CBCS SCHEME

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BCV613D

# Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
# Design and Construction of Highway Pavements

Time: 3 hrs. Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.*
*2. M : Marks , L: Bloom's level , C: Course outcomes.*

| | | Module – 1 | M | L | C |
|---|---|---|---|---|---|
| Q.1 | a. | Explain with sketches the various factors controlling the alignment of road. | 10 | L2 | CO1 |
| | b. | Enumerate the design elements to be considered at the horizontal alignment. | 10 | L2 | CO1 |
| | | OR | | | |
| Q.2 | a. | With the help of neat sketch mention various layers in flexible and rigid pavement. Explain the function of each layer. | 10 | L2 | CO1 |
| | b. | Mention the various tests on bitumen. With the neat sketch explain the procedure for determination of bitumen softening point. | 10 | L2 | CO1 |
| | | Module – 2 | | | |
| Q.3 | a. | Enumerate the desirable properties of road aggregates. State the tests conducted to access each property and specify the desirable values. | 10 | L2 | CO2 CO3 |
| | b. | Mention the desirable properties of subgrade soil. Briefly explain modified proctor test for determination of OMC and MDD. | 10 | L2 | CO2 CO3 |
| | | OR | | | |
| Q.4 | a. | Define Marshal stability and flow value. Explain briefly Marshal stability method for bituminous mix design. | 10 | L2 | CO2 CO3 |
| | b. | Explain slump cone test for measuring workability of concrete. Discuss the different types of slump. | 10 | L2 | CO2 CO3 |
| | | Module – 3 | | | |
| Q.5 | a. | The specific gravities and weight proportions for aggregates and bitumen are as under for the preparation of Marshall mix design. The volume and weight of one Marshal specimen was found to be 475 cc and 1100 gm. Assuming absorption of bitumen in aggregate is zero, find $V_v$, $V_b$, VMA and VFB. (see table below) | 10 | L3 | CO2 CO3 |
| | b. | Enumerate the factors considered in design of flexible pavements and explain any three in detail. | 10 | L1 | CO4 |

| Item | $A_1$ | $A_2$ | $A_3$ | $A_4$ | Bitumen |
|---|---|---|---|---|---|
| Weight (gm) | 825 | 1200 | 325 | 150 | 100 |
| Sp. Gravity | 2.63 | 2.51 | 2.46 | 2.43 | 1.05 |

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|---|---|---|---|---|---|
| | | **OR** | | | |
| **Q.6** | **a.** | Explain with neat sketches the various types of joints in C.C. pavements and explain its functions. | **12** | **L1** | **CO4** |
| | **b.** | With the help of neat sketch, explain the concept of Equivalent Single Wheel Load (ESWL). | **08** | **L3** | **CO4** |
| | | **Module – 4** | | | |
| **Q.7** | **a.** | With the neat sketch explain the working principle and advantages of (i) Dragline (ii) Power shovel | **10** | **L2** | **CO5** |
| | **b.** | Discuss the suitability of various compaction equipment used in road construction work. | **10** | **L2** | **CO5** |
| | | **OR** | | | |
| **Q.8** | **a.** | With the neat sketch explain the component of typical hot mix asphalt plant. | **10** | **L2** | **CO5** |
| | **b.** | What is Work Breakdown Structure (WBS)? Mention its significance in construction project. | **10** | **L2** | **CO5** |
| | | **Module – 5** | | | |
| **Q.9** | **a.** | Enumerate the steps in construction of subgrade and mention the quality control checks. | **10** | **L2** | **CO5** |
| | **b.** | Explain the material specification, construction procedure and quality control check for water bound macadam. | **10** | **L2** | **CO5** |
| | | **OR** | | | |
| **Q.10** | **a.** | Enumerate the construction steps involved in cement concrete pavements. | **10** | **L2** | **CO5** |
| | **b.** | Explain the typical failures in flexible pavements. | **10** | **L2** | **CO5** |

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