Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 731303 Date: 26/12/2012

Subject Name: Traffic Flow Theories 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)**	Explain how you measure the speed, flow and density of a highway segment. Describe the procedure in detail.	**07**
	(b)	Describe the method for establishing headway distribution of an arterial. List the difficulties and limitations for getting headway distribution.	**07**
Q.2	**(a)**	Differentiate Macroscopic and Microscopic traffic flow models.	**07**
	(b)	Explain following term and derive relation between them Free Flow Speed, Jam Density and Maximum Flow	**07**
		OR	
	(b)	Explain the shock wave phenomenon with trajectory of vehicles movements.	**07**
Q.3	**(a)**	Write note on Platoon Diffusion.	**07**
	(b)	What is Simulation? How the traffic simulation helps in traffic engineering?	**07**
		OR	
Q.3	**(a)**	What are the methods to generate random number? Explain any one.	**07**
	(b)	Explain concept of highway capacity. Describe the methods to establish highway capacity.	**07**
Q.4	**(a)**	Explain delay at Intersection? Derive equation of delay at Intersection. State its application and importance.	**07**
	(b)	Explain Level of Service (LOS) and state the factor affecting LOS.	**07**
		OR	
Q.4	**(a)**	Explain average queue length, average waiting time, average time spent in the system and probability of *N* number of entity in the system for M/M/1 queuing models.	**07**
	(b)	What is heterogeneous traffic flow? What are the problems in modeling of heterogeneous traffic flow? How these problems can solve for modeling heterogeneous traffic flow?	**07**
Q.5	**(a)**	Explain Car Following Model.	**07**
	(b)	List simulation software available for traffic engineering. Explain anyone in details with its application.	**07**
		OR	
Q.5	**(a)**	At toll collection center it is found that the 180 vehicles arrive per hour and collection of toll requires 15 seconds for each vehicle. Calculate the service utilization, average number of vehicles in system, average queue length, average waiting time in queue, average time spent in the system, probability of two vehicles in system, and probability of more than one minutes spent in queue. Consider M/M/1 queuing system.	**07**
	(b)	Write programs which generate random number which follows Poisson distribution.	**07**

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