Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – III • EXAMINATION – WINTER • 2013

Subject code: 731303 **Date: 28-11-2013**

Subject Name: Traffic Flow Theory and Simulation

Time: 10.30 am – 01.00 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)**	Compare fluid flow analogy with the traffic flow and state the assumptions and limitations.	**07**
	(b)	Explain procedure to obtain the headway distribution of arriving vehicle at toll plaza.	**07**
Q.2	**(a)**	What do you understand by Gap Acceptance? Enlist its application in traffic flow.	**07**
	(b)	Explain with the example deterministic and probabilistic models.	**07**
		OR	
	(b)	How do you obtain capacity of roadways? Explain.	**07**
Q.3	**(a)**	What are the methods of random number generations? Explain any one.	**07**
	(b)	The traffic flow on a highway is q_1 = 2000 *veh./hr.* with speed of v_1 = 75*km. /hr*. As the result of an accident, the road is blocked. Vehicle length = 4.0 meters. (i) What is the wave speed (v_w)? (ii) What is the rate at which the queue grows, in units of vehicles per hour (N1)?	**07**
		OR	
Q.3	**(a)**	What is PCU? What are the factors affect the value of PCU. List the limitations of using the PCU.	**07**
	(b)	Differentiate homogeneous and heterogeneous traffic flow.	**07**
Q.4	**(a)**	What is saturation flow and how it can be determine?	**07**
	(b)	Describe the procedure to find out the delay at Intersection.	**07**
		OR	
Q.4	**(a)**	What is force flow condition? Explain remedial measures for the same in case of urban roads.	**07**
	(b)	At toll plaza vehicle arrived at an average rate of 15 veh/h. On average 3 minutes needs to transact money for each vehicle arrived at booth. Given that the arrival pattern is described by the Poisson distribution and that the departure time is exponentially distributed. Calculate (i) The percentage of time that the booth will be idle (ii) The probability that the five vehicles will be in the system (iii) The average number of vehicles in the system (iv) The average queue length (v) The average time each vehicle spends in the system and in the queue.	**07**
Q.5	**(a)**	Explain single-server FIFO Systems? Where this type of systems is applicable in traffic engineering?	**07**
	(b)	Enlist the traffic simulation software and describe the important inputs need for such simulation models also state the limitation of these software.	**07**
		OR	
Q.5	**(a)**	What do understand by simulation? Explain how simulation technique is useful in traffic flow modeling.	**07**
	(b)	Draw the sketch of speed-flow diagram and explain Level of Service of stream.	**07**

****