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Question Paper Code:R3102

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

Third Semester

Civil Engineering

R21UCE302 – HIGHWAY ENGINEERING

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

PART A - (5 x 1 = 5Marks)

1. The Width of the three lane road is CO1-U
(a) 10.5m (b) 15 m (c) 11.5m (d)9m
2. Formula for estimating the length of NH and SH is recommended by CO2 – U
(a) First 20 year plan (b) Mumbai plan (c) Five year plan (d) Lucknow plan
3. The ruling design speed on a NH as per IRC is CO2 – U
(a) 80 Kmph (b) 100 Kmph (c) 120 Kmph (d)140 Kmph
4. The expression for estimating the superelevation CO1-U
(a) $e = v^2/127R$ (b) $e = v^2/225R$ (c) $e=v^2/107R$ (d) $e=v^2/305R$
5. Construction joints are used in CO1-U
(a)Flexible pavements (b) Rigid pavements (c) Overlays (d) Fillings

PART – B (5 x 3= 15Marks)

6. Enumerate the recommendations of Jayakar committee and their implications on road development. CO1- U
7. Justify the need for camber on roads? Mention any 2 purposes. CO1- U
8. Why the design of speed of vehicles are important? CO1- U
9. Explore objectives of joints in cement concrete pavements. CO1- U
10. Sketch the different types of joints used in pavement construction. CO1- U

PART – C (5 x 16= 80Marks)

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

Or

- (b) Analyse the speed of road laying prior to independence and after independence in the light of Road development plans. CO1 -U (16)
12. (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 – Aruppukottai road. Assume that the reaction time of drivers be 2.5 secs and co-efficient of friction between road surface and tyres be 0.14. CO2-App (16)
- Or
- (b) Express the objectives of widening of road pavements at horizontal curves? Derive an expression for the extra widening CO2-App (16)
13. (a) Explain the Concept of CBR and give step by step procedure for design of flexible pavement by CBR method as per IRC recommendations CO3-App (16)
- Or
- (b) Analyse the significance of ESWL, lane distribution factors and vehicle damage factor in design of flexible pavement with a case study CO3-App (16)
14. (a) Describe the step by step procedure in construction of bituminous road CO1 -U (16)
- Or
- (b) What are quality control tests conducted on soil? and list the aggregates used for flexible pavement. CO1 -U (16)
15. (a) Compare the failure pattern and maintenance frequency in a road in your neighborhood. CO1 -U (16)
- Or
- (b) Elaborate the measures used for rectifying the failures in flexible pavements CO1 -U (16)