Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 05-12-2025 **Time:** 09:30am – 12:30pm

School: SOE	**Program:** B.Tech in Civil	
Course Code :CIV2501	**Course Name:** Transportation Engineering	
Semester: III	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**4**	**2**	**68**	**14**	**12**

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	List any four requirements of highway alignment	**2 Marks**	**L1**	**CO1**
2.	List the disadvantages of improper alignment	**2 Marks**	**L1**	**CO1**
3.	Define the following terms related to highway materials a) Toughness b) Strength	**2 Marks**	**L1**	**CO2**
4.	Define Overtaking sight distance (OSD)	**2 Marks**	**L1**	**CO3**
5.	List any four factors affecting Overtaking sight distance	**2 Marks**	**L1**	**CO3**
6.	What is meant by camber in road design? Mention its purpose.	**2 Marks**	**L1**	**CO3**
7.	Give the classification of vertical curves used in highway alignment	**2 Marks**	**L1**	**CO3**
8.	What is meant by a railway gauge? What is width of gauge in mm for broad gauge	**2 Marks**	**L1**	**CO4**
9.	List the types of ballast used for railway track	**2 Marks**	**L1**	**CO4**
10.	List the advantages of air transport	**2 Marks**	**L1**	**CO5**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	Calculate the stopping sight distance on a highway at a descending gradient of 2% for design speed of 80 kmph. Assume a reaction time of 2.5 seconds and Coefficient of friction of 0.35.	**10 Marks**	**L3**	**CO3**
		Or			
12.	**a.**	Calculate the safe overtaking sight distance for a design speed of 96 kmph on a two-way traffic road. If the acceleration of overtaking vehicle is 0.96 m/sec^2,assume all other data suitably a) Calculate safe overtaking sight distance b) Calculate the minimum length of overtaking zone c) Draw the neat sketch of the overtaking zone and show the position of the sign post	**10 Marks**	**L3**	**CO3**

13.	**a.**	Define stopping sight distance and list and explain the factors affecting stopping sight distance	**5 Marks**	**L2**	**CO3**
	b.	The design speed of a highway is 80 kmph. There is a horizontal curve of radius 200 m on a certain locality. Safe limit for transverse coefficient of friction is 0.15. a) Calculate the super elevation required to maintain this speed. b) If the maximum super elevation of 0.07 is not to be exceeded, calculate the maximum allowable speed on this horizontal curve as it is not possible to increase the radius	**10 Marks**	**L3**	**CO3**
		Or			
14.	**a.**	With the help of neat sketch show the cross section elements of highway in embankment	**5 Marks**	**L2**	**CO3**
	b.	Find the total width of two lane road on a horizontal curve for a new National Highway to be aligned along a rolling terrain with a ruling minimum radius of 230 m having ruling design speed of 80 kmph. Assume necessary data as per IRC.	**10 Marks**	**L3**	**CO3**

15.	**a.**	List the objects of providing extra widening on horizontal curves	**5 Marks**	**L2**	**CO3**
	b.	A national highway passing through rolling terrain in heavy rainfall area has a horizontal curve of radius 500 m. Design the length of transition curve using the following data. Design speed of vehicle = 80 kmph Allowable rate of superelevation = 1 in 150	**10 Marks**	**L3**	**CO3**

		Pavement rotated about the inner edge of the pavement Pavement width including extra widening = 7.5 m			
		Or			
16.	**a.**	Explain the concept of grade compensation on horizontal curves	**5 Marks**	**L2**	**CO3**
	b.	Calculate the length of the transition curve using the following data; Design speed = 65 kmph Radius of circular curve = 220 m Allowable rate of superelevation = 1 in 150 Pavement rotated about the centre line of the pavement Pavement width including extra widening = 7.5 m	**15 Marks**	**L3**	**CO3**

17.	**a.**	Write and explain equations used to calculate the length of a summit curve based on (a) Stopping sight distance and (b) overtaking sight distance	**5 Marks**	**L2**	**CO3**
	b.	A valley Curve is formed by a descending grade of 1 in 30 meeting an ascending grade of 1 in 25. Design the length of valley curve to fulfill both comfort condition and head light sight distance requirements for a design speed of 100kmph. Assume allowable rate of change of centrifugal acceleration is 0.61 m/s^3.	**15 Marks**	**L2**	**CO3**
		Or			
18.	**a.**	Write and explain equations used to calculate the length of a valley curve based on (a) comfort condition and (b) headlight sight distance	**5 Marks**	**L2**	**CO3**
	b.	An ascending grade of 1 in 120 meets a descending grade of 1 in 100. Design a summit curve for to provide for SSD of 250m and OSD of 470m.	**15 Marks**	**L3**	**CO3**

19.	**a.**	Write a short notes on below mentioned topics related to Railway Engineering a) Defects in rails b) causes of rail failure	**10 Marks**	**L2**	**CO4**
	b.	The length of runway at sea level under standard condition at zero gradient 1500m. The airport site is at an elevation of 900m. The reference temperature is 20^oC. The proposed runway permits ascending gradient of 0.5%. Calculate actual runway length**.**	**10 marks**	**L2**	**CO5**
		Or			

20.	**a.**	For a sleeper density of (n + 5), calculate the number of sleepers required for constructing a Broad Gauge (B.G.) railway track of length 650 m.	**10 Marks**	**L2**	**CO4**
	b.	Explain the various types of surveys conducted during airport planning.	**10 Marks**	**L2**	**CO5**