

Exam Slot: D

06CE6142

Reg Number.....

Name.....

**A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY
M.TECH DEGREE EXAMINATION, MAY/JUNE 2019
SECOND SEMESTER**

**COMPUTER AIDED STRUCTURAL ENGINEERING
BRIDGE ENGINEERING**

Time: 3 Hrs

Maximum Marks:60

PART A

Answer ALL Questions

Any data, if required may be suitably assumed and clearly indicated.

Use of relevant IRC and IS codes are permitted

1. With the help of a neat sketch explain the components of a bridge?
2. Describe Courbon's method for load distribution and indicate the limitations?
3. Describe the expansion and contraction joints in bridges?
4. Discuss the special features of segmental cantilever system of construction?

4 x 5 marks = 20 marks

PART B

5. Design a slab culvert to suit the following data:
Effective span = 6.5 m
Thickness of wearing coat = 80 mm
Width of road = 7.5 m with kerbs 600 mm on either side.
Loading : IRC Class AA Tracked vehicle
Use M25 grade concrete and Fe- 415 steel bars. Sketch the details of reinforcements in the deck slab.

OR

6. Give a critical review of IRC loadings for bridges?

7. For a T-beam slab bridge, design deck slab for the following data:
Effective span of the bridge is 20 m
Carriage way width is 7.5m, Width of foot path on either side is 1 m
Use IRC class A loading
Thickness of wearing coat = 80 mm
Number of main girders = 4
Spacing of main girders = 2.5 m
Spacing of cross girders = 4 m
Use M20 concrete and Fe 415 steel
Draw a neat sketch showing the reinforcement details.

OR

8. Sketch the cross section of a T- beam superstructure and indicate the different components. Describe briefly how you would design each component?
9. Give a neat sketch of elastomeric bearing showing all the details and explain the design procedure?

OR

10. Describe the different types of bridge piers? Illustrate the loads and forces to be considered in the design of a bridge pier?
11. Discuss the major construction techniques adopted in bridge construction?

OR

12. Sketch the main types of cable stayed bridges, describe the main features of cable stayed bridges and requirement of stay cables?

4 x 10 marks = 40 marks

Exam Slot: D

06CE6142/06CE6148

Reg Number.....

Name.....

A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY
M.TECH DEGREE EXAMINATION, APRIL/MAY 2018
SECOND SEMESTER
Branch : Civil Engineering
COMPUTER AIDED STRUCTURAL ENGINEERING/STRUCTURAL
ENGINEERING AND CONSTRUCTION MANAGEMENT
BRIDGE ENGINEERING

Time: 3 Hrs

Maximum Marks:60

Answer ALL Questions

Any data, if required may be suitably assumed and clearly indicated.

Use of IS codes and IRC codes are permitted

PART A

1. Briefly explain various types of bridges?
2. Sketch and enumerate the various components of T-beam bridge with five simply supported span?
3. Discuss the advantages of elastomeric bearings over other types of bearings for T- beam bridges?
4. Explain different types of cable configurations used in a cable stayed bridge?

4 x 5 marks = 20 marks

PART B

5. Design a slab bridge for the following data:
Effective span = 5.5m, Clear width of carriage way = 3.6 m, Kerbs are 1000 mm wide for pedestrian traffic on both sides with hand rails 75 mm thick and 750 mm high, Loading : IRC Class A, Materials : M 25 concrete and Fe 415 steel. Sketch the reinforcement details.

OR

6. Explain the various IRC loading considered in the design of bridges?

7. A RCC T beam bridge deck consists of 3 longitudinal girder spaced at 2.75 m clc. The slab is of 400 mm thickness. Five cross girders are provided at 3 m c/c along the span. The overhangs of 1.60 m each on either sides consists of 1 m carriage way portion and 0.60 m as Kerbs width of carriage way being 7.50 m. Class AA wheeled vehicle is passing the bridge. Determine the maximum design live load bending moment on interior slab panel [2.75 m x 3.0 m] due to the vehicle, using Pigeauds's method.

OR

8. Briefly explain the design procedure for design of simply supported prestressed concrete bridge?
9. Design an elastomeric bearing for a bridge for the following data :
Maximum Normal load = 900 kN, Minimum Normal load = 220 kN, Transverse lateral force = 40 kN, Longitudinal force = 65 kN, Allowable longitudinal translation is 8 mm, Rotation at supports assessed as 0.0018 radians, Rigidity modulus of elastomeric bearing is 1.2 N/mm², Allowable compressive stresses in elastomer and concrete are 10 N/mm² and 7 N/mm² respectively. Sketch the details.

