

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 | (15) |
| following data: | |
| 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.

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| 7 a) Discuss the design principles of a prestressed concrete bridge with neat sketches. | (10) |
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- 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/mm²
 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/m³
 Angle of repose = 30
 Coefficient of friction = 0.6
 Span of bridge = 15 m
 Angle of friction between soil and concrete = 18


