

BACHELOR OF ENGG (CIVIL ENGINEERING) 3RD YEAR 2ND SEMESTER EXAM 2025**TRANSPORTATION ENGG. – I****Time: 3 Hours****Full Marks: 100****(50 Marks for each Part)****Use a separate Answer-Script for each Part****PART I (50 Marks)****Answer briefly & to the point. Assume a standard value for any parameter, if required****Group A: Answer Question 1 and any ONE from the rest**

1. Answer the following briefly – 10×2
 - a. State two major outcomes of the Jayakar Committee Report
 - b. State the differences in the “developmental allowance” of India's 1st and 2nd road development plans.
 - c. Name any two areas which are part of the class – “developed”, following the 2nd road development plan of India
 - d. State the target criteria of village connectivity according to the third road development plan.
 - e. State the major difference between skid and slip as a road characteristic
 - f. Name two major geometric design parameters that are influenced by the length characteristics of a vehicle
 - g. What are the standard boundaries of peripheral vision in the horizontal and vertical planes?
 - h. Define PCU
 - i. State the major difference between possible and practical capacity
 - j. Draw a typical Level of Service curve
2. Considering the area of India as 32,87,263 sq. km with 7935 towns, and 600,000 human habitable places, estimate the target length of NH, SH, and Other Road lengths according to India's 3rd road development plan. 2+4+4
3. Design the number of lanes in a roadway for the design traffic of 5000 pcu/hr, if the average car length is 5.0 m, and the mean free speed is 80 Kmph, under –
 - a. Basic Capacity Condition 4
 - b. A design speed of 60 Kmph considering the linear speed-density model. 6

Group B: Answer Question 4 and any ONE from the rest

4. Answer the following briefly – 5×2
 - a. What is the gauge of the railway track
 - b. State two major functions of ballast in a permanent way
 - c. Why Ballast-less track adopted for underground railway?
 - d. Train wheels are always made tilted with vertical – Name this characteristic of the wheels, also name the corresponding compensating characteristics provided on rails
 - e. Draw a typical case of negative superelevation in a railway turnout
5. Calculate the superelevation and the maximum permissible speed for a 2° BG transitioned curve with a maximum sanctioned speed of 100 km/h. The speed for calculating the equilibrium superelevation is 75 km/h, and the booked speed of goods trains is 50 km/h. Consider, c/c distance of rail used as 1750 mm, allowable Cant deficiency is 100 mm, and permissible Cant excess is 75 mm 10
6. A BG branch line track takes off as a contrary flexure through a 4° turnout from a main line track of a 3° curvature. Due to the turnout, the maximum permissible speed on the branch line is 30 km/h. Calculate the negative superelevation to be provided on the branch line track and the maximum permissible speed on the main line track. 10

BACHELOR OF ENGINEERING (CIVIL ENGINEERING) EXAMINATION 2025

[Third Year; Second Semester]

Transportation Engineering - I

Total Time: Three Hours

Full Marks 100
(Part I: 50 + Part II: 50)*Use a separate Answer-Script for each part***Part II (50 Marks)**

Answer All in brief and to the point. Assume any reasonable data if required but not provided.

- 1 a) Calculate the extra width of pavement required on a horizontal curve of radius 700 m on a two lane highway for the design speed of 80 kmph. Assume wheel base length $l = 6$ m. (10)
- b) The speeds of overtaking and overtaken vehicle are 80 and 60 kmph, respectively. If the acceleration of the overtaking vehicle is 2.5 kmph per second, calculate the safe passing sight distance for –
 - (i) One-way traffic
 - (ii) Two-way traffic
- 2 Explain the CBR, Impact Value Test, and Crushing Value test procedures in the laboratory in details along with the interpretation of data and the corrections, if required? (15)
- 3 Four new road links A, B, C, and D are to be constructed during a five-year plan period. Suggest the order of priority for phasing the road construction programme based on maximum utility approach. Assume utility units of 0.5, 1.0, 2, and 4 for the four population ranges and 2, 2, and 5 units per 1000 t of agricultural, raw material, and industrial products from the following data. (10)

Road Link	Length (in km)	No. of Villages served with population range				Productivity served (in t)		
		< 500	501 - 1000	1001 - 2000	> 2000	Agricultural	Raw Material	Industrial Product
A	75	30	15	10	3	8000	3000	1000
B	35	20	8	6	3	5000	1000	1600
C	40	15	6	5	5	6000	2000	3200
D	50	40	4	3	2	3000	7000	500

- 4 Briefly describe the 'Cross-Section Elements of a Highway' with a neat sketch. Explain briefly the various stages of work in a New Highway Project. (15)