APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree (Hons.) Examination June 2020

Course Code: CE366
Course Name: TRAFFIC ENGINEERING AND MANAGEMENT

Max. Marks: 100   Duration: 3 Hours

(Provide Graph Sheets)

PART A
Answer any two full questions, each carries 15 marks.   Marks

1 a) Write short notes on Motor Vehicle Act.   (5)

   b) Define traffic calming. Explain the methods of implementing traffic calming   (10)
       measures with sketches

2 a) Explain Intelligent transportation System and write short notes on functional (5)
       areas of ITS.

   b) In an urban area a four-legged intersection is formed when a state highway   (10)
       meets with a major district road (MDR). The building provided on the corner of
       intersection is having an offset of 20m from the state highway and 15m from
       MDR as shown in Figure.1. Analyse whether the intersection is safe if vehicles
       are travelling at design speed on both state highway and major district road. If
       not, then suggest the improvement strategies to be implemented at the
       intersection.
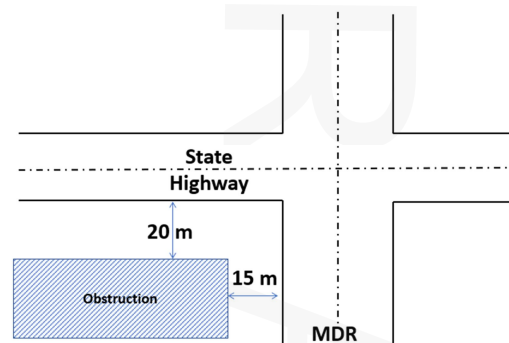

Figure 1. Intersection

3 a) Explain the need and significance of traffic regulations in traffic engineering (5)
   and management.

b) The result of a speed study in a highway location is given in the form of a frequency distribution table. Find the values of upper and lower speed limit to be implemented for the given location. Draw histogram and cumulative frequency distribution of given data. (10)

Speed Range km/hr)	Frequency
01 – 10	1
11 – 20	4
21 – 30	10
31 – 40	14
41 – 50	28
51 – 60	30
61 – 70	12
71 – 80	8
81 – 90	0
91 – 100	2

PART B
Answer any two full questions, each carries 15 marks.

4 a) Explain the terms traffic capacity, basic capacity, possible capacity and practical capacity. (5)

b) Mention and explain the steps involved in determining peak-hour flow rate, free flow speed and LOS for the level terrain portion of the highway segment of undivided four-lane highway. (10)

5 a) Write short notes on Signal Coordination (5)

b) The width of a carriage way approaching an intersection is given as 15 m. The entry and exit width at the rotary is 10 m. The traffic approaching the intersection from the four sides *(in PCUs / hour)* is shown in figure. Find the capacity of the rotary using the given data. (10)
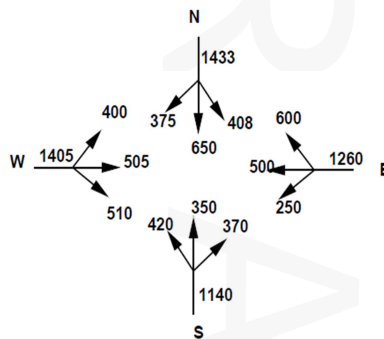
6 a) Define passenger car unit (PCU). What are the factors upon which PCU value depends? (5)

b) A three-phase traffic signal is to be installed at a four-legged intersection with approach width being 12m wide between kerbs. One of the phases provided is a pedestrian only phase occurring at the end of each cycle. Starting delay may be taken as 2seconds. An all-red period of 4seconds is to be provided after each vehicle phase to allow clearance of right turning vehicles left over in the crossing. The design hour traffic volumes in PCU/hour are given in the following table. Calculate the optimum cycle time and sketch the phasing diagram for each phase. Make suitable assumptions for amber and pedestrian interval. (10)

From	N			E			S			W		
To	E	S	W	S	W	N	W	N	E	N	E	S
Flow PCU/hr	40	800	80	80	500	52	60	660	60	70	680	60

PART C
Answer any two full questions, each carries 20 marks.

7 a) Explain collision diagrams and condition diagrams .What are the applications of these diagrams? (10)

b) Explain the fundamental diagrams of traffic flow and derive the expression for determining the maximum traffic flow (10)

8 a) The maximum capacity of a 2-lane road in one direction is 3000 vehicle/hour. The actual flow of traffic during a normal day under steady state condition is 2250 vehicles/ hour. The flow is brought to halt when traffic signal turns red and results in the formation of queue. When vehicles are stationary in a jamming condition, the average length occupied by a vehicle is 6.50 m. Find the time in seconds which elapses from the moment the signal turns red until the stationary queue reaches another intersection 500m from the signal. (10)

b) It is observed that on an average a vehicle driver drives 5000km during the course of a year. The probability of having an accident is 100 per 200 million vehicle-kilometres. What is the probability of a driver having at least two accidents during his driving career extending to 25years? (10)

9 a) Explain car following theory and Queuing theory. List the classification of car-following models and have a detailed discussion on any three car following models. (10)

b) Morning peak traffic upstream of a toll booth is given in the table below. The (10) toll plaza consists of three booths, each of which can handle an average of one vehicle every 8 seconds. Determine the maximum queue, the longest delay to an individual vehicle.

Time Period	10 Minute Vehicular Volume
8:01 – 8:10 am	200
8:11 – 8:20 am	400
8:21 – 8:30 am	500
8:31 – 8:40 am	250
8:41 – 8:50 am	200
8:51 – 9:00 am	150

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