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**Question Paper Code: 94105**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

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. Reconnaissance survey deals with CO1- U  
(a) Survey conducted using jeeps and horse (b) Survey conducted using compass  
(c) Survey conducted using dumpy level (d) Survey conducted using theodolite
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. Justify the need for camber on roads? Mention any 2 purposes. 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) Analyse the role of any four Institutions formed based on the CO1- App    (16)  
recommendations of the Jayakar committee in Road development  
initiatives of the government.
- Or
- (b) Compare the first and second 20 year road development plans of CO1- App    (16)  
India in terms of road development, road pattern and other  
provisions.
17. (a) Calculate the Overtaking sight distance required to avoid CO2- U        (16)  
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.
- Or
- (b) Express the objectives of widening of road pavements at CO2- U        (16)  
horizontal curves? Derive an expression for the extra widening.

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) Explain the advantages of using pavement overlays in maintenance of pavements CO5- U (16)
- Or
- (b) Justify the necessity for using flexible overlay system over other systems CO5- U (16)

