

A  
Subject

Transportation Planning  
And Engr.

ID #

7794

Section

A

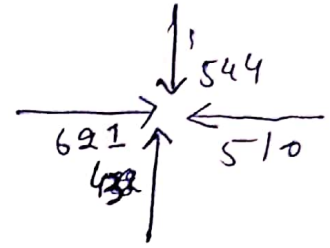
Mid

Term

paper.

Q No. 1)

Determine yellow interval



$$y = t + \frac{1.47 S_{85}}{2a + (64.4 \times 0.01G)}$$

$$S_{85} = 35 + 5 = 40 \text{ mph}$$

$$S_{15} = 35 - 5 = 30 \text{ mph}$$

$$y = 20 + \frac{1.47(40)}{2(10) + (64.4 \times 0.01 \times 0)}$$

$$y = 4.94 \text{ s}$$

→ Length of all-red clearance interval

$$S_{85} = 35 + 5 = 40 \text{ mph}$$

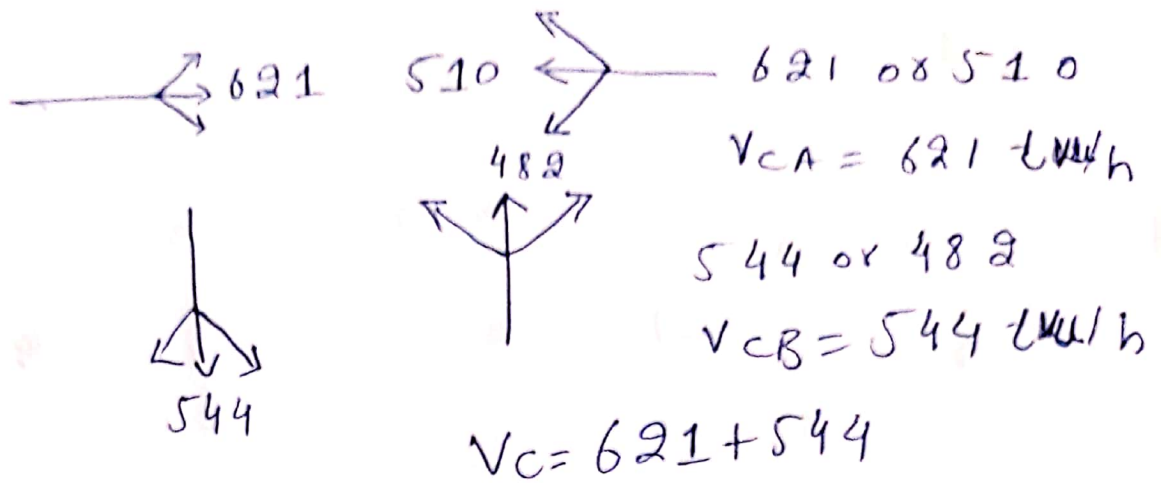
$$S_{15} = 35 - 5 = 30 \text{ mph}$$

$$a_x = \frac{W + L}{1.47 S_{15}} = \frac{30 + 20}{1.47 \times 30} = 1.134 \text{ s}$$

L-length of standard vehicle usually taken 18-20 ft.

$$a_x = \frac{P}{1.47 S_{15}} = \frac{40}{1.47 \times 30} = 0.91$$

→ Determine optical lane volume



→ Determination of lost time:

$$\gamma = \gamma + a\delta = 4.94 + 1.134 = 6.07 \text{ s}$$

$$l_2 = \gamma - e = 6.07 - 2.0 = 4.07 \text{ s}$$

$$t_L = l_1 + l_2 = 2.0 + 4.07 = 6.07 \text{ s}$$

$$\text{Total lost time per cycle} = L = 6.07 + 6.07$$

$$L = 12.14 \text{ s}$$

Determination of cycle length:

$$C_{des} = \frac{L}{1 - \left[ \frac{V_C}{1615 \times PHF \times V_C} \right]}$$

$$C_{des} = \frac{12.14}{1 - \left[ \frac{1165}{1615 \times 0.92 \times 0.90} \right]}$$

