



CBCS SCHEME

USN 1 A Y 1 8 C V 0 5 0

18CV56

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021 Highway Engineering

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume the missing data, if any, as per IRC codes.

Module-1

- 1 a. List the objectives and functions of the following in Highway development in India.
i) Indian Roads congress
ii) Central Road Research Institute. (06 Marks)
b. What is the contribution of KRDC and KSHIP in the road development in Karnataka? (08 Marks)
c. List and elaborate the various advantages and disadvantages of Road transport compared with other modes of transport. (06 Marks)

OR

- 2 a. Elaborate on various salient features of VISION 2021. (06 Marks)
b. What are the various factors affecting highway alignment? Explain each one, in detail with the help of neat sketches. (08 Marks)
c. What are the objectives of preliminary survey in highway Alignment? Enumerate the detail to be collected in it. (06 Marks)

Module-2

- 3 a. Calculate the stopping sight distance on a highway for a vehicle moving at 80kmph on a
i) Level Road
ii) On a road having 1 in 100 grade (ascending and descending)
Assume other data as per IRC recommendations. (08 Marks)
b. Explain PIEV theory with a neat sketch. (06 Marks)
c. What are the various factors affecting friction? Also explain skid and slip failures, in detail. (06 Marks)

OR

- 4 a. Enumerate the steps for practical design of super elevation considering mixed traffic. (06 Marks)
b. Find the total width of pavement on a horizontal curve for a two lane National highway to be aligned along a rolling terrain with ruling minimum radius. (08 Marks)
c. List the various objects of providing a horizontal transition curve? Also explain the various shapes of transition curve and ideal transition curve. (06 Marks)

Module-3

- 5 a. List and explain the various desirable properties of subgrade soil as highway material. (06 Marks)
b. List the various properties of coarse aggregate and the tests to be conducted to find each property of coarse aggregate. (06 Marks)
c. How do you find CBR value in the Laboratory? Explain the test procedure with a neat sketch. (08 Marks)

OR

- 6 a. A plate load test was conducted on a soaked subgrade during monsoon season using a plate of diameter 30cm. The load values corresponding to the mean settlement dial readings are given below. Determine the modulus of subgrade reaction for the standard plate :

Mean settlement value, in mm	0.0	0.26	0.52	0.76	1.02	1.26	1.53	1.76
Load values, in Kg	0.0	540	1010	1290	1510	1550	1730	1900

- (08 Marks)
- b. What do you understand about HRB soil classification? Explain in detail? (06 Marks)
- c. Calculate the ESWL of a dual wheel assembly arraying 2044kg each for a trail pavement thickness values of 150, 200 and 250mm, if the centre to centre spacing between the two tyres = 270mm, clear gap between the wall of the tyres = 110mm (06 Marks)

Module-4

- 7 a. With a neat sketch, explain the method of determining the aggregate- bituminous mixes proportioning by Rothfuch's method. (08 Marks)
- b. List the explain the various construction steps in the WMM base construction. (06 Marks)
- c. What do you understand by Tack coat and Prime coat? List the various objectives of providing these in pavements. (06 Marks)

OR

- 8 a. Explain the various steps in the construction of Dense bituminous macadam pavement. (10 Marks)
- b. Step by step, explain in detail, construction of Dry Lean Concrete sub base course. (10 Marks)

Module-5

- 9 a. List the objects of
- Surface drainage
 - Sub surface drainage of roads.
- (06 Marks)
- b. What are various cross drainage structure? Explain each one of those. (05 Marks)
- c. What do you understand by
- Lowering of water table
 - Control of seepage flow
 - Control of capillary rise.
- Explain with neat sketches. (09 Marks)

OR

- 10 a. Compare the annual costs of a 2 lane road for two types of pavement structures
- WBM with thin bituminous surface at a total cost of Rs 100 lakhs per km, life of 10 years, interest at 10%, with a salvage value of Rs 2.50 lakhs after 10 years, and annual average maintenance cost of Rs 5 lakhs/km
 - Bituminous macadam base and bituminous concrete surface, with a total cost of Rs 200 lakhs/km, life of 15 years, interest at a rate of 8%, salvage value of 3.50 lakhs at the end of 15 years, with annual average maintenance cost Rs 7.5 lakhs/km. Comment which one is more economical? (08 Marks)
- b. What is Public Private Partnership? How it will help the Road projects in India? Explain. (06 Marks)
- c. What are the various advantages and disadvantages of Benefit cost ratio method? Explain the method with formulae. (06 Marks)

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