Ref. No.: Ex/CE/5/T/304/2023(S)

BACHELOR OF ENGINEERING (CIVIL ENGINEERING)
THIRD YEAR SECOND SEMESTER SUPPLEMENTARY EXAM 2023

TRANSPORTATION ENGINEERING – I
Part – I

Answer Part I and Part II in Separate Answer Scripts

Time: 3 Hours **Full Marks for this Part: 60**

Answer brief & to the point. Assume standard value for any parameter, if required

1. Briefly explain the following 5 x 3
   a. One role of each of the following vehicular characteristics on geometric design of highways – Length, Height, Acceleration, Braking, Turning Ability
   b. The major recommendations of Jayakar Committee
   c. Vision Characteristics of a road user in context with Traffic Engineering

2. Write short note on the following: 5 x 3
   a. Cant deficiency and Cant excess
   b. Requirements of a good sleeper
   c. Factors influencing choice of railway gauge

3. Calculate the superelevation and the maximum permissible speed for a 3° BG transitioned curve on a high-speed route with a maximum sanctioned speed of 80 km/h. The speed for calculating the equilibrium superelevation as decided by the chief engineer is 70 km/h and the booked speed of goods trains is 50 km/h. The permissible cant excess and cant deficiency may be considered as 75mm and 100mm respectively 10

4. A BG branch line track takes off as a contrary flexure through a 3° from a main line track of a 2° curvature. Due to the turnout, the maximum permissible speed on the branch line is 20 km/h. Calculate the negative superelevation to be provided on the branch line track and the maximum permissible speed on the main line track (when it takes off from a straight track) 8

5. The design flow, mean free speed and average vehicle length on a roadway are 1500 veh/hr, 60KmpH and 4.0m respectively. Determine the required number of lanes for the following cases –
   a. Under basic capacity condition 4
   b. Under LoS C condition with design speed as 75% of mean free speed and maximum permissible flow capacity ratio of 0.3 8

[Turn over

Ref. No. Ex/CE/5/T/304/2023 (S)

BACHELOR OF ENGINEERING (CIVIL ENGINEERING) EXAMINATION 2023 (Supplementary)

[Third Year; Second Semester]

Transportation Engineering - I

Total Time: Three Hours | Full Marks 100 (Part I: 40 + Part II: 60)

Use a separate Answer-Script for each part

Part II (40 Marks)

Answer All (2 × 20 = 40)

1 (a) Two vehicles, A and B, are moving with the velocities of 600 m/min and 700 m/min, respectively. Find the SSD for "all the possible relative positions for the vehicles" when, (i) They are moving in the same direction, and (ii) They are moving towards each other for the following two cases – (15)

(A) Plane terrain with 0% slope, and, (B) slope with 5% inclination.

Consider the fiction coefficient as 0.7 and reaction time as 2 sec.

(b) Design the rate of super-elevation for a horizontal highway curve of radius 240 m and speed 120 kmph. Assume standard values/components/limits if required. (5)

2 (a) What is "Highway Alignment" and how does it required for human beings? (5)

(b) Find the CBR value of the two soil samples (A and B) as shown in the plot as per IS recommendation. Use the given plot for the necessary calculation, as/if required. (15)