Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - OCT 2023

Semester : Semester VII - 2020
Course Code : CIV2022
Course Name : Sem VII - CIV2022 - Railway Engineering and Tunnelling
Program : B. TECH

Date : 31-OCT-2023
Time : 9:30AM - 11:00AM
Max Marks : 60
Weightage : 30%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. Define rails and list down the types.
(CO1) [Knowledge]
2. List out the advantages of rail transport.
(CO1) [Knowledge]
3. Define gauge and list the types.
(CO1) [Knowledge]
4. List out the need for geometric design in railways.
(CO2) [Knowledge]
5. Provide the formula to find the length of vertical curve in railway.
(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(2 X 15 = 30M)**

6. A) Different types of railway components are used in track construction. Specially to join the rails and sleepers various members are utilized. List down all the types of fittings and fastenings, explain with neat diagram. (10 Marks)
B) Define railway alignment. Explain the basic requirements of the same. (5 Marks)
(CO1) [Comprehension]

7. A) The major terms in geometric design of railway also includes Equilibrium speed, Maximum permissible speed, Cant deficiency, Cant excess, Superelevation. Summarize these terms by considering the curved alignment of a railway line. List out the main functions of superelevation (10 Marks)

B) During a road survey, the team came across a vertical curve. They came across two gradients, one rising at a rate of 1 in 200 and the other rising at a rate of 1 in 400. Identify the type of vertical curve and calculate its length. (5 Marks)

(CO2) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION **(1 X 20 = 20M)**

8. A) Solve the given problem by applying the knowledge of maximum permissible speed on curved alignment of railway for its geometric design. 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 110 km/h. The speed for calculating the equilibrium superelevation as decided by the chief engineer is 80 km/h and the booked speed of goods trains is 50 km/h.

B) Due to passage of moving loads and friction between the rail and wheel, the rails will eventually wear out. Elaborately explain rail wear with the types, defects and also causes for rail failure.

(CO1) [Application]