

Code: 20CE3502

**III B.Tech - I Semester – Regular / Supplementary Examinations  
NOVEMBER 2024**

**HIGHWAY ENGINEERING  
(CIVIL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.

2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

***Note: IRC 37 and 58 should be distributed***

			BL	CO	Max. Marks
<b>UNIT-I</b>					
1	a)	List out the recommendations of Jayakar committee report. Mention how this helped in road development in India?	L1	CO1	7 M
	b)	Explain with sketches the various factors controlling the alignment of roads.	L2	CO1	7 M
<b>OR</b>					
2	a)	Briefly outline the main features of various road patterns commonly in use. Explain star and grid pattern with neat sketch.	L2	CO1	7 M
	b)	Explain the necessity and objectives of highway planning.	L2	CO1	7 M
<b>UNIT-II</b>					
3	a)	Define superelevation. Derive the equation for determining the superelevation.	L4	CO2	7 M

	b)	Write a short note on (i) Traffic Medians and (ii) Kerbs	L1	CO2	7 M
<b>OR</b>					
4	a)	Explain various measures that may be taken to prevent accidents.	L2	CO2	7 M
	b)	With neat sketches show various types of traffic signs, classify them in proper groups.	L2	CO2	7 M
<b>UNIT-III</b>					
5	a)	List out the advantages and disadvantages of rotary intersection.	L1	CO3	7 M
	b)	Draw a neat sketch of full cloverleaf and show the movement of traffic.	L3	CO3	7 M
<b>OR</b>					
6	a)	Illustrate the test procedure for determining the CBR of soil in the laboratory.	L1	CO3	7 M
	b)	List out the desirable properties of aggregates to be used in road construction and explain them.	L2	CO3	7 M
<b>UNIT-IV</b>					
7	a)	List out the pavement components and explain the functions of each component.	L2	CO4	7 M
	b)	Calculate the stresses at interior, edge and corner regions of a CC pavement using Westergaard's stress equation. Use following data. Wheel load = 4800 kg Modulus of elasticity of CC = $3 \times 10^5$ kg/cm <sup>2</sup>	L5	CO4	7 M

		Pavement thickness = 16cm Poisson ratio of concrete = 0.15 Modulus of sub grade reaction = 6 kg/cm <sup>3</sup> Radius of contact area = 14 cm			
<b>OR</b>					
8	a)	Find the spacing between contraction joints for a 3.5m slab width having a thickness of 20 cm for plain concrete slab. The allowable tensile stress values in concrete and steel are 0.8 and 1400 kg/m <sup>2</sup> , coefficient of friction is 1.5. Unit wt. of CC = 2400 kg/cm <sup>3</sup> .	L5	CO4	7 M
	b)	Explain the design considerations for spacing of (i) Expansion joints and (ii) Contraction joints.	L2	CO4	7 M
<b>UNIT-V</b>					
9	a)	Enumerate the steps for the preparation of subgrade.	L1	CO5	7 M
	b)	Explain about different equipment's used for construction of cement concrete pavements.	L2	CO5	7 M
<b>OR</b>					
10	a)	Discuss the principles and scope of soil-lime stabilization.	L1	CO5	7 M
	b)	Explain the factors influencing the properties of soil-cement stabilization.	L2	CO5	7 M