$$C_{des} = 94.26 \approx 97 \text{ sec}$$

$$\text{Effective Green time available} = 97 - 12.14$$

$$= 84.86 \text{ s}$$

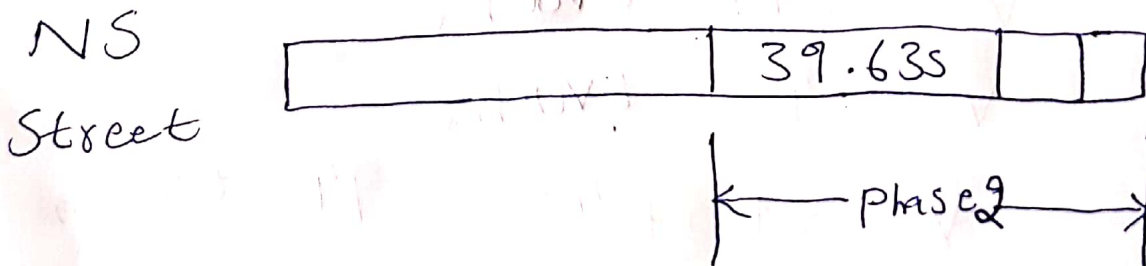
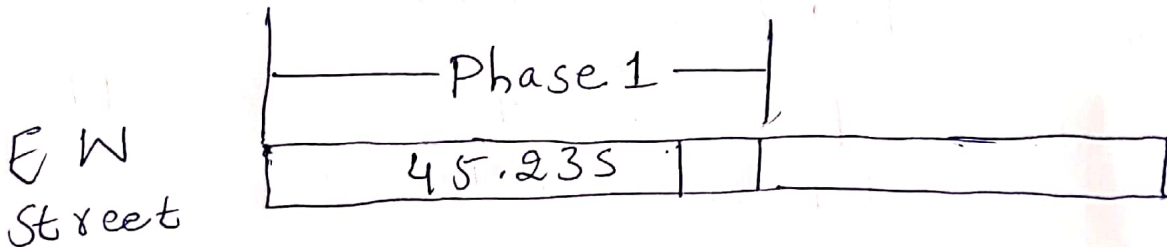
$$g_A = g_{TOT} \times \left[ \frac{V_{cA}}{V_c} \right] = 84.86 \times \left[ \frac{621}{1165} \right]$$

$$g_A = 45.23s$$

$$g_B = g_{TOT} \times \left[ \frac{V_{cB}}{V_c} \right] = 84.86 \times \left[ \frac{544}{1165} \right]$$

$$g_B = 39.63s$$

Check  $45.23 + 39.63 + 12.14 = 97 \text{ sec.}$



Since two lanes are provided

$$g_C = g_{TOT} \times \left[ \frac{V_{cC}}{V_c} \right] = 84.86 \times \left[ \frac{510}{1165} \right]$$

$$g_C = 37.15s$$

$$g_D = g_{TOT} \times \left[ \frac{V_{cD}}{V_c} \right] = 84.86 \times \left[ \frac{432}{1165} \right]$$

$$g_D = 31.47 \text{ sec}$$

check

$$37.15 + 31.47 + 12.14 = 80.76 \text{ s}$$

$$E_{8008} = 97 - 80.76$$

$$= 16.24 \text{ sec}$$

→ Now 700 red interval.

$$S_{85} = 35 + 5 = 40 \text{ mph}$$

$$S_{15} = 35 - 5 = 30 \text{ mph}$$

$$a_8 = \frac{W + L}{1.47 S_{15}} = \frac{30 + 20}{1.47 \times 30} = 1.13 \text{ sec}$$

$$a_8 = \frac{P}{1.47 S_{15}} = \frac{40}{1.47 \times 30} = 0.91 \text{ s}$$

→ lane critical volume for second lane.

$$V_{CC} = 510 \text{ tvu/h}$$

$$V_{CD} = 432 \text{ tvu/h}$$

$$V_C = 510 + 432 = 942 \text{ tvu/h}$$

Determination of loss time is

$$\text{same so } L = 12.14 \text{ s}$$

$$C_{des} \approx 97 \text{ sec.}$$

Q NO. 2):

Ans): Traffic Signs: The MUTCD provides specifications and guidelines for the use of literally hundreds of different signs for different purposes. In general, traffic signs fall into one of three major categories;

→ Regulatory Sign: Regulatory sign convey information concerning specific traffic regulations. Regulations may relate to right-of-way, speed limits, lane usage, parking, or a variety of other functions.

