Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER III (NEW) – EXAMINATION – WINTER-2016

Subject Code: 2731306 **Date:25/10/2016**

Subject Name: Traffic Flow Theory and Simulation

Time:02:30 pm to 05:00 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)** Enlist goodness of fit tests required in Traffic Engineering. Explain any one test **07**

(b) What do you understand by Capacity of highways? Explain factors affecting capacity of highways. **07**

Q.2 **(a)** Write down the steps of simulation techniques. **07**

(b) Write a 'C' programme which generates the Random numbers **07**

OR

(b) Explain shock wave theory **07**

Q.3 **(a)** What is need of multiplying passenger car unit with traffic volume? Write PCU values for all types of vehicles used for capacity of urban roads as per IRC:106-1990. **07**

(b) Explain the models for delay at intersection and pedestrian crossings. **07**

OR

Q.3 **(a)** Write a short note on "Acceleration Noise" **07**

(b) What do you understand by Gap Acceptance? **07**

Q.4 **(a)** What is the importance of Level of service in Highway? Explain criteria for level of service for rural highways. **07**

(b) Explain linear and nonlinear car following models **07**

OR

Q.4 **(a)** A road consists of 4 lanes, two in each direction. The maximum capacity of 2 lanes in one direction is 2500 vehicle/hour. When vehicles are stationery in a jamming condition, the average occupied by a vehicle is 6.25 m. During a period of observation, the actual volume of traffic in one direction is steady at the rate of 1200 vehicle/hour. This flow is brought to a halt when a traffic signal turns red and a queue forms. Find the time in seconds which elapses from the moment the signal turns red until the stationery queue reaches another intersection 75 m from the signal. Assume a linear relationship between speed and concentration. **07**

(b) What are the applications of Queuing theory in Traffic Engineering? **07**

Q.5 **(a)** A toll booth at the entrance to a bridge can handle 130 veh/hour, the time to process a vehicle being exponentially distributed. The flow is 90 veh/hour with a Poisson arrival pattern. Determine **07**

(i) the average number of vehicles in the system
(ii) the length of the queue
(iii) the average time spent by the vehicle in the system
(iv) the average time spent by the vehicle in the queue.

(b) What are the types of simulation? Explain them in brief. **07**

OR

Q.5 **(a)** What do you understand by Gap and Lag? **07**

(b) The distribution of headways by mean of a multi-watch is given in table **07**

Headway class, t in sec	Observed frequency of headway (*fi*)
0-3	120
3-6	112
6-9	41

9-12	40
12-15	15
15-18	9
18-21	12
21-24	5
24-27	7
27-30	3
30-33	4
33-36	3
36-39	1

Test the goodness of fit of a chi-square test.

****