

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER-3 (old course) EXAMINATION (Remedial) – WINTER 2015****Subject Code: 731303****Date: 07/12/2015****Subject Name: Traffic flow theories & simulation****Time: 2:30 TO 5:30****Total Marks: 70****Instructions:**

1. Attempt any five of eight questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What are basic & derived traffic flow parameters? How will they be useful to characterize traffic stream characteristics? **07**
- (b) Distinguish between macroscopic & microscopic traffic flow models? **07**
- Q.2** (a) Define traffic flow capacity? Discuss how it influences the traffic flow behaviour? **07**
- (b) Describe the operation of priority highway intersection & the function of lag & gap acceptance? **07**
- OR
- (b) Discuss poisons arrival process? List situations under which it is observed **07**
- Q.3** (a) Describe relation between speed, density & flow to study flow behaviour at midblock & nearing bottleneck? **14**
- OR
- Q.3** (a) Define platoon? What are the criteria to define platoon? When could it correctly depict the traffic flow behaviour? **07**
- (b) Write a note on car following model? **07**
- OR
- Q.4** (a) Write a programme in c++ to generate random number? **07**
- (b) What is traffic flow simulation? Why is it needed? List various traffic flow simulation software? Explain any one? **07**
- OR
- Q.4** (a) Write a note on Cellular Automata concept to characterize traffic flow behaviour? **07**
- (b) What is Queuing? Discuss Queuing theory & its importance in traffic flow analysis? **07**
- Q.5** (a) A toll collection system has four toll booths & it is observed that at each toll booth the time required to pay the toll had an exponential distribution with a mean time of 5 sec. Vehicles arrive at the toll plaza at the rate of 2400 veh/hour. It is assumed that flow in each stream (lane) could not move to another lane at toll plaza & the vehicles are served on first come first basis. Calculate average time spent in system, average waiting time spent in Queue & average Queue length. **14**
- OR
- Q.5** (a) On a two lane carriage way roadwork restricts the width of both traffic lanes creating a bottle neck to traffic flow. The maximum flow per lane on the unobstructed carriage way is 2500 veh/hour, while the section under repair the maximum flow is restricted to 2000 veh/hour. When stationary vehicles are spaced at average distance headway of 8m. It may be assumed that there is a linear relation between speed & density. **14**
- When the traffic flow approaching the road is 4500 veh/hour. Calculate
- 1) The speed of the traffic stream a considerable distance in advance of the bottleneck.
 - 2) The speed of the vehicle immediately before the commencement of bottleneck.

3) The speed of shockwave formed by the bottleneck.
