



APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code : TE0821206-I

(Pages: 3)

Name:

Reg. No:

SECOND SEMESTER M.TECH. DEGREE EXAMINATION JULY 2021

Branch: Civil Engineering

Specialization: Transportation Engineering

08CE6206 ADVANCED TRAFFIC ENGINEERING

(Common to TE)

Time: 2 hour 15 minutes

Max. Marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Use of design charts and tables are permitted

Q. No.	Module 1	Marks
1.a	Explain stream flow characteristics with neat sketch.	3
Answer b or c		
b	In a traffic study experiment, density values are obtained as 160, 120, 40 and 72 veh/km corresponding to speed values of 3, 18, 55, 32 respectively. Determine the parameters of Greenshield's model. Find the density corresponding to a speed of 40 kmph. Find also the maximum flow.	6
c	Distinguish between microscopic and macroscopic models	6
Q. No.	Module 2	Marks
2.a	What are the commonly used counting and interval distributions?	3
Answer b or c		
b	Using the following random numbers generate vehicle arrival for a period of 20 sec. Assume headways to follow exponential distribution with mean time headway 6 sec. [0.59, 0.45, 0.26, 0.70, 0.14, 0.28]	6
c	Explain Poisson distribution Binomial distribution	6

Q. No.	Module 3	Marks
3.a	A group of vehicles that travels in close proximity to one another. Briefly explain the situation.	3

Answer b or c

- | | | |
|---|---|---|
| b | Explain in detail the basic concept of Lighthill and Witham's theory. | 6 |
| c | If the jam density on the approach is 130 veh/km, determine the velocity of the stopping wave when the approach signal changes to red if the density on the approach is 45 veh/km and the space mean speed is 40 km/h. At the end of the red interval, what length of the approach upstream from the stop line will vehicles be affected if the red interval is 35 sec? | 6 |

Q. No.	Module 4	Marks
4.a	Briefly explain the different types of queue structures.	3

Answer b or c

- | | | |
|---|---|---|
| b | Arrival of vehicles at toll plaza is Poisson distributed with a mean arrival rate of 100 vph. The time to process a vehicle is exponentially distributed with a mean time of 25 sec. Compute the operating parameters of the toll plaza and critically comment on the congestion. | 6 |
| c | What are the basic assumptions involved in the formulation of a simple queuing theory? | 6 |

Q. No.	Module 5	Marks
5.a	The results of a traffic count taken between 5.00 pm and 6.00 pm are given below:	4

Time Interval	Volume (Vehicles)
5.00-5.15pm	900
5.15-5.30pm	1000
5.30-5.45pm	1200
5.45-6.00pm	850
6.00-6.15pm	425
6.15-6.30pm	700
6.30-6.45pm	725

The peak hour factor needs to be determined for this section of freeway.

Answer b or c

- b** LOS and capacity are influenced by different factors. Explain. **8**
- c** A four lane highway has a 2500 vph peak hour volume that includes mostly commuter traffic, 5% trucks and 6% buses. The section of highway that we are interested in is in rolling terrain. The peak hour factor has been determined by earlier studies to be 0.95. What is the passenger car equivalent (or service) flow rate for this section of freeway? **8**

Q. No.	Module 6	Marks
6.a	Distinguish between discrete and continuous systems. Give transportation examples for each type of system.	4

Answer b or c

- b** What is Pseudo numbers? Explain the method generate such numbers. How can you test the random number? Give application also. **8**
- c** Vehicles arrive at a service station every 10 +/- 2 minutes. There are two bays offering the same service takes 22+/-3 minutes. Manually simulate the processing of 15 vehicles. Compute the parameters of operation and discuss the results. **8**

Random Number Table

45	25	36	41	31
31	63	53	78	52
41	78	36	54	07
51	55	59	32	43

Generally the arrival is considered as uniformly distributed and service is also uniformly distributed.