A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 94105

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Fourth Semester

Civil Engineering

19UCE405 - HIGHWAY ENGINEERING

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Jayakar committee is formed for CO1- U

   (a) Road development plan (b) recommendation for institutions such as IRC,CRRI

   (c) Speed limits (d) Toll collection

2. The Width of the three lane road is CO1-App

   (a) 10.5m (b) 15 m (c) 11.5m (d)9m

3. The ruling design speed on a NH as per IRC is CO2-App

   (a) 80 Kmph (b) 100 Kmph (c) 120 Kmph (d) 140 Kmph

4. The degree of the circular curve is 20 Degree. Estimate the radius of the curve CO2-U

   (a) 86 m (b) 96 m (c) 106m (d) 116 m

5. The role of Surface course in pavement is CO3-U

   (a) Wear and tear and protecting base course (b) Good look

   (c) Good wearing surface (d) Protecting the vehicles

6. Dowel bars are used in CO3-U

   (a) Transverse joints (b) Longitudinal joints (c) both joints (d) construction joints

7. Camber provided in water bound macadam road is CO4-U

   (a) 1 in 33 (b) 1 in 40 (c) 1 in 25 (d) 1 in 13

8. Impact test values are used for …….course CO4-U

(a) Base course (b) Surface course (c) sub base (d) wearing course

9. Most common failures in flexible pavement are CO5- R

(a) Diagonal cracks (b) Potholes, gullys

(c) sinking of pavement (d) grouting effect

10. Benkelman beam is used to measure CO5- R

(a) Structural cracks (b) Diagonal cracks (c) undulations (d) potholes

PART – B (5 x 2= 10 Marks)

11. Differentiate between rural roads and urban roads in terms of carriage way spacing CO1- App

12. Construct the procedure for calculating the length of valley curve. CO2- App

13. Name factors influencing the design of flexible pavements. CO3- App

14. What is the purpose of conducting softening point test on bitumen? CO4- App

15. Explain how the rescaling of cracks may be carried out in rigid pavements. CO5- App

PART – C (5 x 16= 80 Marks)

16. (a) Describe the conventional and modern methods of engineering surveys to be carried out for highway location fixing CO1- U (16)

Or

(b) Justify the need for considering various factors which influencing the ideal alignment of a highway, with a case study of Madurai- Melur Highway. CO1- App (16)

17. (a) Calculate the Overtaking sight distance required to avoid accident of two cars approaching opposite directions at a speed of 75kmph and 85kmph in Madurai – Aruppukkottai road. assume that the reaction time of drivers be 2.5 secs and co-efficient between road surface and tyres be 0.14. CO2- U (16)

Or

(b) Express the objectives of widening of road pavements at horizontal curves? Derive an expression for the extra widening. CO2- U (16)

18.	(a)	Design the pavement for construction of a new by-pass with the following data: Two lane carriage way, Initial traffic in the year of completion of construction = 1500 CVPD (sum of both directions), Traffic growth rate = 5% Design life = 15 years, Vehicle damage factor based on axle load survey = 2.5 standard axles per commercial vehicle. Design CBR of subgrade soil = 6%.	CO3-App	(16)
		Or		
	(b)	Write down the functions of providing dowel bars and tie bars in Cement concrete pavement joints. Highlight their roles and advantages	CO3-U	(16)
19.	(a)	Describe the step by step procedure in construction of bituminous concrete road	CO4- U	(16)
		Or		
	(b)	Describe the step by step procedure in construction of water bound macadam road	CO4- U	(16)
20.	(a)	Describe any 5 types of failures commonly occur in flexible pavement with neat sketches also suggest suitable remedial measures	CO5- U	(16)
		Or		
	(b)	How cracks and potholes affect the performance of a bituminous road. Justify with suitable suggestions to over this issue	CO5- U	(16)

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