



**ADAMAS UNIVERSITY**  
**END-SEMESTER EXAMINATION : JANUARY 2021**  
(Academic Session: 2020 – 21)

<b>Name of the Program:</b>	B.Tech.	<b>Semester:</b>	V
<b>Paper Title:</b>	<b>Transportation Engineering I</b>	<b>Paper Code:</b>	ECE43107
<b>Maximum Marks :</b>	40	<b>Time duration:</b>	3 Hrs.
<b>Total No of questions:</b>	9	<b>Total No of Pages:</b>	2

**Answer all the Groups**

**Group A**

Answer all the questions of the following

$5 \times 1 = 5$

1. a) What is the role OD Matrix in finalizing highway alignment?  
b) How National Highway can be differentiated from State Highway?  
c) What do you mean by “Jam Density” and “Free Flow Speed”?  
d) What is the full form of PCU? State its necessity.  
e) What do you mean by “Weaving Conflict”? Show with a neat sketch.

**GROUP –B**

Answer any three of the following

$3 \times 5 = 15$

2. With a neat sketch show different design elements within a rotary intersection. (5)
3. An ascending gradient of 1 in 100 meets a descending gradient of 1 in 120. Design a summit curve for a speed of 80 kmph so as to have an overtaking sight distance of 470 m. (5)
4. With a rough sketch show Radial or star and grid pattern of road. Also enumerate the advantage and disadvantage of this pattern. (5)
5. (a) What are the objectives of providing transition curve in a roadway? (3)  
(b) While aligning a hill road with a ruling gradient of 6%, a horizontal curve of radius 60 m is encountered. Find the compensated gradient at the curve. (2)
6. Calculate the overtaking sight distance required for a design speed of 90 kmph. Assume a overtaking acceleration as  $0.62 \text{ m/sec}^2$ . (5)

**GROUP –C**

Answer any two of the following

$2 \times 10 = 20$

7. (a) What are the recommendations of Jayakar committee regarding road development in India? What are the organizations formed based on above report? (4+1)  
(b) For the data given below compute the Time Mean Speed and Space Mean Speed. Finally determine the concentration of the traffic stream. (5)

<b>Speed Range (kmph)</b>	0-10	10-20	20-40	40-60	60-80	80-100
<b>Frequency</b>	8	12	32	45	25	6

8. (a) From an in-out survey conducted for a parking area consisting of 40 bays, the initial vehicle count was found to be 25. Table gives the result of the survey. The number of vehicles coming in and out of the parking lot for a time interval of 5 minutes is as shown in the tabular form also. Find the accumulation, total parking load, average occupancy and efficiency of the parking lot. (6)

Time	In	Out
10 am to 10:05 am	3	2
10:05 am to 10:10 am	2	4
10:10 am to 10:15 am	4	2
10:15 am to 10:20 am	5	4
10:20 am to 10:25 am	7	3
10:25 am to 10:30 am	8	2

Time	In	Out
10:30 am to 10:35 am	2	7
10:35 am to 10:40 am	4	2
10:40 am to 10:45 am	6	4
10:45 am to 10:50 am	4	1
10:50 am to 10:55 am	3	3
10:55 am to 11 am	2	5

(b) What do you mean by Ruling Gradient and Limiting Gradient?

(2 + 2)

9. From a moving vehicle surveying technique over a 4.25 km long stretch of road following data is obtained in a tabular form. Find the followings:

(i) Mean flow of the traffic stream in both (N-S) and (S-N) direction.

(ii) Average journey time in both (N-S) and (S-N) direction.

(iii) Journey speed and running speed in both (N-S) and (S-N) direction.

(4+3+3)

Direction	Journey Time (Min)	Stopped Delay (Min)	No. of Vehicles		
			Overtaking	Overtaken	In Opposite Direction
N to S	6.45	1.40	4	7	268
S to N	7.00	1.20	5	3	186
N to S	6.25	1.25	5	3	280
S to N	7.38	1.50	2	1	195
N to S	6.50	1.26	3	5	250
S to N	7.30	1.55	2	2	175
N to S	6.65	1.15	2	5	285
S to N	7.65	1.75	3	2	175

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