# Hall Ticket Number:

18CED52

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IV/IV B.Tech (Regular) DEGREE EXAMINATION

# May, 2022 Civil Engineering

**Eighth Semester Bridge Engineering**

**Time:** Three Hours **Maximum:** 50 Marks

*Assume any relevant data if necessary. IRC code books are allowed*

*Answer ANY FIVE questions from Unit-I to Unit-V.* (5X10 = 50 Marks)

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| **UNIT I** | | | |
| 1. | a) | With the help of a neat sketch explain the components of a bridge. | 5M |
| b) | Explain about the importance of site selection Bridge. | 5M |
| **(OR)** | | | |
| 2. | a) | Explain about most economical span of Bridge. | 5M |
|  | b) | Explain about scour depth? | 5M |
| **UNIT II** | | | |
| 3. |  | Design a Deck slab for a culvert on state highway for Class AA Tracked vehicle. Width of bridge is 10m. The materials used for concrete is M30 and that of steel is Fe 415. The clear span of bridge is 7m and wearing course of 60mm thick asphaltic concrete. | 10M |
| **(OR)** | | | |
| 4. |  | Explain in detail about IRC standard live loads with sketches. | 10M |
| **UNIT- III** | | | |
| 5. |  | Obtain Courbon’s reaction factor and the maximum bending moment in case of a T-beam bridge having the following details: Roadway: 2 lanes Loading: IRC Class A No. of main girders: 3, c/c spacing = 2.6 m Span of the bridge: 16 m Kerb width: 600 mm on either side | 10M |
| **(OR)** | | | |
| 6. |  | Design slab of a T beam bridge for the following data.  Clear width of roadway=25m, Effective span=18m, Live load - class AA vehicle, Thickness of wearing coat=100mm, Use M20 grade concrete and Fe 415 steel | 10M |
| **UNIT -IV** | | | |
| 7. | a) | Explain why abutment caps are used? | 5M |
| b) | Explain different types of abutment and different materials used for the construction of abutment? | 5M |
| **(OR)** | | | |
| 8. |  | Design a pier for a bridge having simply supported T-beam of 21m span and having a well  foundation. Dead load from each span is 2500kN. Reaction due to live load on one span is 1000kN. Maximum mean velocity of current is 3.6m/sec. Design for a live load of IRC class AA or Class A whichever produces severer effect. It is required to check adequacy of the assumed dimensions. | 10M |
| **UNIT V** | | | |
| 9. |  | Explain the types of bearings for slab bridges with neat sketches? | 10M |
|  |  | **(OR)** |  |
| 10. |  | A well foundation is to be designed for an abutment of 10 m ¥ 5 m base dimensions. The well is founded on a sandy soil. The data available are as follows: Height of bearing above the maximum scour level: 28 m Permissible horizontal displacement of the bearing level: 50 mm Height of the abutment: 6.0 m Total vertical load including weight of the abutment and well (considering buoyancy effect): 20,000 kN Total lateral load at the scour level = 400 kN Submerged unit weight of soil: 9.5 kN/m3 Design the well and verify the stresses in the steining. | 10M |

