

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – III • EXAMINATION – SUMMER • 2014****Subject code: 731303****Date: 05-06-2014****Subject Name: Traffic Flow Theory and Simulation****Time: 02:30 pm - 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) Derive the linear relationships between speed and concentration. (7)
 (B) Explain the fundamental relationship between, headway, speeds, density, spacing and traffic flow. (7)

- Q.2** (A) The headway observed are as under: (7)
 0.9, 2.1, 2.5, 3.8, 1.4, 1.1, 2.9, 1.8, 1.2, 1.0, 1.1, 2.0, 2.1, 2.5, 4.6, 1.1, 5.7, 2.1, 2.3, 3.5, 0.9, 5.6, 0.8, 1.7, 1.4.
 Derive the Erlang distribution function .What is the probability that headways are greater than 4 second?
 (B) How the arrival of vehicle distribution can be obtained? Explain procedure for the same? (7)

OR

- (B) Explain car following model and derive the equation for the car following model. (7)
Q.3 (A) Explain briefly Queuing. How queuing theory is useful in Traffic Engineering? (7)
 (B) A toll booth at the entrance of expressway can handle 800 V.P.H, the time to process a vehicle being exponentially distributed. The flow is 600 V.P.H with a Poissonian arrival pattern. Determine: (7)
 (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.

OR

- Q.3** (A) Explain M/M/1 and M/D/1 queuing models. (7)
 (B) At toll collection center it is found that the 240 vehicles arrive per hour and collection of toll requires 20 seconds for each vehicle. Compare the traffic intensity, average queue length, average waiting time in queue, and average time spent in the system considering M/M/1 and M/D/1 queuing model and writes your comments on that. (7)
Q.4 (A) What is LOS? Explain in detail the factors affecting LOS. (7)
 (B) Define (i) Basic capacity (ii) Possible Capacity (iii) Practical capacity. What is the importance of Capacity in highway engineering? (7)

OR

- Q.4** (A) What are the problems in Mixed Traffic flow? How it will affect the Capacity of road? (7)
 (B) How will you determine the capacity of rotary intersection? (7)
Q.5 (A) Describe briefly the different steps required in the Simulation. (7)
 (B) Describe in detail with suitable example the Time based and Event based simulation. (7)

OR

- Q.5** (A) Traffic simulation is becoming one of the necessities for Traffic Engineer in the present scenario of high volume growth comment. (7)
 (B) Briefly explain the simulation model VISSIM. (7)
