

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER-I(New course)• EXAMINATION – WINTER- 2015

Subject Code: 2711302**Date: 01/01/2016****Subject Name: Traffic Engineering****Time: 2:30 pm to 5:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What are the basic components of road traffic? Explain road user's characteristics. **07**
- (b) Explain with graphs speed-flow-density relationship for the highway traffic. **07**
 Using Greenshield's linear speed-density function, derive the equations for maximum flow condition.
- Q.2** (a) Define: ADT, DDHV, PCU, Time headway, Space mean speed, Flow rate, Gap. **07**
- (b) What are the objectives of conducting Spot-speed survey? Enlist various methods of it and explain any one method. **07**

OR

- (b) What are the aims of conducting Travel-time and Delay studies? Explain moving observer car method. **07**
- Q.3** (a) Explain with sketch formation of shock-wave in traffic flow using flow-density graph. **05**
- (b) Develop speed-density relationship from the following data. Determine Maximum flow, Jam density, Free flow speed, Optimum speed for maximum flow. Draw speed-flow and speed-density graphs. **09**

Density (vpk)	10	20	30	40	50	60	70	80	90	100
Speed (kmph)	86	79	74	65	62	57	45	36	30	25

OR

- Q.3** (a) Define: Fixed delay, Operational delay, Capacity of highway, Level of service of highway, Signal cycle. **05**
- (b) A test car was used on a North-South road of 3.2 km and following data for the moving car was collected. Calculate traffic volume, average travel time and SMS on both directions. **09**

North bound trip no.	Travel time (min)	No. of veh. met against of stream	No. of veh. overtaking test car	No. of veh. overtaken by test car
1	8.1	225	5	2
2	8.2	250	7	3
3	8.7	300	8	4
4	9	320	10	5
South bound trip no.	Travel time (min)	No. of veh. met against of stream	No. of veh. overtaking test car	No. of veh. overtaken by test car
1	7.5	255	4	2
2	7.6	235	6	5
3	7.8	275	7	4
4	8.1	315	9	4

- Q.4 (a)** As per HCM, describe basic conditions for basic freeway segment and steps involved for its operational analysis. **07**
- (b)** The speed-density relationship of traffic on a section of a freeway lane was estimated to be $v_x = 17.6 \ln (240/k)$ as per Greenberg's model. (a) Find flow, speed and density at Maximum flow, (b) Find jam density. **07**

OR

- Q.4 (a)** What is 'Weaving'? Describe with sketches different types of weaving areas on freeway as per HCM. **07**
- (b)** Explain the Webster's method for finding optimum signal cycle time on four arm junction having two-way divided lane flow on both the streets. **07**

- Q.5 (a)** Write short note on: (i) Parking accumulation and duration study, (ii) Condition diagram for accident study. **07**
- (b)** Discuss in brief: (i) Pedestrian facility requirement on urban road network, (ii) TSM techniques. **07**

OR

- Q.5 (a)** Briefly discuss: (i) Air pollution by road traffic and its mitigation techniques, (ii) Mandatory signs. **07**
- (b)** Write short note on: (i) O-D survey by License plate method, (ii) Simulation in traffic engineering design. **07**
