## **GUJARAT TECHNOLOGICAL UNIVERSITY** ME SEMESTER- III (NEW) EXAMINATION – SUMMER 2017

Subject Code: 2731306 Date : 02/				
	Subje Time Instru	<ul> <li>ect Name: Traffic Flow Theory a</li> <li>:02:30 pm to 05:00 pm</li> <li>ctions: <ol> <li>Attempt all questions.</li> <li>Make suitable assumptions wherever</li> </ol> </li> </ul>	and Simulation Total Marks: 70 er necessary.	)
		3. Figures to the right indicate full ma	rks.	
Q.1	(a)	What do you mean by Macroscopic models? Explain various Macroscopic models with <b>0</b> neat sketches.		
	<b>(b)</b>	Explain the field procedure of measuring time headway.		07
Q.2	<b>(a)</b>	Write a short note on "Poisson Distribution of vehicle arrival" <b>0</b>		07
	(b)	Define: - Basic capacity, Possible capacity, Practical capacity, Level of Service, 0 Uninterrupted traffic flow.		
	<b>(b)</b>	Write a short note on "Acceleration No	Dise.	07
Q.3	(a)	For the following data on speed an Greenshield's Model. Also find the m speed of 30Km/hour.	e following data on speed and density, determine the parameters of the dield's Model. Also find the maximum flow and density correspondence to f 30Km/hour.	
		K (as x)	V (as y)	
		171	5	
		129	15	
		20	40	
	<ul> <li>(b) An observation on an Expressway yielded a count of 300 vehicles in a period of han hour. Calculate the number of headways in this count.</li> <li>(i) Greater than 4 sec</li> <li>(ii) Less than 15 sec</li> </ul>			07
Q.3	(a)	The traffic flow on a highway is $q_1 = 2000 \text{ veh/hr}$ with speed of $v_1 = 80 \text{ km/hr}$ . As a result of an accident, the road is blocked. The density in the queue is $k_2 = 275 \text{ veh/km}$ and jam density. Consider vehicle length = 3.63 m. Calculate : (1) What is the wave speed (Vw)? (2) What is the rate at which the queue grows, in units of vehicles per hour (q)?		07
	<b>(b)</b>	Explain the factors affecting Capacity and LoS.		07
Q.4	<b>(a)</b>	Derive the equation of Moving observer method.		07
	(b)	What are the basic traffic flow parameters? Explain the relationship between basic flow parameters with neat sketch.		07
			OR	
Q.4	<b>(a)</b>	The headway observed are as under :		07

0.8, 2.2, 2.8, 3.9, 1.6, 1.2, 3.5, 1.8, 1.4, 1, 1.4, 2.8, 2.6, 2.9, 4.9, 1.8, 1.7, 5.9, 6.8, 2.3, 3.5, 0.9, 6.2, 0.8, 1.8, 1.4. What is the probability that headways are greater than 5 seconds? 07

- (b) Explain deterministic and stochastic queuing models
- Q.5 A self - service store employs one cashier at its counter. Nine customers arrive on an 07 (a) average every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate. Find :
  - (1) Average number of customers in the system
  - (2) Average number of customers in queue or average queue length
  - (3) Average time a customer spends in the system
  - (4) Average time a customer waits before being served
  - What do you understand by Shock wave? Explain with sketch 07 **(b)**

## OR

- Write down the steps for simulation 0.5 (a)
  - Explain gap acceptance **(b)**

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07

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