VIT
Vellore Institute of Technology

SLOT:G1

SCHOOL OF CIVIL ENGINEERING
CONTINUOUS ASSESSMENT TEST – II
WINTER SEMESTER 2023-2024

Programme Name & Branch	: **B.Tech. Civil Engineering**
Course Code	: BCLE305L
Course Name	: **Transportation Engineering**
Faculty Name(s)	: P. Sasanka Bhushan
Class Number(s)	: VL2023240500894
Exam Duration	: **90 minutes** **Maximum Marks: 50**

General instruction(s):
Answer all the questions. Answer all parts of a question in the same sequence and at one place. *IRC 73-1980 (complete manual as stapled or bound) is permitted.*

Q. No.	Question Text	Marks
1	Given: On a plain terrain, a 4-lane highway is designed with design speed of 100kmph. For this highway, answer the following questions: • What is the purpose of a transition curve? (2marks) • At what radius of circular curve transition curve is not required? (2 marks) • Consider a circular curve section with radius 750m. Find the minimum length of transition to be provided on this curve based on IRC 73-1980 guideline. (6 marks)	10
2	Design speed for a 2 lane highway is 65kmph. On this highway, a 1.5% descending gradient section is meeting a 2.5% ascending gradient section. Design a suitable vertical curve for this section according to IRC 73-1980. Include the following in your answer: • In a rough sketch of the road section, draw a valley curve joining the two gradients. • Write the main principle based on which the valley curve length is found. • Write the minimum length of vertical curve at 65kmph design speed. • Calculate the length of the curve for this grade difference. Use stopping sight distance as 95m. Round off to next 5m.	10
3	A student conducted a spot speed study at a location on a highway. She summarized the number of vehicles moving in each range of speeds as shown in Table 1. Draw a %frequency chart, cumulative %frequency chart and identify median speed, the speed to be used for maximum speed limit and the speed to be used for design speed from the graph. Use graph sheet for your graphs. Table 1.	10

Speed range (kmph)	Number of vehicles (frequency)
0-9	2
10-19	5
20-29	11
30-39	25
40-49	18
50-59	14
60-69	5

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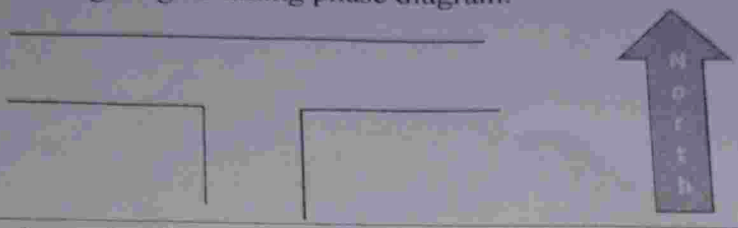
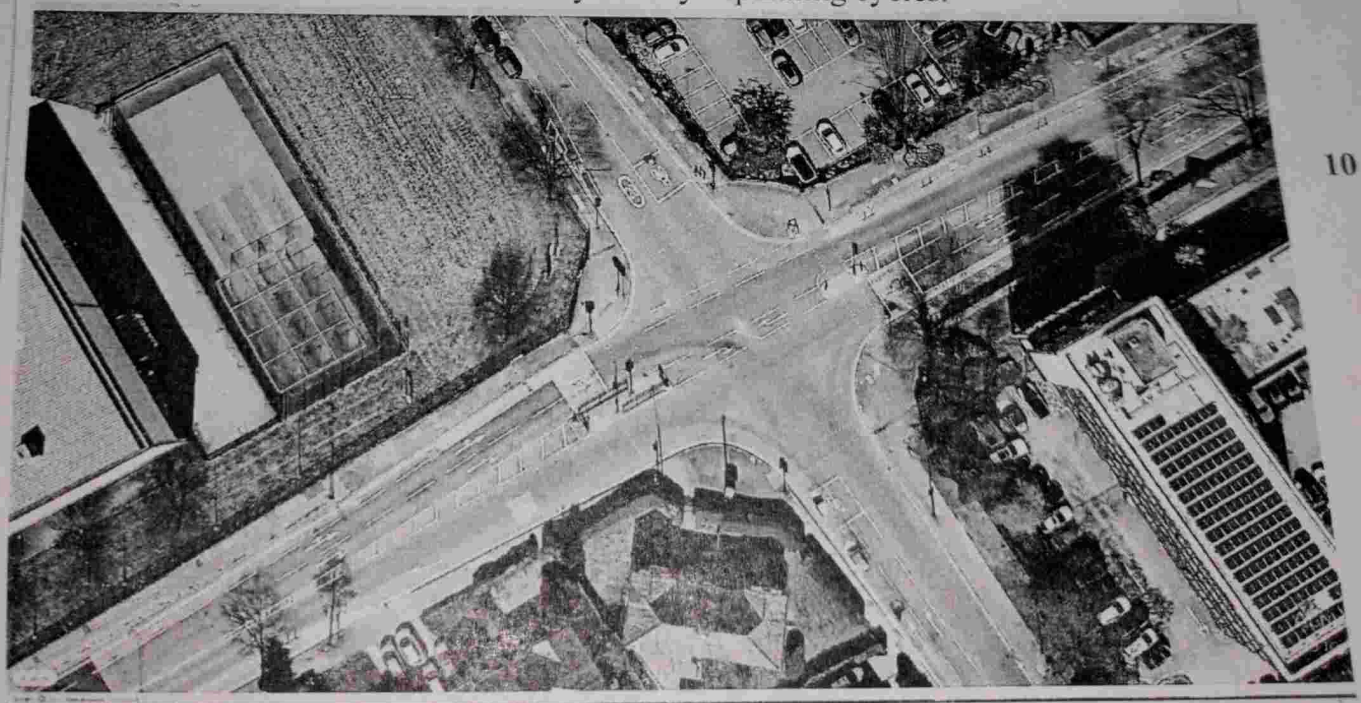
4	Answer the following questions:	10
a.	Estimate directional design hour volume (DDHV) for a highway section for Year 2035 with the following data and suggest number of lanes to be constructed. • AADT in 2023 was 24,000. • AADT grows by 700 each year. • Peak hour proportion is 0.10 and directionality factor is 55%. • Maximum service volume on one lane is 1100 veh/hour.	5
b.	At a three legged T intersection, vehicle movements are controlled by a traffic signal. The signal is operating with three phases, one for each approach. Show this operation using a signal timing phase diagram. 	5
5	Picture shown in Figure below is an aerial view of an intersection in Manchester, UK. You have learned many design features related to intersection for safe and efficient movement of motor vehicles as well as non-motorized transport such as pedestrians and bicyclists. Identify at least eight of those design features in this intersection and write about the specific role of each feature in safe and efficient movement. Example: Some area on road pavement is painted green to tell that that area is dedicated to cycles. This will not only gives priority to cycles but also reduces chance of crash with motor vehicles by clearly separating cycles. 	10