CBCS SCHEME

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15CV63

Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Highway Engineering

Time: 3 hrs. Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume any missing data suitably.

Module-1

1 a. Explain the various characteristics of Road Transport. **(04 Marks)**

b. What are the objectives of IRC and Central Road Research Institute [CRRI] **(08 Marks)**

c. What are the advantages and disadvantages of airways? **(04 Marks)**

OR

2 a. Explain the saturation system of Road Planning. **(04 Marks)**

b. Write a short note on KSHIP and its projects. **(04 Marks)**

c. Four new road links A, B, C & D are to be constructed during a 5 year plan period. Suggest the order of priority for phasing the road construction programme based on maximum utility approach. Assume utility units of 0.5, 1.0, 2.0 and 4.0 for the population ranges and 2, 2 and 5 units per 1000 tonnes of agricultural, raw material and industrial products from the following data:

Road link	Length km	No. of villages with Pop^n range				Productivity served		
		<500	501–1000	1001–2000	>2000	Agricultural	Raw materials	Industrial Product
A	75	30	15	10	3	8000	3000	1000
B	35	20	08	06	3	5000	1000	1600
C	40	15	06	05	5	6000	2000	3200
D	50	40	04	03	2	3000	7000	500

(08 Marks)

Module-2

3 a. What are the main objectives of preliminary survey and steps followed in the preliminary survey by conventional method [Name the steps]. **(06 Marks)**

b. Briefly explain the map study is the alignment of a highway project. **(04 Marks)**

c. Define camber. Discuss the factors on which the amount of camber to be provided depends. Specify, the recommended ranges of camber for different types of pavement surfaces. **(06 Marks)**

OR

4 a. Explain the PIEV theory with a neat diagram. **(06 Marks)**

b. Calculate the minimum sight distance required to avoid a head on collision of two cars approaching from the opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient of friction 0.7 and brake efficiency of 50% in either case. **(06 Marks)**

c. Explain briefly the steps of superelevation design. **(04 Marks)**

Module-3

5 a. Distinguish between Bitumen and Tar. **(04 Marks)**

b. Explain the various properties of Road aggregates. **(06 Marks)**

c. Define the modulus of subgrade reaction. With the sketch explain the plate load test for determining the k value. **(06 Marks)**

OR

6 a. Explain ESWL. How is it determined for dual wheel assembly? **(04 Marks)**

b. Explain the steps involved in the design of slab thickness of rigid pavement as per IRC 58:2002. **(06 Marks)**

c. The properties of the subgrade soil are given below:
Passing 75 micron IS sieve = 80%
Liquid limit = 58%
Plasticity index = 25%
Classify the soil by HRB system with group index value. **(06 Marks)**

Module-4

7 a. Write down the construction steps for wet mix macadam base course. **(06 Marks)**

b. Explain in detail the requirements specifications of materials and the construction steps / methods for Bituminous Concrete [BC] layer. **(06 Marks)**

c. Briefly explain the Rothfuch's method of proportioning of materials. **(04 Marks)**

OR

8 a. Explain in brief the construction of cement concrete pavements. **(08 Marks)**

b. Explain in brief the specifications of materials for WBM pavement. **(08 Marks)**

Module-5

9 a. What are the requirements of highway drainage system? **(04 Marks)**

b. Explain briefly the design of filter material used in subsurface drains. **(08 Marks)**

c. Explain the cross drainage structures in brief. **(04 Marks)**

OR

10 a. Explain in brief any three methods of economic evaluation of highway projects. **(06 Marks)**

b. Explain in brief the various factors affecting the vehicle operation cost. **(06 Marks)**

c. Explain BOOT with respect to highway financing. **(04 Marks)**

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