

B.E. CIVIL ENGINEERING THIRD YEAR SECOND SEMESTER EXAM 2025
TRANSPORTATION ENGINEERING – II

Time: 3 Hours

Use separate answer scripts for each Part

Full Marks: 100

Part – I**[60 marks for this part]****Group A: CO1 Answer Qn 1 and any two from the rest**

1. Answer the following in brief –

5 × 2

- Name the two operations through which a parked vehicle merges with the traffic stream
- Name the type of on-street parking styles which create i) the least and ii) the most disturbance to the main traffic stream
- Based on the interview location, name the two methods of O&D survey.
- Name the two parameters that are essentially fixed in a “fixed delay”
- What is the 30th highest hourly volume?

2. (a) Name two major types of automatic volume study and state one merit and demerit of each

5

- (b) The observations of a moving car study over a length of AD are as follows. Assuming that the flow is constant over successive sections, determine the average flow, journey time and running time over the section BD.

5

Section	Time Taken (sec)	Vehicles met with		
		Opposite Direction	Overtaking	Overtaken
AB	152	25	8	6
B	15	08	--	--
BC	172	31	5	2
C	10	03	--	--
CD	138	28	3	6
D	20	12	--	--
DC	132	50	12	11
C	12	04	--	--
CB	160	55	6	7
B	18	06	--	--
BA	145	45	7	2

3. (a) Name the four major components of a single-storied off-street parking space with one function of each in brief

5

- (b) The parking survey data collected from a 10-bay parking lot by license plate method is shown below. Determine Overall Parking Load, Average Parking Index, Parking Volume, Average Turnover, and Average Duration of the parking lot.

5

Time in min	Bays									
	1	2	3	4	5	6	7	8	9	10
0-15	9881	7223	2269	9730	6656	4394	2987	4702	5617	6432
15-30	3462	7223	2269	9730	6656	4394	2987	4702	5617	6432
30-45	9919	7223	2269	9730	5692	4394	2987	3080	5617	8255
45-60	--	3803	--	9730	5692	6353	2987	3080	5617	8255

4. Explain the following: Delay & its types; traffic volume growth factors

5+5

[Turn over

Group B: CO2 Answer Qn 5 and any two from the rest

5. Answer the following in brief – 5 × 2

- a. State the maximum superelevation adopted in a rotary with reason
- b. Draw typical schematic sketches of staggered and skew-staggered intersections
- c. What are the augmentation factors for saturation flow of an intersection when it is at i) best and ii) worst condition?
- d. What are the typical shapes of i) regulatory and ii) cautionary traffic signs
- e. State the major advantages of weaving over crossing in brief

6. (a) Explain briefly 'weaving length' and 'weaving angle' and state the limiting values for them 5
 (c) Determine the minimum radius and carriageway width of a circular rotary to manage the intersection of two mutually perpendicular 4-lane 2-way roads with the freeway design speed of 60 kmph 5

7. (a) Name the two types of mandatory traffic signs and state the function of both 5
 (c) Draw the conflict diagram of a T-junction of two 2-lane 2-way roads. Name and draw the possible grade separation for this case, showing the grade separated flow paths 5

8. A 4-phase traffic signal is to be designed for the perpendicular intersection of two 2-lane 2-way roads AB and CD. For each phase, the starting delay is 2 secs, the Amber period is 3 secs, and the all-red period for clearing excess traffic is 5 secs. The turn from A to C is a left turn, and the traffic data recorded is as follows –

From	A			B			C			D		
To	C	B	D	D	A	C	B	D	A	A	C	B
Flow Pcu/hr	18	195	19	21	211	22	17	230	19	15	182	23

- (a) Draw the possible phase diagrams for managing the intersection through the Webster method 2
- (b) Determine the effective green times for each phase considering saturation flow for single and double lane approach as 1890 pcu/hr and 3675 pcu/hr respectively; right turning radius 25m and intersection quality as worst. 8

B.E. CIVIL ENGINEERING EXAMINATION 2025

[3rd Year; 2nd Semester Examination]

Transportation Engineering - II

Total Time: Three Hours

Full Marks 100
(Part I: 60 + Part II: 40)

Use a separate Answer-Script for each part

Part II (40 Marks) (All CO 4)

Answer all in brief and to-the-point

1. Define: (i) Adzing of Sleepers; (ii) B.H. Rails; (iii) Grade Compensation; (iv) Momentum Gradient; (v) Switch Back (10)
2. Draw a neat sketch of a typical Cross-section of a Permanent Way on Embankment indicating salient features. Mention the advantages of Uniformity of Gauges. (3+3)
3. What is Hauling Capacity of a Locomotive? Elaborate different Tractive Resistances with its magnitudes. (1+5)
4. Calculate the maximum permissible load that can be pulled by a locomotive on a straight and level track if hauling capacity of engine is 12060 kg and the train has to run a speed of 96.56 kmph. What should be the reduction in speed, if the train has to ascend a slope of 1 in 200 with a 2° curve. (6)
5. Define Sleeper Density. Define Minimum Depth of Ballast Section. Define briefly the suitability of various materials which are commonly used as ballast in a railway track. (2+2+2)
6. A B.G. track has a sleeper density as $(M + 6)$. If the track is laid with welded rails of 26 m length, find out the number of sleepers on the rail length. What does it mean if a rail is identified as "60R (RBS)"? Mention the disadvantages of 'Double Headed Rail'. (3+1.5+1.5)