

Roll No. ....

**23233**

**M. Tech. 1st Semester (Civil Engg.)  
Transportation Engg. (Elective-II)  
Examination – January, 2023  
TRAFFIC ENGINEERING AND TRAFFIC FLOW THEORY**

Paper : CE-642

Time : Three hours ]

[ Maximum Marks : 100

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all. All question carry equal marks.

1. Differentiate between space and time mean speeds. Calculate modal speed, upper and lower speed limits and design speed for a road with the help of following data.

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Speed in kmph	< 10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-100
No. of vehicles	45	230	375	500	680	525	430	290	110
							100-120	120-130	> 130
							25	8	2

23233-2-Q(F-3)(Q-8)(23)

P. T. O.

2. (a) Describe the uses of photographic techniques in traffic surveys. 10

(b) Find out peak hour flow and peak hour factor from the following data. 10

Time Interval	4 : 00- 4 : 15	4 : 15- 4 : 30	4 : 30- 4 : 45	4 : 45- 5 : 00	5 : 00- 5 : 15	5 : 15- 5 : 30	5 : 30- 5 : 45	5 : 45- 6 : 00	6 : 00- 6 : 15	6 : 15- 6 : 30
Cars	30	25	35	40	49	55	65	50	39	30

3. What are the objectives of accident studies ? Differentiate between accident frequency and accident rate. Elaborate various causes of accidents in India. 20
4. Draw fundamental diagrams of traffic flow. Define and explain level of service with the help of them. The free mean speed on a road is 100 kmph. At jam condition average space headway observed was 6 m. Determine the capacity of road. 20
5. Which fundamental relationship of traffic is used in analysis of bottlenecks on highways ? Derive expression for shock wave speed. 20
6. (a) What are various types of hazard markings ? Explain with neat sketches. 12  
(b) Differentiate between signal phase and signal cycle. 8

23233- (P-3)(Q-8)(23) ( 2 )

7. What do you understand by  $M/D/N/10/\infty$  queuing model ? Estimate queue length in an  $M/M/1$  model considering arrival and departure rates on a toll plaza as 9 and 10 vehicles per 10 minutes. Also calculate the probability of at least 4 persons in the system at a particular instance of time. 20

8. Give example of a four phase signal and show various phases with neat sketch. Find yellow time for a phase based on fundamental principles for the given data: average vehicle length = 6.5 m; longest width of intersection area = 20 m; approach speed at the intersection = 50 kmph; Reaction time = 2.5 sec. 20

23233- (P-3)(Q-8)(23) ( 3 )