**18CED52**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **April,2023** | **Civil Engineering** | | |
| **Eighth Semester** | **Bridge Engineering** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Relevant IS codes are permitted*  *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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|  |  | **Unit - I** |  |  |
| 1. | a) | With the help of neat sketch, explain the components of a bridge. | CO1(BL2) | **5M** |
|  | b) | Explain the need for investigation, before constructing a bridge. | CO1(BL2) | **5M** |
| **OR** | | | | |
| 2. |  | Explain the classification of types of bridges with neat sketch. | CO1(BL2) | **10M** |
|  |  | **Unit - II** |  |  |
| 3. | a) | Classify different loadings to be considered on the bridges according to IRC? Explain | CO2(BL2) | **5M** |
|  | b) | Explain the importance of impact factor on bridges. | CO2(BL3) | **5M** |
| **OR** | | | | |
| 4. |  | Design a deck slab for the following particulars:  Clear Span : 6m  Width of the footpath: 600mm on either side  Wearing coat: 80mm  Loading: IRC Class 70R (Tracked)  Materials: M40 concrete and Fe415 steel | CO3(BL4) | **10M** |
|  |  | **Unit - III** |  |  |
| 5. | a) | Explain how you will calculate the reactor factors for longitudinal girders. | CO2(BL2) | **5M** |
|  | b) | Illustrate the Pigeaurd’s method and explain how bending moments are calculated for an interior panel? | CO2(BL2) | **5M** |

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| **OR** | | | | |
| 6. |  | The slab panel of a reinforced concrete T-beam and slab deck is 2.47m between main girders and 3.87m between cross-girders. Design the slab for IRC-class AA loading (wheeled). Adopt M40 concrete and Fe415 steel. Assume 200mm thick slab and 80mm wearing coat. | CO3(BL4) | **10M** |
|  |  | **Unit - IV** |  |  |
| 7. |  | Verify the adequacy of dimensions for the pier shown in figure  Top width of pier: 1.6m, height of pier up to springing level: 10m,  c/c of bearings on either side:1m, side batter 1 in 12  High flood level: 1m below the bearing level  Span of bridge :12m, loading on span : IRC class AA  Road: Two-lane road with 1m wide footpath on either side  Super structure consists of three longitudinal girders of 1.0m depth with a deck slab of 180mm depth. Rib width of girders=250mm.  Material of pier M15 grade concrete  **P.T.O**  **18CED52** | CO4(BL4) | **10M** |
| **OR** | | | | |
| 8. | a) | Classify various types of abutments and explain. | CO4(BL2) | **5M** |
|  | b) | Discuss in detail the loads acting on pier with neat sketch. | CO4(BL2) | **5M** |
|  |  | **Unit - V** |  |  |
| 9. | a) | Explain the various types of bearings. Suitability of those bearing also mention clearly. | CO5(BL3) | **5M** |
|  | b) | Explain the importance of elastomeric bearings with neat sketches. And also mention its advantages. | CO5(BL2) | **5M** |
|  |  | **OR** |  |  |
| 10. |  | A well foundation is to be designed for an abutment of 8x4m base dimensions. The well is founded on a sandy soil. The data available are as follows  Height of bearing above the maximum scour level: 28m  Permissible horizontal displacement of bearing level : 50mm  Height of abutment 6m  Total vertical load including weight of abutment and well (including buoyancy): 20,000KN  Total lateral load at the scour level: 400KN  Submerged unit weight of soil: 9.5KN/m3 | CO4(BL4) | **10M** |

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