OR

10. What are the functions of bearings in bridges and with the help of a neat sketch explain the design procedure of elastomeric bearing ?
11. Briefly explain with the help of a neat sketch the working principles of a suspension bridge and explain the structural action of each member?

OR

12. Briefly explain various rehabilitation techniques adopted in bridges?

4 x 10 marks = 40 marks

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A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY**M.TECH DEGREE EXAMINATION, MAY 2017****SECOND SEMESTER****Branch: Civil Engineering****BRIDGE ENGINEERING****Time: 3 Hours****Max. Marks: 60***Answer ALL questions**Any data, if required may be suitably assumed and clearly indicated.
Use of IS codes and IRC codes permitted***Part-A**

1. Describe the features of an ideal bridge site.
2. Explain Hendry Jaegar's method for bridge analysis.
3. Write short notes on bridge joints.
4. Briefly explain some maintenance techniques of bridges.

(4 x 5 marks =20 marks)**Part-B**

5. What are the various IRC loads considered in the design of bridges? Explain.

Or

6. Design an RCC slab bridge section for the following data.

Carriageway width - 7.5m

Live load - IRC Class AA tracked.

Thickness of wearing coat - 80mm

Kerb width - 600mm

Span of bridge - 6m

Use Fe 415 steel & M25 grade concrete.

7. Explain any 2 methods available for the calculation of live load distribution in longitudinal girders of a T-beam bridge.

Or

8. Plot the cable arrangement for a prestressed concrete bridge for the following data.

Effective span	= 40m
Carriageway width	= 7.5m
Footpath	= 1.5m
Live Load	= IRC Class A
Girder spacing	= 2.7m
Concrete Mix	= M45

9. Design an elastomeric pad bearing for a bridge for the following data:-

Maximum dead load reaction per bearing = 280kN, Maximum live load reaction per bearing = 520kN, vertical reaction due to longitudinal forces per bearing = 12kN, Longitudinal load per bearing = 33kN, Total longitudinal translation = 12 mm, Rotation at support = 0.0025 radians, Modulus of rigidity = 1.2 N/mm². Allowable compressive stress for concrete = 7 N/mm² and that for elastomer = 9 N/mm².

Or

10. Describe with figure the different types of bridge foundations.

11. Design a composite bridge deck with reinforced concrete slab and steel plate girdes with shear connectors, to cover a span of 18m.

Given,

Roadway width = 7.5m

Footpath 1m on either side

Spacing of main girders = 2m

Materials : M20 concrete & Fe 415 steel.

: Rolled steel sections with yield stress of 236N/mm².

Or

12. Explain the major construction methods of bridges.

(4 x 10 marks =40 marks)

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**A P J ABDUL KALAM TECHNOLOGICAL UNIVERSITY
M.TECH DEGREE EXAMINATION, MAY 2016**

SECOND SEMESTER

Branch: < COMPUTER AIDED STRUCTURAL ENGINEERING >

<Bridge Engineering>

Time: 3 Hours

Max. Marks: 60

PART A

Answer ALL questions

1. Describe various IRC loadings.
2. Discuss the advantages of prestressed concrete bridges over RCC bridges.
3. Explain well foundation with a neat sketch.
4. Briefly discuss cable stayed bridges.

(4 x 5 marks =20 marks)

PART B

5. Design the simply supported slab bridge for the following data:
Clear span is 4.5, Clear width of roadway is 7.5 m, and Thickness of wearing coat is 80 mm, Materials: M20 grade concrete & Fe 415 steel. Type of loading: IRC Class AA tracked. Design the deck slab. Show the reinforcement details
OR
6. Explain the various factors to be considered in the site selection for an RCC bridge. Also discuss the need of investigation for the selection of site.
7. Design the cantilever slab of a Tee beam & slab bridge deck using the following data: Width of roadway = 7.5 m, width of kerb is 600mm, depth of curb 300mm. Thickness of wearing coat is 80 mm. Type of loading IRC class A wheel loads. Materials: M20 concrete & Fe 415 steel.
OR
8. Explain balanced cantilever bridges and its design features with a neat sketch.
9. Design an elastomeric bearing of a bridge for the following data:

Normal load_{max}=1100 KN, Normal load_{min}=100 KN, Transverse Lateral load=50 KN, Longitudinal load=40 KN, Total longitudinal translation is 12mm, Rotation at supports is 0.0012 radians. Modulus of rigidity is 1 N/mm² Allowable compressive stress for concrete is 7 N/mm² & that for elastomer is 9 N/mm².

OR

10. Explain briefly different types of bridge foundation.
11. Describe the inspection, maintenance & construction of bridges.

OR

12. Explain with a neat sketch the different features of a suspension bridge. Describe the function of each structural member.

(4 x 10 marks =40 marks)