

CBCS SCHEME

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18CV56

Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Highway Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What are the recommendations of Jayakar committee and how are they implemented? (08 Marks)
- b. List out different modes of transportation and compare among them. (08 Marks)
- c. Discuss the Socio – Economic impact of improving transport infrastructures? (04 Marks)

OR

- 2 a. Discuss the different types of roads and classification of roads in detail. (08 Marks)
- b. Explain all types of road patterns in detail with neat sketches. (12 Marks)

Module-2

- 3 a. Explain two lane width of pavement with neat sketch, mention the IRC recommendations for the same for various classes of roads. (08 Marks)
- b. Calculate the minimum sight distance required to avoid head on collision of two cars approaching from opposite direction at 90 and 60kmph. Assume a reaction time of 2.5secs, co-efficient of friction of 0.7 and a break efficiency of 50 percent in both cases. (08 Marks)
- c. Define stopping sight distance and overtaking sight distance. (04 Marks)

OR

- 4 a. The radius of horizontal curve (circular) is 100m, the design speed is 50kmph and the design co-efficient of lateral friction is 0.15 :
 - i) Calculate the super elevation required
 - ii) Calculate the co-efficient of friction if no super elevation is provided. (08 Marks)
- b. Write note on :
 - i) Widening of pavement
 - ii) Radius of horizontal curve
 - iii) Method of introducing extra widening in field
 - iv) Objects of providing transition curves. (12 Marks)

Module-3

- 5 a. List out the desirable properties of soil used as a highway material. (04 Marks)
- b. Explain California Bearing Ratio (CBR) Test with all necessary sketches and formulas. (12 Marks)
- c. What are the various soil classifications systems used in field of highway engineering? (04 Marks)

OR

- 6 a. Differentiate between Bitumen and Tar. (04 Marks)
 b. Explain different components and functions of flexible pavement and Rigid pavements. (08 Marks)
 c. Explain the concept of ESWL with the help of neat sketch. (08 Marks)

Module-4

- 7 a. Explain step-by-step procedure for construction of WMM base course with specifications. (10 Marks)
 b. Explain step-by-step procedure for construction of Bituminous Macadam Base Course. (10 Marks)

OR

- 8 a. Write a note on :
 i) Quality control checks of GSB
 ii) Dense Bituminous macadam
 iii) Quality control during construction of C.C. Pavements
 iv) Different types of C.C. Pavement. (12 Marks)
 b. Explain step-by-step procedure for construction of Dry Lean Concrete (DLC) of a rigid pavement by mentioning quality control requirements. (08 Marks)

Module-5

- 9 a. List out the requirements and importance of highway drainage. (08 Marks)
 b. Explain simplified steps for the design of longitudinal road drain. (12 Marks)

OR

- 10 a. Explain the various components of quantifiable and non-quantifiable benefits to the road users due to highway development projects. (08 Marks)
 b. Calculate the annual cost of stretch of highway from the following particulars :

Item	Total cost in lakhs	Estimated life years	Rate of interest
Land	35.0	100	6%
Earthwork	40.0	40	8%
Bridges and Culverts		—	—
Drainage	50.0	60	8%
Pavement	100.0	15	10%
Traffic signs and road appertence	15.0	05	10%

The average cost of maintenance of road is Rs.1.5 lakhs per year.

(12 Marks)
