KUMARAGURU
college of technology
character Is life

B.E DEGREE EXAMINATIONS: APRIL /MAY 2024

(Regulation 2018)

Fourth Semester

CIVIL ENGINEERING

U18CEI4202: Highway and Traffic Engineering

(IRC -37 and 58 are permitted)

COURSE OUTCOMES

CO1:   Acquire knowledge about the surveys involved in planning and highway alignment.

CO2:   Design the geometric elements of highways and expressways.

CO3:   Apply the knowledge of the traffic studies and implement traffic regulation and control measures and intersection design.

CO4:   Characterize pavement materials and design flexible and rigid pavements as per IRC.

CO5:   Understand the concepts of pavement distress and methods to evaluate and maintain the Pavement.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions: -

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

1.	Differentiate positive and negative obligatory points in a highway alignment with examples.	CO1	[K_2]
2.	Write the basic requirements for an ideal highway alignment.	CO1	[K_3]
3.	Differentiate Camber and Gradient with neat sketches.	CO2	[K_2]
4.	Mention the different elements of expressway.	CO2	[K_3]
5.	Mention the use of enoscope in traffic studies.	CO3	[K_2]
6.	What are the 3 E's of traffic engineering?	CO3	[K_2]
7.	Differentiate flexible and rigid pavement.	CO4	[K_2]
8.	Define 40/50 grade bitumen and where it is used?	CO4	[K_3]
9.	Name any four pavement evaluation methods.	CO5	[K_2]
10.	Mention the use of Benkelman Beam Deflection (BBD) Test.	CO5	[K_3]

Answer any FIVE Questions: -
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain the main recommendations of the Jayakar committee and narrate its results in our country.	8	CO1	[K$_2$]
	b)	Explain the various surveys to be carried out for aligning a highway.	8	CO1	[K$_3$]
12.	a)	Discuss about PIEV theory with a neat sketch.	8	CO2	[K$_2$]
	b)	Calculate the safe stopping sight distance for the design speed of 50 kmph.	8	CO2	[K$_3$]

      i. Two-way traffic on a two-lane road

     ii. Two- way traffic on a single lane road

    iii. Two-way traffic on a two-lane road with an ascending gradient of 2%

    iv. Two- way traffic on a two-lane road with an descending gradient of 3%

13.	a)	Explain in detail about the salient features of Nagpur, Bombay and Lucknow road plan and its classification.	8	CO1	[K$_2$]
	b)	A National highway (wide 7 m) passing through a rolling terrain has a horizontal curve of of radius 500m. If the design speed is 100 kmph, calculate rate of super elevation, extra widening, Assume necessary data suitably as per IRC.	8	CO2	[K$_3$]
14.	a)	Explain about the various methods of carrying out speed and delay study.	8	CO3	[K$_2$]
	b)	Examine any four non-destructive testing methods of pavement deflection.	8	CO5	[K$_3$]
15.	a)	Discuss the various measures of engineering that may be useful to prevent accidents.	8	CO3	[K$_2$]
	b)	Find the thickness of the pavement for construction of a new two-lane carriage way for the design life of 20 years using IRC method. The initial traffic in the year of completion in each the direction is 200 CPVD and growth rate 5%, VDF based on axle load survey=2.5standad axle per commercial vehicle. Design CBR of subgrade soil=4%.	8	CO4	[K$_3$]
16.	a)	Discuss the various alternate materials that are used in the present-day road construction.	8	CO4	[K$_2$]
	b)	Define the term overlay and explain its types in highway engineering.	8	CO5	[K$_3$]

****