



USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10CV667

Sixth Semester B.E. Degree Examination, Aug./Sept.2020

Traffic Engineering

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.
2. Assume any missing data suitably.

PART – A

- 1 a. Explain the scope of traffic engineering. (06 Marks)
- b. Explain the physical characteristics of road users. (06 Marks)
- c. A vehicle of weight 2000 kg has to accelerate at 3 m/sec^2 in the first gear from 10 kmph to 20 kmph. The gradient is +1% and the rolling resistance is 0.02. The frontal area is 2.0 m^2 and coefficient of air resistance is 0.39. The radius of tyres is 33 cm with a deformation factor of 0.935. The transmission gear ratio and rear-axle gear ratio are 2.78:1 and 3.82:1 respectively. Determine the engine horse power needed and the speed of the engine of transmission efficiency is 0.9. (08 Marks)

- 2 a. Enumerate the objectives and uses of traffic volume studies. (06 Marks)
- b. Enumerate the applications of O and D studies. (06 Marks)
- c. Explain the floating car method of conducting speed and delay studies. (08 Marks)

- 3 a. The speed data obtained is presented below:

Speed Range (kmph)	0 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	80 to 90	90 to 100
No. of Vehicles	12	18	68	89	204	255	119	43	33	9

- Analyse the data and determine the salient speeds for design and regulation. (06 Marks)
 - b. Enumerate the factors that affect the PCU values of different vehicle classes. (06 Marks)
 - c. Enumerate the various causes of accidents. (08 Marks)
- 4 a. One lane of a 2-lane one-way roadway is closed for repairs. The maximum free speed under low flow condition is 60 kmph both on the 2-lane portion and the bottleneck. The average headway under stationary conditions is 8m. When the volume is 2500 vehicles/hour, find:
 - (i) Mean speed through bottleneck
 - (ii) Mean speed at approach to the bottleneck
 - (iii) Mean speed beyond the influence of the bottleneck
 - (iv) Rate at which the queue entering the bottleneck grows. (12 Marks)
- b. List the assumptions made in queueing theory. (08 Marks)

PART – B

- 5 a. The speed and concentration values of a traffic stream are as follows:

Speed, kmph	72	68	61	52	47	39	32	27	20	13
Concentration, veh/km	5	10	15	20	25	30	35	40	45	50

- Find the regression equation for determining the speed from the concentration. (12 Marks)
 - b. Enumerate the advantages of simulation techniques in traffic engineering. (08 Marks)

CMRIT LIBRARY
BANGALORE - 560 037

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 6 a. The number of vehicles arriving in successive 10 second intervals is as follows. Find the mean rate of arrival:

Number of vehicles	0	1	2	3	4	5	6	7 and more
Frequency	11	28	30	18	8	4	1	0

Assuming a Poissonian distribution, compare the observed frequency with the theoretical distribution and comment on the results. (12 Marks)

- b. Explain the various methods/models of traffic forecasting. (08 Marks)
- 7 a. The average normal traffic on cross roads A and B for design are 400 and 250 PCU/hour. The corresponding saturation flows are 1250 and 1000 PCU/hr. The all red time required for pedestrian crossing is 12 seconds. Design the traffic signal by Wabster's method. (08 Marks)
- b. Illustrate with neat sketches the reduction in conflicts due to imposition of one-way regulation at an intersection between cross roads. List the advantages of one-way regulation. (12 Marks)
- 8 a. Enumerate the applications of ITS. (08 Marks)
- b. Enumerate the advantages and limitations of traffic rotary. (12 Marks)

CMRIT LIBRARY
BANGALORE - 560 037
