

Mid term paper

Name

Rizwan ullah Khan

ID

7807

Section

"A"

Subject

Transportation & Planning
Engineering

Submitted To

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Name: Rizwan ullah khan

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Q: 11

Given data:-

$$PHF = 0.92$$

$$\text{Target } V/C = 0.90$$

$$\text{All lanes} = 20 \text{ ft}$$

$$\text{Avg speed} = 35 \text{ mph}$$

$$\text{Cross walk} = 10 \text{ ft}$$

$$\text{Driver reaction time} = 2.0 \text{ s}$$

$$\text{Deceleration rate} = 10 \text{ ft/s}^2$$

Solution:-

Determination of yellow interval:-

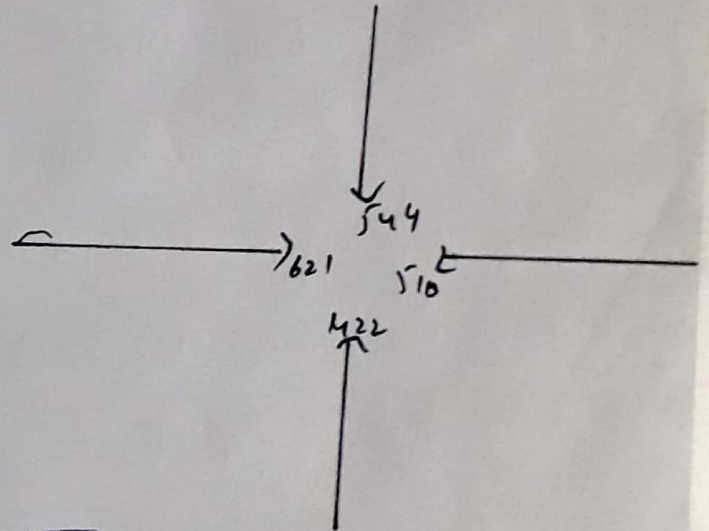
$$y = t + \frac{1.47 S_{8r}}{2a + (64.4 \times 0.01 G)}$$

$$S_{8r} = 35 + 5 = 40 \text{ mph}$$

$$S_{1r} = 35 - 5 = 30 \text{ mph}$$

$$y = \frac{2.0 + 1.47 (40)}{2 \times (10) + 64.4 \times 0.01 \times 20}$$

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



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→ Length of all-red clearance interval:

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

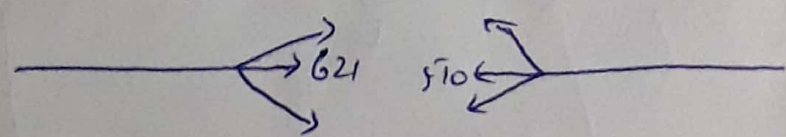
$$S_{15} = 35 - 5 = 30 \text{ mph}$$

$$a_r = \frac{w + L}{1.47 S_{15}} = \frac{30 + 20}{1.47 \times 30} = 1.1345$$

L - Length of Standard vehicle usually taken 18 - 20 ft.

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

→ Determination Critical Lane volume:-

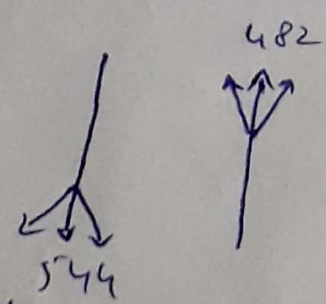


621 or 510

$$V_{LA} = 621 \text{ veh/h}$$

544 or 482

$$V_{LB} = 544 \text{ veh/h}$$



$$V_L = 621 + 544$$

$$V_L = 1165 \text{ veh/h}$$

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⇒ Determination of lost time:-

$$y = \bar{y} + a_v = 4.94 + 1.134 = 6.07s$$

$$L_2 = y - e = 6.07 - 2.0 = 4.07s$$

$$t_2 = l_1 + l_2 = 2.0 + 4.07 = 6.07s$$

Total lost time per cycle = L =

$$6.07 + 6.07$$

$$L = 12.14s$$

⇒ Determination of cycle length:-

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

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

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

⇒ Effective Green time available.

