Nirma University

Institute of Technology

Semester End Examination (IR), December - 2022

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

2CLOE28 Road Safety and Management

Roll / Exam No.		Supervisor's Initials with Date	

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.
5. Assume additional data, if required and mention the same.

SECTION – I

Q-1. Answer the following. **[22]**

[A] CO1BL4 Discuss various cross-sectional elements of urban roads. [06]

[B] CO3BL4 Categorize the common reasons attributed to road crashes in India. Justify how these can be misleading. [08]

OR

[B] CO3BL4 Enumerate the objectives of accident studies. [08]

[C] CO3BL5 Describe various stages of road safety audit with a flowchart. [08]

Q-2. Answer the following. **[28]**

[A] CO2BL4 Explain the applications of Origin and Destination Studies. [08]

[B] CO2BL5 Discuss road user characteristics with emphasis on their effects on geometric design of roads. [06]

[C] CO2BL4 Enumerate the objectives of traffic volume studies. [08]

OR

[C] CO2BL5 Discuss the Floating Car Method of Speed and Delay Studies. [08]

[D] CO1BL4 Explain various types of Sight Distance available on Carriage Way for safe movement of vehicles. [06]

SECTION - II

Q-3. Answer the following. **[24]**

[A] CO1BL5 Determine the minimum sight distance required to avoid a head on collision of two cars approaching from the opposite directions at 80kmph and 50 kmph. Assume coefficient of friction of 0.8 and a brake efficiency of 50 percent. [08]

OR

[A] CO1BL5 The speeds of overtaking and overtaken vehicles are 80 and 50 kmph respectively on a two-way traffic. The average acceleration during overtaking may be assumed as 3.16 kmph/sec or a = 0.99 m/s^2. Determine safe overtaking sight distance. [08]

[B] CO2BL5 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. Determine Average Volume and Average Journey Time for both directions. [08]

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	8	7	134
2	S – N	07 – 10	01 – 50	7	8	297
3	N – S	06 – 50	01 – 10	9	6	337
4	S – N	07 – 40	01 – 30	6	8	177
5	N – S	06 – 30	01 – 00	5	6	262
6	S – N	08 – 20	02 – 10	8	7	227
7	N – S	06 – 30	01 – 10	7	9	147
8	S - N	07 – 30	01 – 40	5	7	257

[C] CO1BL4 The radius of a horizontal circular curve is 120 m. The design speed is 60 kmph and the design co-efficient of lateral friction is 0.15. (a) Determine the super elevation required if full lateral friction is assumed to develop. (b) Determine the co efficient of friction needed if no super elevation is provided. [08]

Q-4. Answer the following. **[26]**

[A] CO3BL4 Enumerate the various steps involved in traffic accident studies and explain any one in brief. [08]

[B] CO4BL5 Describe the goals of ITS regarding road transportation. [06]

[C] CO4BL4 Discuss various types of sensors used in data collection for traffic analysis. [06]

[D] CO4BL4 Describe various types of traffic signs and justify their purpose in assuring road safety. [06]