

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

**Course Code: CE463**  
**Course Name: BRIDGE ENGINEERING**

Max. Marks: 100

Duration: 3 Hours

*(Use of IS 456, SP 16, IRC 6,18,21,83,112 and design charts may be permitted)*

**PART A**

*Answer any two full questions, each carries 15 marks.*

- |   |  | Marks |
|---|--|-------|
| 1 | a) What are the considerations in determining the effect of wind loads?              | (7)   |
|   | b) Explain the longitudinal forces acting on bridges.                                | (8)   |
| 2 | a) What are the factors to be considered while selecting suitable site for a bridge. | (8)   |
|   | b) Write the IRC specifications for Road bridges.                                    | (7)   |
| 3 | a) Explain the classification of bridges.  | (8)   |
|   | b) Write a note on the importance of impact factor in the design of bridges?         | (7)   |

**PART B**

*Answer any two full questions, each carries 15 marks.*

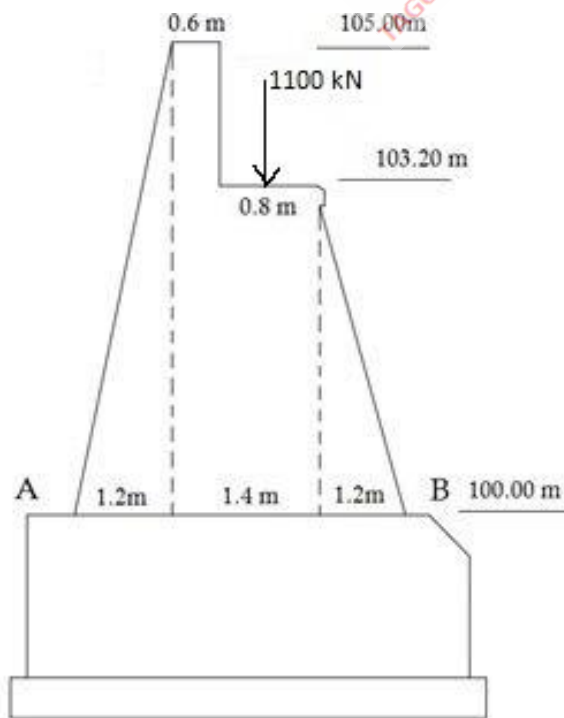
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|---|--|------|
| 4 | a) Explain the design principles of box culvert.   | (10) |
|   | b) Explain the 'Effective width method' in the design of slab bridges.                               | (5)  |
| 5 | Design a solid slab bridge required for a highway road having the following data. (15)               |      |
|   | Width of carriage way = 7.5 m  |      |
|   | Clear Span = 5m  |      |
|   | Loading = IRC Class A  |      |
|   | Width of Kerb = 600 mm   |      |
|   | Materials = M 30 concrete and Fe 415 grade steel.  |      |
| 6 | Design the intermediate longitudinal girder of a T beam and slab bridge for the following data: (15) |      |
|   | Effective span = 10 m  |      |
|   | Carriage way width = 7.5m  |      |
|   | Kerb = 600mm width on either side  |      |
|   | Provide three longitudinal beams..   |      |
|   | Loading = IRC Class A vehicle  |      |
|   | Adopt M30 concrete and Fe 415 grade steel. Shear check is not required.                              |      |

**PART C**

*Answer any two full questions, each carries 20 marks.*

- |   |  |  |
|---|--|--|
| 7 | a) Discuss the design principles of a prestressed concrete bridge with neat sketches. (10) |  |
|---|--|--|

- b) What are the types of foundations in bridges? Explain any one in detail with neat sketches. (10)
- 8 a) Design an elastomeric pad bearing for a two lane reinforced concrete T-beam bridge for 15 m effective span having the following data: (15)
- Vertical sustained load- 300 kN  
 Vertical dynamic load- 60 kN  
 Horizontal sustained load- 80 kN  
 Coefficient of friction = 0.65  
 Modulus of rigidity-1 N/mm<sup>2</sup>  
 M 20 grade concrete.
- b) Write brief note on elastomeric bearings. (5)
- 9 Verify the stability of abutment. The salient details are given below. (20)
- Material of the abutment : Concrete  
 Live load : IRC AA (Tracked)  
 Density = 18 kN/m<sup>3</sup>  
 Angle of repose = 30  
 Coefficient of friction = 0.6  
 Span of bridge = 15 m  
 Angle of friction between soil and concrete = 18



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