit of the freeway.
- B. 10 mph below the freeway speed limit.
- C. 5 mph above the ramp speed limit.
- D. The average speed of merging vehicles.

**Answer:** A

**Explanation:** The recommended design speed for the merging section should match the speed limit of the freeway to promote smooth integration of vehicles entering the freeway and minimize conflicts.

### Question: 611

In the context of transportation planning, what does the term "induced demand" refer to?

- A. The reduction in vehicle usage due to high fuel prices
- B. The decrease in travel time due to improved transit services

- C. The shift of users from public to private transport
- D. The increase in traffic due to new road construction

**Answer:** D

**Explanation:** Induced demand refers to the phenomenon where increasing road capacity leads to more traffic because it makes driving more attractive.

**Question: 612**

In a neighborhood traffic-calming plan, which of the following features is most effective at reducing vehicle speeds while improving safety for non-motorized users?

- A. Roadway narrowing
- B. Increased lane widths
- C. Higher speed limits
- D. Additional signage

**Answer:** A

**Explanation:** Roadway narrowing is an effective traffic-calming measure that visually and physically reduces vehicle speeds, enhancing safety for pedestrians and cyclists in residential



areas.

### Question: 613

In a design review for pedestrian facilities, it was noted that a proposed crosswalk lacks adequate visibility. Which of the following features should be implemented to improve visibility and safety for pedestrians?

- A. Removing street furniture
- B. Installing decorative lighting
- C. Adding high-visibility pavement markings
- D. Widening the roadway

**Answer: C**

**Explanation:** Adding high-visibility pavement markings at crosswalks significantly improves visibility for both pedestrians and drivers, enhancing safety at crossing points.

### Question: 614

When assessing the safety performance of an intersection,

which statistical measure is most frequently used to evaluate the effectiveness of safety improvements?

- A. Crash Modification Factor (CMF)
- B. Average Daily Traffic (ADT)
- C. Level of Service (LOS)
- D. Vehicle miles traveled (VMT)

**Answer: A**

**Explanation:** The Crash Modification Factor (CMF) is commonly used to quantify the expected reduction in crashes due to specific safety improvements.

### **Question: 615**

During the evaluation of a roundabout, the engineer finds that the entry angle for vehicles is acute. What impact does this have on the operation of the roundabout?

- A. Increases vehicle speed
- B. Increases conflict points
- C. Improves safety for pedestrians
- D. Reduces the need for signage

**Answer: B**

**Explanation:** Acute entry angles can increase conflict points within the roundabout, potentially leading to higher accident rates as vehicles navigate tighter turns.

**Question: 616**

A shared-use path is proposed adjacent to a roadway with a speed limit of 45 mph. What is the minimum recommended lateral offset distance from the edge of the roadway to the shared-use path to ensure user safety?

- A. 1 foot
- B. 5 feet
- C. 3 feet
- D. 10 feet

**Answer: B**

**Explanation:** A minimum lateral offset of 5 feet from the edge of the roadway is recommended for shared-use paths adjacent to higher-speed roadways to provide a buffer zone that enhances user safety.



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