Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019
Course Code: CE463
Course Name: BRIDGE ENGINEERING

Max. Marks: 100   Duration: 3 Hours

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

PART A
Answer any two full questions, each carries 15 marks.
Marks

1 a) Define the term "bridge". Explain the components of a bridge structure with neat diagram. (7)

   b) Explain the classification of bridges. (8)

2 a) Write note on the factors to be considered while selecting suitable site for a bridge. (7)

   b) Explain the importance of Hydraulic design in Bridge Engineering (8)

3 a) Explain the longitudinal forces acting on bridges. (5)

   b) Write a note on the importance of impact factor in the design of bridges? (5)

   c) Write the IRC specifications for Road bridges. (5)

PART B
Answer any two full questions, each carries 15 marks.

4 A reinforced concrete simply supported slab forms the deck of a road bridge, having the following data: (15)

   (i) Clear span = 6 m.

   (ii) Carriage way -2 Lane.

   (iii) Width of kerb= 500 mm on either side

   (iv)Width of bearing= 400 mm

   (v) Materials = M25 grade concrete and Fe 415 steel.

   (vi) Type of loading IRC class AA tracked vehicle.

   Design the deck slab. Show the reinforcement details.

5 Design the interior deck slab panel of a T-beam and slab bridge for the following data. (15)

   Effective span-18m, Carriage way width-7.5m, Kerb- 600 mm on either side.

Provide three longitudinal beams and five cross beams. Loading IRC class AA tracked vehicle. Adopt M20 concrete and Fe415 bars. Sketch the reinforcement details.

6   a)   Explain the different type of forces and their combinations in the design of box culverts.   (7)

    b)   What are the load distribution theories used in girders of Tee beam and slab bridge. Explain Courbon's theory.   (8)

PART C
Answer any two full questions, each carries 20 marks.

7   a)   List the merits and demerits of the Prestressed concrete bridges over RCC bridges.   (5)

    b)   Write brief note on elastomeric bearings.   (5)

    c)   Discuss about the stability analysis of abutments.   (10)

8   a)   With neat sketch, explain well foundation and its components.   (7)

    b)   What is a bearing? What are the main functions of bearings?   (7)

    c)   What are the forces to be considered during the design of piers and abutments?   (6)

9   Determine the minimum section modulus , prestressing force and eccentricity of a prestressed concrete slab bridge having the following data: (20)

Clear span-10 m, Width of bearing-400 mm, Carriageway width-2 lane, Footpath on either side-1 m.

Live load-IRC Class AA tracked vehicle.

Materials- M40 concrete, Ultimate tensile strength of steel-1500 N/mm^2.

Compressive stress of concrete at transfer, f_{ci}=35 N/mm^2

f_{ct}=15 N/mm^2, f_{cw}=12 N/mm^2, f_{tt}=f_{tw}=0.

Loss ratio=0.8

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