$$= 97 - 12.14 = 84.86 \text{ s}$$

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

$$g_A = 45.23 \text{ s}$$

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

$$g_B = 39.63 \text{ s}$$

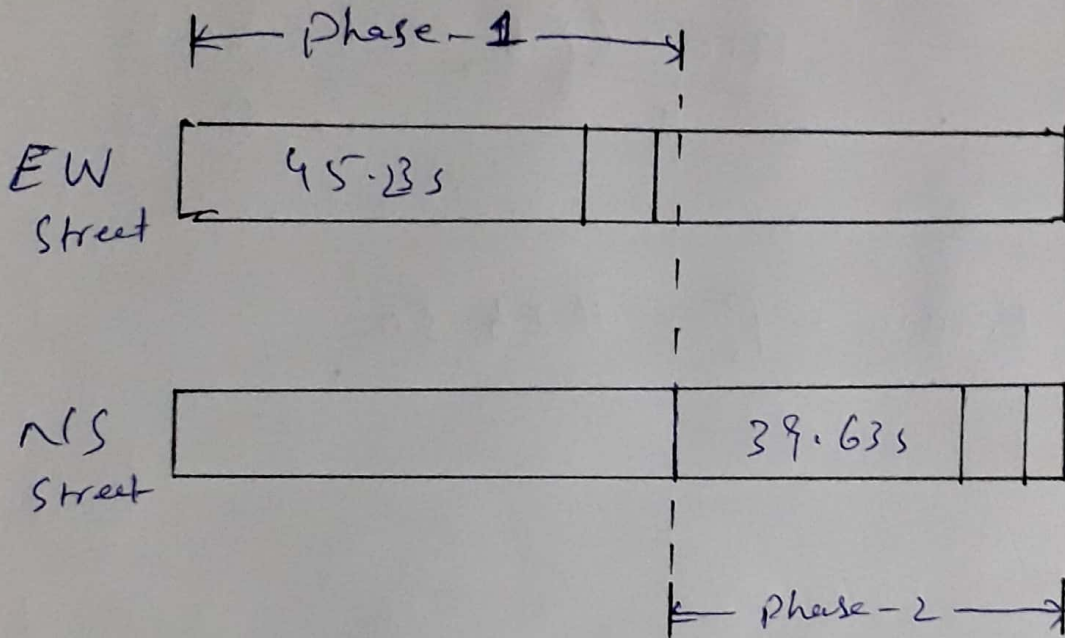
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~~Since two phases are provided~~

Check:-

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



Since two lanes are ~~parallel~~ provided.

$$g_c = g_{tot} \times \left[\frac{V_{cc}}{V_c} \right] = 84.86 \times \left[\frac{510}{1165} \right]$$

$$g_c = 37.15 \text{ s}$$

$$g_D = g_{tot} \times \left[\frac{V_D}{V_c} \right] = 84.86 \times \left[\frac{432}{1165} \right]$$

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

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Check =

$$37.15 + 31.47 + 12.14 = 80.76$$

$$\text{Error} = 97 - 80.76$$

$$= 16.24 \text{ sec}$$

⇒ Now for red interval:-

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

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

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

$$a_r = \frac{P}{1.47 S_{15}} = \frac{40}{1.47+30} = 0.91 \text{ s}$$

⇒ Lane critical volume for second Lane:-

$$V_{LL} = 510 \text{ tvu/hr}$$

$$V_{LD} = 432 \text{ tvu/hr}$$

$$V_L = 510 + 432 = 942 \text{ tvu/hr}$$

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⇒ Determination of loss time is same

So $L = 12.14s$

⇒ $C_{des} \approx 97sec$

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Q: 2/ Traffic Signs:-

The MUTCD provides specification and guidelines for the use of literally hundreds of different signs for ~~the~~ different purposes.

Different traffic signs:-

- ⇒ Regulatory signs:-
- ⇒ Warnings signs
- ⇒ Guide signs

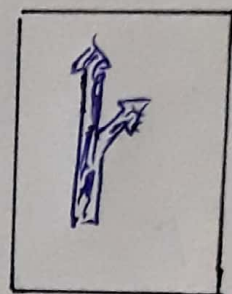
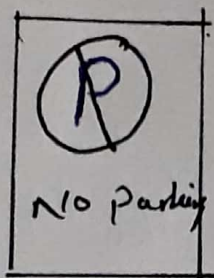
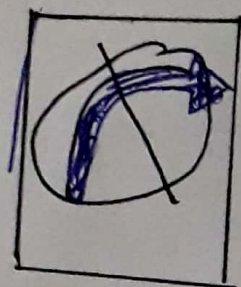
① Regulatory signs:-

Regulatory signs convey information concerning specific traffic regulation.

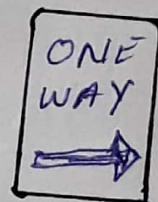
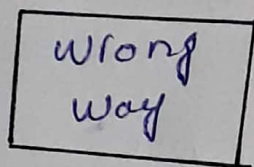
- ⇒ Regulatory signs affecting right of way
- ⇒ Speed limit sign
- ⇒ Turn prohibition sign
- ⇒ Lane use sign
- ⇒ Parking control sign

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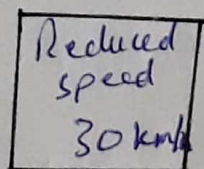
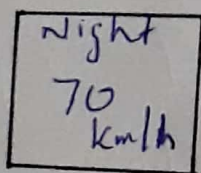
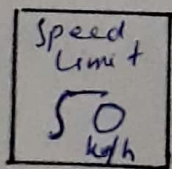


⇒ Regulator Sign Affecting Right of way



Regulatory Signs Affecting right of way used with permission of Federal Highway Administration, US Department of transportation.