→ Warning Signs: Warning signs are used to inform drivers about upcoming hazards that they might not see or otherwise discern in time to safely react.

→ Guide Sign: Guide signs provide information on routes, destinations, and services that drivers may be seeking.

Regulatory Signs:

→ Regulatory sign affecting right-of-way.

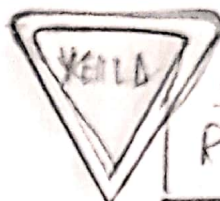
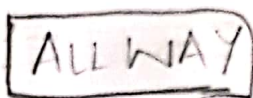
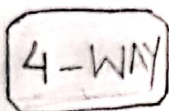
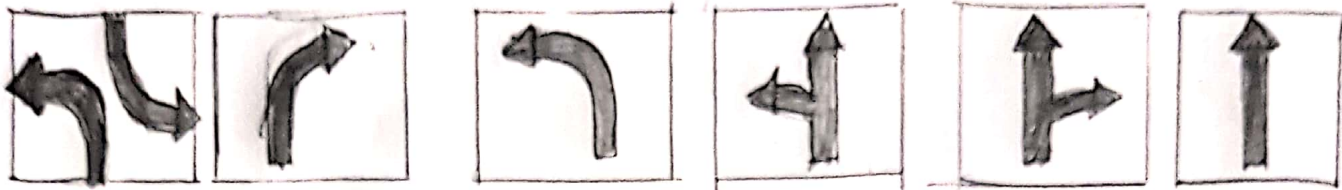
→ Speed limit signs.

→ Turn prohibition signs.

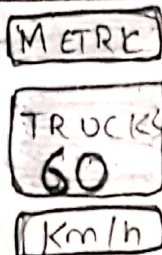
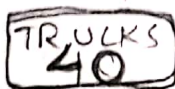
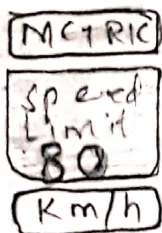
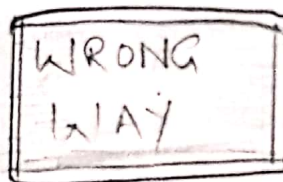
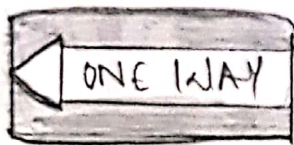
→ Lane-use sign.

→ parking control signs.

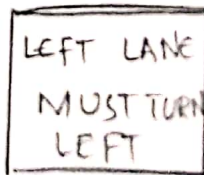
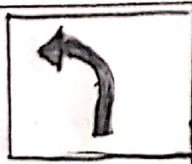
### REGULATORY SIGNS



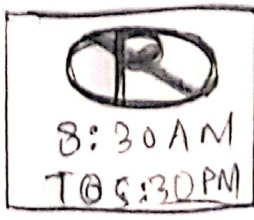
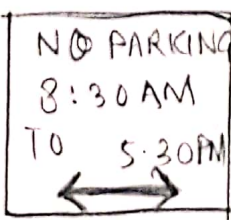
REGULATORY SIGNS AFFECTING RIGHT-OF-WAY



(REGULATORY SIGNS (SPEED LIMIT SIGNS))



