

MODEL QUESTION PAPRT  
6<sup>th</sup> Semester Civil Engineering  
Subject: Design and Construction of Highway Pavements-(BCV613D)

Instructions: 1) Use of IRC 37-2001 and IRC 58-2002 is permitted.

Module-1

- 1 a) Explain briefly about different components of the layers of flexible and rigid pavement with the aid of neat sketches. (10)
- 1 b) Explain briefly about road development plan associated in India from the year 1981 to present date. (10)

OR

- 2 a) Explain briefly about characteristic features of highway alignment and its associated engineering surveys. (10)
- 2 b) Explain briefly about desirable properties required for the highway subgrade soil. (10)

Module-2

- 3 a) Explain briefly about various tests and its significance, done on stone aggregates for determining its suitability to be used as road aggregates. (10)
- 3 b) Explain briefly about various tests and its significance, done on bituminous binders for determining its suitability to be used as highway pavements. (10)

OR

- 4 a) Describe briefly about desirable properties of bituminous paving mix, required to be used as High-way flexible pavement. (10)
- 4 b) Explain briefly about the significance of Marshall Stability and flow test done on bituminous mix. (10)
- 5 a) Explain briefly about traffic and loading characteristics influencing the design of flexible pavement. (6)
- 5 b) Design the pavement for construction of a new bypass with the following data. Type of road is two-lane single carriage way, initial traffic in the year of completion of construction is 600 commercial vehicles per day from both directions, annual traffic growth rate is 7.5%, design life is 10 years, vehicle damage factor is 2.5, design CBR value of the soil subgrade is 4%. (7)
- 5 c) Explain briefly about the composition of flexible pavement along with their functions. (7)

OR

6 a) Explain briefly about the composition of rigid pavement along with their functions, with the aid of neat sketch. (8)

6 b) A cement pavement is to be designed for a two- lane two-way National Highway in Karnataka State. The total two-way traffic is 3000 c v p d at the end of the construction period. Check the safety of the pavement for the thickness of 35 cm. The design parameters are:

- i) Flexural strength of cement concrete = 45 kg/cm<sup>2</sup>.
- ii) Effective modulus of subgrade reaction of the DLC sub base = 8 kg/cm<sup>3</sup>.
- iii) Elastic modulus of concrete = 3X10<sup>5</sup> kg/cm<sup>2</sup>.
- iv) Poisson's ratio = 0.15
- v) Coefficient of thermal coefficient of concrete = 10X10<sup>-6</sup> /0C.
- vi) Tyre pressure = 8 kg/cm<sup>2</sup>.
- vii) Coefficient of Annual rate of traffic increase= 0.075
- viii) Spacing of contraction joints = 4.50 m ix) Width of slab = 3.50 m
- ix) Design period =25 years

The axle load spectrum obtained from axle load survey is presented in the following table.

Single axle Loads		Tandem Axle Loads	
Axle load class, tons	Percentage of axle loads	Axle load class, tons	Percentage of axle loads
19-21	0.60	34-38	0.30
17-19	1.50	30-34	0.30
15-17	4.80	26-30	0.60
13-15	10.80	22-26	1.80
11-13	22.00	18-22	1.50
9-11	23.33	14-18	0.50
< 9	30.00	< 14	2.00
Total =	93	Total =	7

(12)

7 a) Explain briefly about Asphalt Hot Mix Plant. (7)

7 b) Explain briefly about Wet Mix Macadam Plant. (6)

7 c) Explain briefly about Factors affecting output of Plant & Equipment. (7)

OR

8 a) Explain briefly about Concrete Batching Plant. (6)

8 b) Explain briefly about Earthmoving-Excavation Equipment and Paving Equipment. (7)

8 c) Explain briefly about concept of Highway planning and scheduling. (7)

9 a) Explain briefly about construction practices and quality control of Granular Sub-base. (10)

9 b) Explain briefly about construction practices of Hot Mix Asphalt Layer. (10)

OR

10 a) Explain briefly about construction practices of Pavement Quality Concrete. (10)

10 b) Explain briefly about pavement evaluation for functional, structural, and distresses of Flexible and Rigid Pavement. (10)