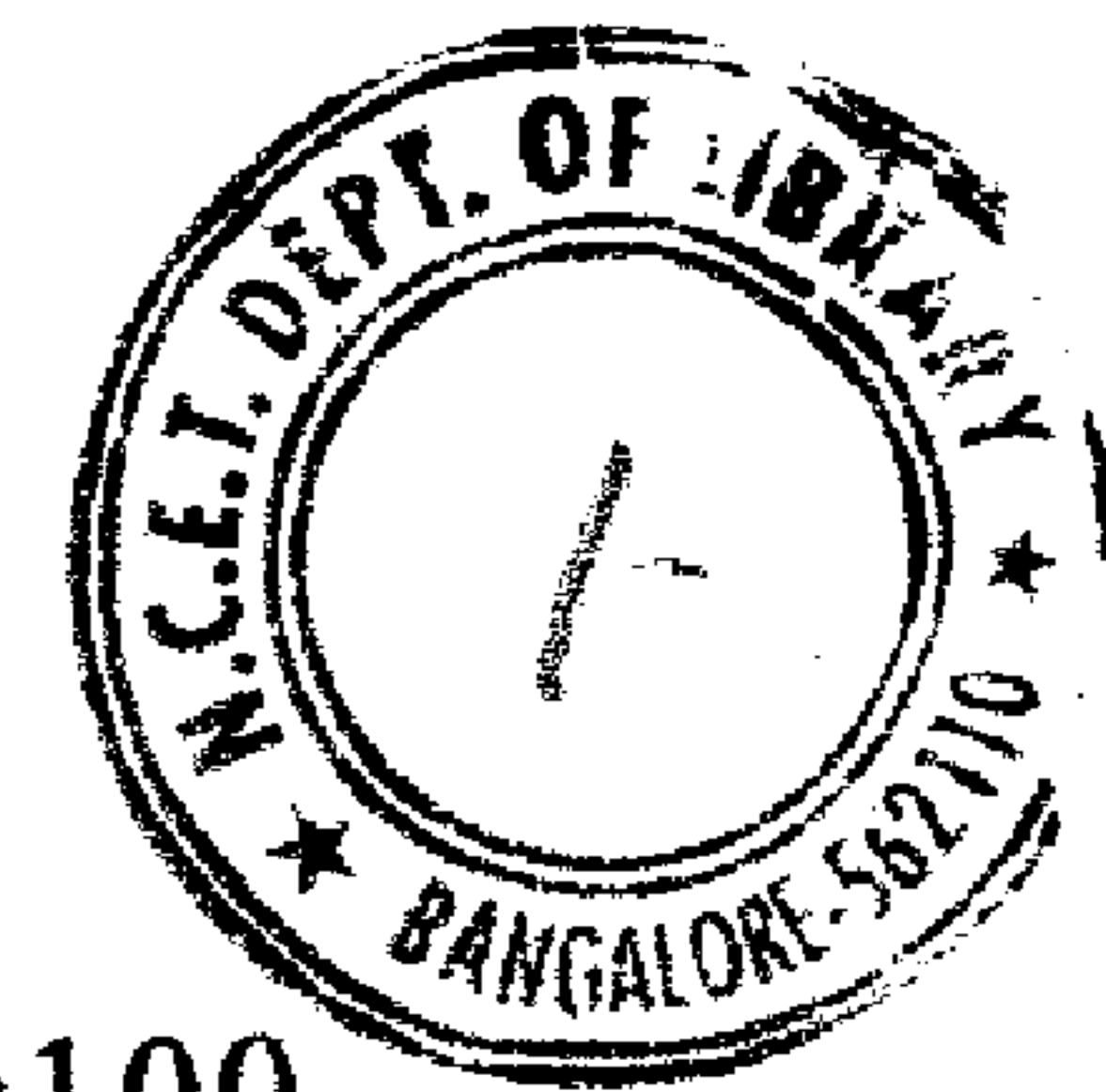


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06CV667

Sixth Semester B.E. Degree Examination, June-July 2009
Traffic Engineering



Time: 3 hrs.

Max. Marks:100

- Note:1. Answer any FIVE full questions, selecting at least TWO questions from each part.**
2. Use of statistical tables allowed.
3. Missing data can be suitably assumed.