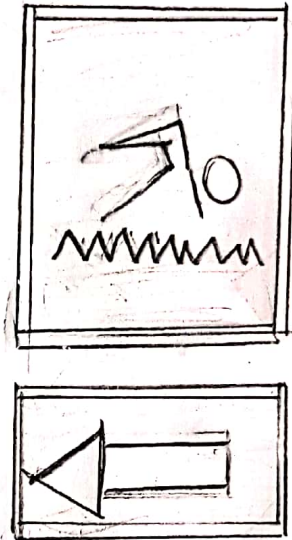
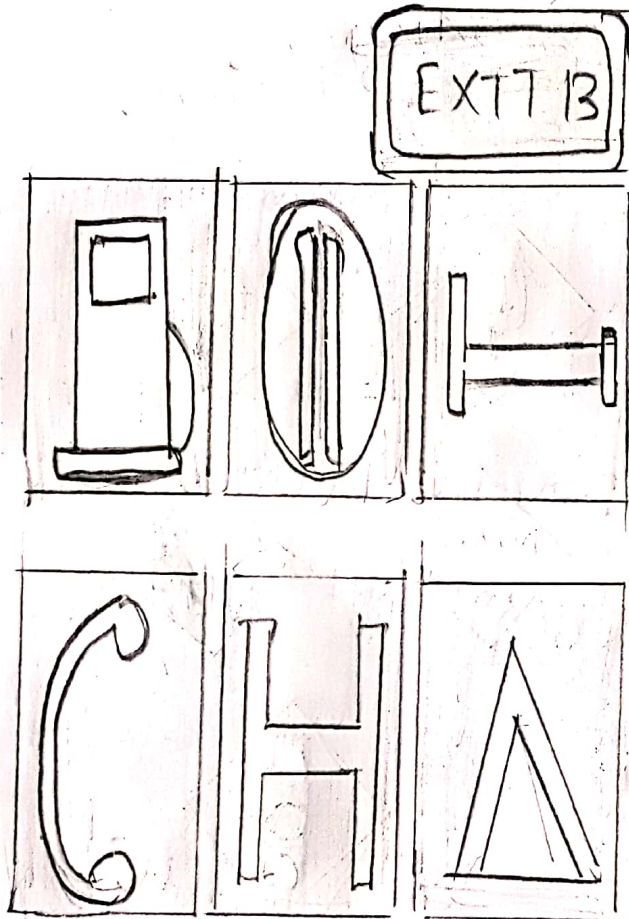
(REGULATORY SIGNS (TURN PROHIBITION SIGNS))



(REGULATORY SIGNS (PARKING CONTROL SIGNS))

# Guide signs:

- Route Markers and Mileposts.
- Destination signs.
- Recreational and Cultural-Interest Guide signs.
- Service Guide signs.

