CBCS Scheme

Sixth Semester B.E. Degree Model Question Paper
Highway Engineering (15CV63)

Time: 3 hrs. Max. Marks: 80

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

Module -1

1 a. Explain the role of transportation in social and economic development of the country. **(08 Marks)**

b. The area of a state is 3, 08,000 sq. km. The number of towns as per census are 276, number of villages are 41833. Calculate the length of various categories of road as per third 20-year road plan formulae. **(08 Marks)**

OR

2 a. Explain the principle and application of saturation system in phasing road development. **(08 Marks)**

b. Write a note on the following:
i) IRC
ii) CRRI **(08 Marks)**

Module -2

3 a. Explain obligatory points. With neat sketches, discuss how these control the alignment. **(08 Marks)**

b. What is sight distance? Explain with sketches, how restrictions to sight distance occurs on highways. **(08 Marks)**

OR

4 a. What are the conditions which necessitate a realignment project? List the steps involved in realignment of a highway? **(08 Marks)**

b. The design speed of overtaking vehicle is 60 Kmph. The rate of acceleration of the above vehicle is 3.6 Kmph/sec. The difference in speed between overtaking and overtaken vehicle is 20 Kmph. Calculate OSD as per IRC guidelines for a road with two way traffic. Draw the sketch of overtaking zone. **(08 Marks)**

Module -3

5 a. What are the desirable properties of bitumen? Explain. **(08 Marks)**

b. What is the significance of ESWL in pavement design. Explain the graphical method of determining ESWL in flexible pavements. **(08 Marks)**

OR

6 a. Draw a sketch of flexible pavement cross section and show the component parts. Enumerate the functions of each component of the pavement? **(08 Marks)**

b. The properties of subgrade soil are given bellow:
Passing 75 micron IS sieve = 80%

Liquid limit = 58%
Plasticity index = 25%
Determine the group index and Classify the soil by HRB system. **(08 Marks)**

Module -4

7 a. Explain briefly the proportioning of soil aggregate mix by Rothfutch's method. **(08 Marks)**

b. Explain the functions of prime coat, tack coat and seal coat in bituminous pavement construction?

(08 Marks)

OR

8 a. Explain in detail the requirements, specifications of materials and the construction steps for WMM layer. **(08 Marks)**

b. Discuss in brief, the properties of bituminous mixes in pavement construction. **(08 Marks)**

Module -5

9 a. Describe the significance of highway drainage. With a neat sketch, explain any one method of subsurface drainage. **(08 Marks)**

b. Determine the relative economics of two types of flexible pavements by annual cost method from the following data.

Details	Pavement Type A	Pavement Type B
Total cost per km, Rs. (lakhs)	3.30	6.20
Design life, years	5.00	12.00
Annual rate of interest %	10.00	9.00
Salvage value after design life. Rs. Lakhs	2.10	3.00
Average annual maintenance cost per km, Rs. Lakhs	0.40	0.20

(08 Marks)

OR

10 a. Briefly explain the various highway user costs and benefits. **(08 Marks)**

b. The maximum quantity of water expected in one of the open longitudinal drains on clayey soil is 0.9 m^3/sec. Design the cross section and longitudinal slope of trapezoidal drain assuming the bottom width of the trapezoidal section and cross slope suitably. The allowable velocity of flow in the drain is 1.2 m/sec and Manning's roughness coefficient is 0.02. (**08 Marks)**

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