PART – A

- 1 a. Discuss the primary functions of Traffic Engineering. (06 Marks)
 b. Describe the visual aspects of road users affecting highway design. (04 Marks)
 c. A driver of the vehicle starts displacing the vehicle at a distance of 200 m when driving at 60 kmph, after seeing a road sign placed at 4 m left of his path. Suggest where the sign should be placed so that the driver starts displacing at 400 m. (04 Marks)
 d. A car weighing 1300 kg and travelling at a speed of 65 kmph on a level road of rolling resistance coefficient 0.025, is allowed to coast by suddenly switching off the engine and putting the gear in neutral. If coefficient of air resistance is 0.37 and frontal area is 1.65 m², find the deceleration caused. In how much distance will the car come to a halt? (06 Marks)
- 2 a. Explain the terms: i) Design hourly volume ii) Design vehicle iii) Spot-speeds. (06 Marks)
 b. One kilometer section of a road is covered by three vehicles in 1 minute, 2 minutes and 3 minutes. Calculate the time mean speed and space mean speed as also the standard deviation. (04 Marks)
 c. The table below summarizes the field data obtained for spot-speeds:
- | | | | | | | | | | | |
|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Speed mid class, kmph | 12.45 | 17.45 | 22.45 | 27.45 | 32.45 | 37.45 | 42.45 | 47.45 | 52.45 | 57.45 |
| Number of vehicles observed | 3 | 10 | 21 | 31 | 54 | 43 | 21 | 10 | 5 | 2 |
- Plot the analysed data and determine the following : i) Modal speed ii) Median speed
 iii) Speed for traffic regulation iv) Speed for geometric design v) Standard deviation. (10 Marks)
- 3 a. Discuss the various types of parking, their advantages and disadvantages. (08 Marks)
 b. Outline the causes of accidents and suggest remedial measures for prevention. (06 Marks)
 c. A vehicle skids through a distance of 50 m before colliding with another parked vehicle. After collision both vehicles skid through a distance equal to 15 m, before stopping. If weights of both the vehicles are equal, compute the critical speed of moving vehicle. Assume coefficient of friction as 0.40. (06 Marks)
- 4 a. Explain i) Level of service ii) Desireline diagram iii) License plate method. (06 Marks)
 b. Discuss the factors affecting capacity. (06 Marks)
 c. The data shown below were noted in a travel time study on a 2 kilometer stretch of a highway using moving-observer method. Determine the travel time and flow in each direction. (08 Marks)

Direction	Travel time Minutes	Number of Vehicles			
		Travelling in opposite direction	Overtaking test vehicle	Overtaken by test vehicle	
North Bound (NB)	1	3.20	75	3	1
	2	2.80	80	2	2
	3	3.25	85	0	1
	4	3.01	70	2	1
	Average	3.07	77.5	1.75	1.25
South Bound (SB)	1	3.30	78	4	0
	2	3.25	74	2	2
	3	3.40	79	0	2
	4	3.35	82	3	3
	Average	3.33	78.25	2.25	1.75

PART – B

- 5 a. Describe the basic relationship between flow parameters. (08 Marks)
 b. Develop a linear regression relationship from the following speed-density data:

Density VPK, (x)	10	20	30	40	50	60	70	80	90	100
Speed, KPH (y)	60	50	45	40	35	30	20	15	10	5

and determine optimum speed, Jam density and free speed. (12 Marks)

- 6 a. The average arrival rate of vehicles at a stop controlled approach is 720 veh/hr. Assuming that arrival of vehicles is Poisson distributed, estimate the probabilities of having 0, 1, 2, 3, 4, 5 or more vehicles arriving over a 10 seconds interval. (06 Marks)
 b. In a study of 363 observations of spot speed of vehicles, a researcher found the resulting mean to be 39.7 kmph with a standard deviation of 6.80 kmph. What would be a 95% confidence interval for the population mean speed? Assume that the observations are normally distributed. (06 Marks)
 c. An engineer observed that five consecutive kilometer of a rural highway had the following number of accidents per year:

Kilometer number	1	2	3	4	5
Accidents	43	29	52	34	48

Because these sections were similar in geometrics and volume, is there enough evidence to show that location makes a difference? Test at 5% and 10% significance levels. (08 Marks)

- 7 a. Describe the main functions of traffic control devices. (10 Marks)
 b. A simple four leg intersection needs a fixed time signal. The critical flow in N-S and E-W directions are 600 and 400 veh/hr, saturation flow is 1800 veh/hr and the lost time per phase is observed to be 1.20 seconds. Determine the cycle length and distribution of green. Give a neat sketch of timings. Use Webster's method. (10 Marks)
- 8 a. Highlight the functions of different types of signals. (08 Marks)
 b. Explain :
 i) Traffic rotary.
 ii) Simulation techniques.
 iii) Saturation flow. (12 Marks)