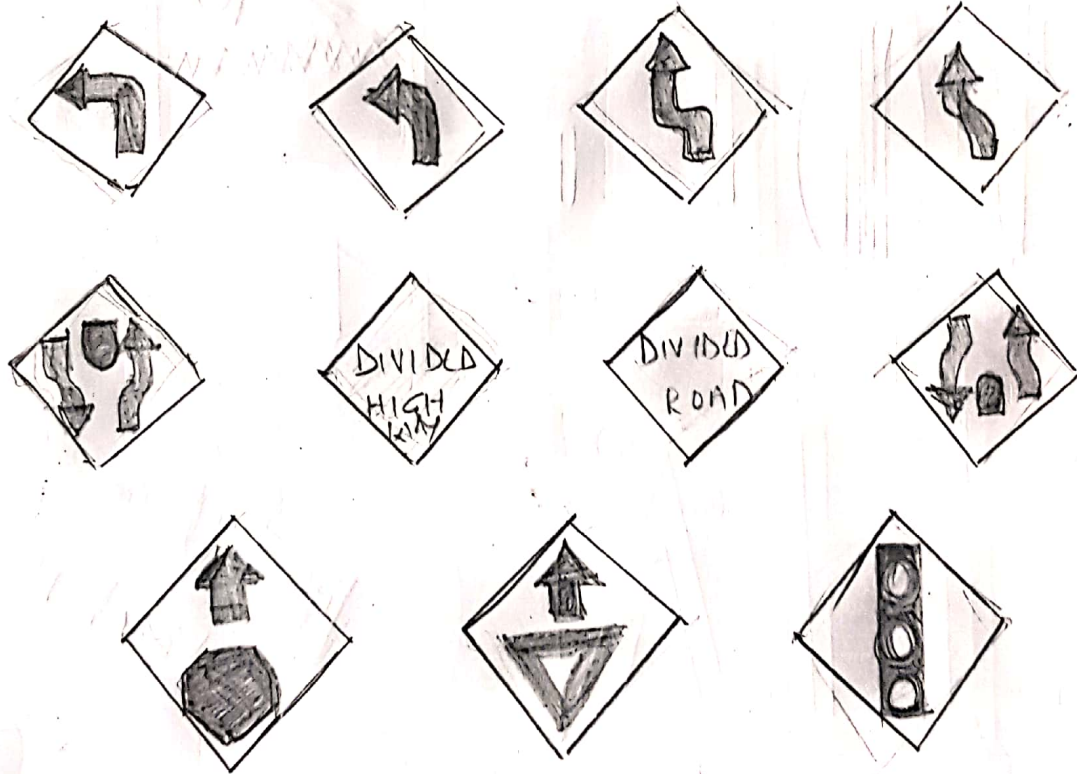


GUIDE SIGNS



# Warning Signs:

- changes in horizontal alignment.
- Intersections.
- Advance warning of control devices.
- converging traffic lanes.
- Narrow roadways.
- changes in highway design.
- Grades
- Roadway surface conditions.



(WARNING SIGNS)

## Q.No.3):

Ans): Road Margins: The portion of the road beyond the carriageway and on the roadway can be generally called road margin. Various elements that form the road margins are given below.

- 1- Shoulders
- 2- Parking lanes.
- 3- Bus-bays
- 4- Service roads
- 5- cycle track
- 6- Footpath
- 7- Guard rails

### 1- Shoulders:

→ Shoulders are provided along the road edge and is intended for accommodation of stopped vehicles, serve as an emergency lane for vehicles and provide lateral support for base and surface courses. The shoulder should be strong enough to bear the weight of a fully loaded truck even in wet conditions.

→ The shoulder width should be adequate for giving working space around a stopped vehicle. It is desirable to have a width of 4.6 m for the shoulders. A minimum width of 2.5m is recommended.

For 2-lane rural highways.

2-Parking lanes:

→ Parking lanes are provided in Urban lanes for side parking. Parallel parking is preferred because it is safe for the vehicles moving on the road. The parking lane should have a minimum of 3.0m width in the case of parallel parking.

3-Bus-bays:

→ Bus bays are provided by recessing the kerbs for bus stops. They are provided so that they do not obstruct the movement of vehicles in the carriage way. They should be at least 75 meters away from the intersection so that the traffic near the intersections is not affected by the bus-bay.

Service Roads:

→ Service roads or frontage roads give access to controlled highways like freeways and expressways. They run parallel to the highway and will be usually isolated by a separator and access to the

high way will be provided only at selection points.

→ These roads are provided to avoid congestion in the expressways and also the speed of traffic in those lanes is not reduced.

5- Cycle Track:

→ Cycle track are provided in urban areas when the volume of cycle traffic is high. Minimum width of 2 meter is required which may be increased by 1 meter for every additional track.

6- Footpath:

→ Footpath are exclusive right of way to pedestrians, especially in urban area. They are provided for the safety of the pedestrians when both the pedestrian traffic and vehicular traffic is high.

Minimum width is 1.5 meter and may be increased based on the traffic. The footpath should be either as smooth as the pavement or more smoother than that to induce the pedestrian to use the footpath.

7- Guard Rails:

→ They are provided at the edge

of the shoulder usually when  
the road is on an embankment  
They serve to prevent the vehicles  
from running out of the embankment.  
especially when the height of the  
embankment exceeds 3m. Various  
designs of guard rails are there  
Guard stones painted in alternate  
black and white are usually used  
They also give better visibility of  
curves at night under headlights  
of vehicles