⇒ Regulatory Signs speed limit



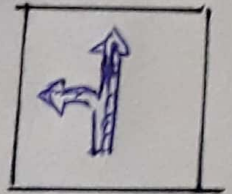
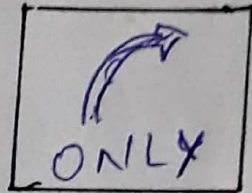
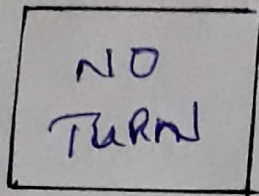
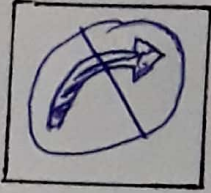
Speed limit signs placed on road to show you how much speed are required on this road or you have to reduce your speed or increase your speed.

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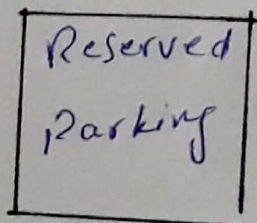
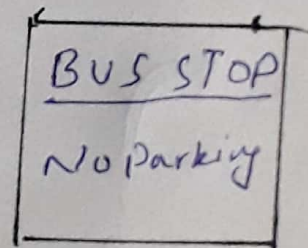
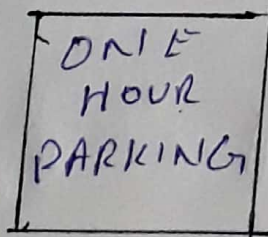
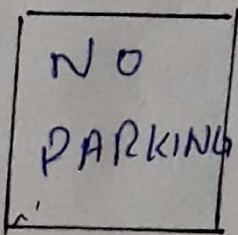
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⇒ Regulatory Signs Turn Prohibitions:-



This signs indicate Turns on Road, oneway Road, two way road, Donot turn, Only this side turns. etc.

⇒ Regulatory signs Parking Control:-



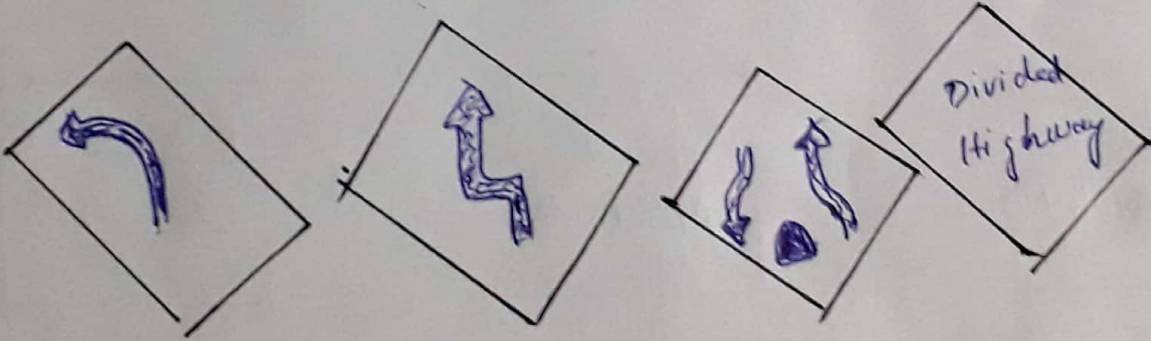
Parking Control signs Shows about Parking area, or No parking area, One, two hours parking etc.

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② Warning Signs

- Changes in Horizontal alignment
- Intersections
- Advance warning of Control device
- Narrow road ways
- Roadway Surface Conditions
- Grades
- Changes in highway design



③ Guide Signs

- Route Markers and Mile posts
- Destination Signs.

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⇒ Recreational and cultural - Interest
Guide Signs.

⇒ Service Guide Signs.

حیات آباد Hayat abad	رینگ روڈ Ring road	انڈسٹریل ایریا Industrial Area	کارخانہ KARKHANO
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Air port
KOHAT Road

Q: 3/ Road Margins:-

The portion of road beyond the carriageway and on the roadway can be generally called road margin. Many elements that form the road margin are following.

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 provided lateral support for base and surface courses.

Shoulder width should be adequate for giving working space around a stopped vehicle. It is desirable to have a width of 4.6m for shoulders. minimum 2.5m is recommended for 2-lane rural highways.

② Service Roads:-

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

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 meter away from the intersection so that the traffic near the intersection ~~so that~~ is not affected by bus-bay.

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④ Parking Lane:-

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.

⑤ Cycle track:-

Cycle tracks 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 1m for every additional track.

⑥ Foot Path:-

Footpaths are exclusive right of ways to pedestrian, especially in urban areas. They are provided for the safety of the pedestrian when both the

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Pedestrians traffic and vehicular traffic is high. minimum width is 1.5m and may be increased based on the traffic.

⑦ Guard rails:-

They are provided at edge of the shoulder usually when the road is on an embankment. They serve to prevent the vehicles from running out of the embankment exceeds 3m. Various design of guard rails are usually used.