Nirma University

Institute of Technology

Semester End Examination (IR), December - 2023

B. Tech. in CH / ME / EE / EC / CSE, Semester-VII

2CLOE28-O Road Safety and Management

Roll / Exam No. | Supervisor's Initials with Date: N.B 21/12.

Time: 3 Hours | Max. Marks: 100

Instructions:
1. Attempt all questions.
2. Figures to right indicate full marks.
3. Use section-wise separate answer book.
4. Draw neat sketches wherever necessary to score better.
5. Assume additional data, if required and mention the same.
6. Answer descriptive questions in bullet points wherever possible, to score better.

SECTION - I

1[A] CLO2 BL2	Discuss the important pavement surface characteristics with respect to highway geometric design.	[8]
	OR	
1[A] CLO1 BL2	Explain sight distance and factors causing restrictions to sight distance. Discuss significance of stopping, intermediate and overtaking sight distances.	[8]
1[B] CLO2 BL2	List the various traffic engineering studies. Mention the objectives and importance of each study.	[8]
	OR	
1[B] CLO2 BL2	Elaborate the various methods of carrying out origin and destination studies.	[8]
1[C] CLO1 BL2	Explain superelevation. Enumerate the design steps for superelevation.	[8]
1[D] CLO3 BL2	Describe various stages of road safety audit with a flowchart.	[8]
2[A] CLO1 BL2	Write short notes on- (a) kerbs (b) road margins (c) width of formation	[6]
2[B] CLO1 BL2	Discuss the design elements to be considered at the horizontal alignment.	[6]

2[C] CLO1 BL2 Draw a detailed sketch of an overtaking zone. Mention why are they provided and what is the basis of deciding the length of these zones. [6]

SECTION - II

3[A] CLO1 BL3 Calculate the minimum sight distance required to avoid a head on collision of two cars approaching from the opposite directions at 80kmph and 60kmph. Assume reaction time of 2s, coefficient of friction of 0.8 and a brake efficiency of 50 percent. [8]

OR

3[A] CLO1 BL3 The speeds of overtaking and overtaken vehicles are 80 and 60 kmph respectively on a two-way traffic. If the acceleration of the overtaking vehicle is 2.5 kmph per second calculate the safe overtaking sight distance for two-way traffic. [8]

3[B] CLO2 BL3 The consolidated data collected from speed and delay studies by floating car method on a stretch of urban road 4.5 km, running North – South are given below. Evaluate Average Volume and Average Journey Time for both directions. [8]

Trip No	Trip Direct-ion	Journey Time, min–sec	Total Stopped Delay, min–sec	No. of vehicles over-taking	No. of vehicles over-taken	No of vehicles from opposite direction
1	N – S	06 – 20	01 – 30	7	8	120
2	S – N	07 – 10	01 – 50	8	7	295
3	N – S	06 – 50	01 – 10	6	7	335
4	S – N	07 – 30	01 – 30	5	8	175
5	N – S	06 – 30	01 – 00	7	6	265
6	S – N	08 – 20	02 – 10	3	7	227
7	N – S	06 – 40	01 – 10	6	9	147
8	S - N	07 – 30	01 – 40	5	5	250

3[C] CLO1 BL3 A radius of 250 m has to be provided at a locality due to site restrictions in a national highway with design speed of 100 kmph. Design the superelevation, discuss if there should be speed restriction. [8]

3[D] CLO4 BL2 Define parking. Describe the requirements of parking for different road users. [8]

4[A] CLO3 BL2 Explain the different factors responsible for causing accidents. [6]

4[B] CLO4 BL2 Enumerate the general principle of traffic sign. [6]

4[C] CLO3 BL2 Elaborate collision diagram with help of a sketch. How are these useful for accident analysis [6]