Register No.: ....   Name: ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R,S), MAY 2024
CIVIL ENGINEERING
(2020 SCHEME)

Course Code :   **20CET332**

Course Name: **Traffic Engineering and Management**

Max. Marks :   **100**   **Duration: 3 Hours**

PART A
(Answer all questions. Each question carries 3 marks)

1. Describe the fundamental parameters of traffic flow.
2. Explain the concept of Multi regime traffic stream models.
3. Discuss the need for traffic regulations in a country.
4. Discuss the concept of speed zoning.
5. Explain pre-timed and traffic actuated signals.
6. Explain concept of signal coordination.
7. Differentiate base capacity and adjusted capacity.
8. Define the concept of PCU.
9. Describe the different aspects of a vehicle that can cause an accident.
10. Discuss any two methods for the statistical analysis of accident data.

PART B
(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Derive the relationship between the time mean speed and space mean speed. Explain why space mean speed is considered lower than the time mean speed.   (7)

    b) Traffic study at a particular location resulted in a calibrated speed-density relationship as follows. v = 52.5 (1 - 0.35 k). For this relationship, determine free flow speed, jam density and maximum flow. Also, illustrate the relationship between fundamental parameters of traffic with a neat sketch.   (7)

OR

12. a) The results of a speed study are given in the form of a frequency distribution table. For the data given in table 1, compute the time mean speed and space mean speed. Also verify the relationship between them. Finally compute the density of the stream. (7)

Table 1

Speed range	Frequency
0-10	6
10-20	16
20-30	24
30-40	25
40-50	17

b) Explain the time-space diagram for single vehicle and multiple vehicles with a neat sketch. (7)

MODULE II

13. Discuss any four traffic management measures. (14)

OR

14. a) Explain the different aspects covered in the regulation of vehicles and drivers. (8)

b) Explain the features of the Motor Vehicle Act Amendment bill. (6)

MODULE III

15. a) Explain the significance of adjustment factors in capacity estimation. Also, discuss the various adjustments factors considered in the Indo HCM (2017) guidelines. (8)

b) Describe the factors affecting highway capacity. (6)

OR

16. a) Discuss the concept of LOS and the factors affecting it. (7)

b) Explain the procedure mentioned in Indo HCM (2017) for the determination of base capacity and level of service of two lane inter urban road. (7)

MODULE IV

17. a) Explain the levels of intersection control. (7)

b) A fixed time 2-phase signal is to be provided at an intersection having a North-South and an East-West road where only (7)

straight-ahead traffic is permitted. The design hour flows from the various arms and the saturation flows for these arms are given in the table 2:

Table 2

From	N	S	E	W
Flow	800	500	850	600
Saturation flow	2400	2000	3000	3000

Calculate the optimum cycle time and green times for the minimum overall delay. The inter-green time should be the minimum, necessary for efficient operation. The time lost per phase due to starting delays can be assumed to be 2.5 seconds. The value of amber period is 2 seconds. Sketch the timing diagram for each phase.

OR

18. a) Explain the design principles of a channelized intersection. (7)
    b) Illustrate the design elements of a rotary intersection. (7)

MODULE V

19. a) Discuss the uses of accident data. (9)
    b) Explain the various stages of road safety audit. (5)

OR

20. a) Explain the difference between collision diagram and condition diagram with a neat sketch. (8)
    b) Discuss the influence of road characteristics on pedestrian accidents. (6)

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