MANIPAL INSTITUTE OF TECHNOLOGY MANIPAL (A constituent unit of MAHE, Manipal)

MANIPAL INSTITUTE OF TECHNOLOGY VI SEMESTER B.TECH. (CIVIL ENGINEERING) END SEMESTER (Makeup) EXAMINATION, APRIL-MAY 2024 TRAFFIC SYSTEMS AND ENGINEERING (CIE 4070)

(-05-2024)

TIME: 3 HRS.

Note: 1. Answer all questions.

2. Any missing data may be suitably assumed. MARKS 0. **OUESTION** CO BL 1A List out the advantages and disadvantages of floating car and license plate 4 1 1 methods for carrying out speed and delay studies. 4 5 **1B** Identify the conflict points and mark them on the figure below 2 ı **1C** Discuss the applications of Lighthill and Whitham's Theory? 2 2 2 The maximum capacity of a 2-lane carriageway or a 4-lane dual 5 2 5 2A carriageway is 4000 veh/hr. Due to pipe laying operations, the width of the 2-lane carriageway is reduced, restricting the maximum capacity to 2400 veh/hour. When the flow upstream beyond the influence of the bottleneck is reasonably steady and free flowing at 3000 veh/hour, **Evaluate:** The mean speed of traffic in the bottleneck i) ii) The rate at which the queue of congested conditions outside the bottleneck grows. Assume, the mean space headway when the vehicles are stationary is 8 m. The relation between speed and concentration is linear. **2B** Illustrate with a neat sketch 3 different layouts of Y-intersections. 3 3 2 **2C** Discuss the following: a) Rotary intersection, b) Merging traffic, c) 2 3 2 Diverging traffic, d) Weaving traffic.

MAX. MARKS: 50

3A	The normal flow of traffic at crossroads A and B is 400 and 250 vehicles per hour, respectively. The saturation flow for roads A and B are estimated as 1250 and 1000 vehicles per hour, respectively. The all-red time for pedestrians to cross is 12 seconds, and lost time at each phase is 2 seconds. Design a two-phase traffic system by Webster's method.							5	3	5
3B	What is off-street parking? Explain the design features of off-street parking.							3	4	2
3C	What is an Origin-Destination Survey? Discuss the applications of the OD survey.							2	4	2
4 A	What are the objectives of road accident studies? Explain the causes of road accidents.						5	5	2	
4B	Discuss the following: i) Luminous Flux, ii) Death Rate based on population, iii) Accident Involvement Rate						3	5	1	
4C	It has been found that, on average, 1 in 80 drivers in a bus company are involved in an accident every year. If there are 150 drivers in the company, Estimate the probability of exactly 5 drivers being involved in an accident during a year.							2	5	4
5 A	Explain the road lighting system at a rotary intersection with a neat sktech.							4	5	2
5B	Assess whether there is any relationship between the accident severity and							4	5	5
	the age of drivers using a suitable statistical test for the data given below:									
			Age group of drivers			Total				
			18-30	30-50	Above 50	Accidents				
	Accident severity	Fatal	12	8	16	36				
		Grievous Injury	25	14	41	80				
		Minor	48	35	70	153				
	severity	Injury								
	severity	Injury Total Accidents	85	57	127	269				