	Utech
Name:	
Roll No.:	A stand (Chambidge 2nd Excland
Invigilator's Signature :	

2012

BRIDGE ENGINEERING

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

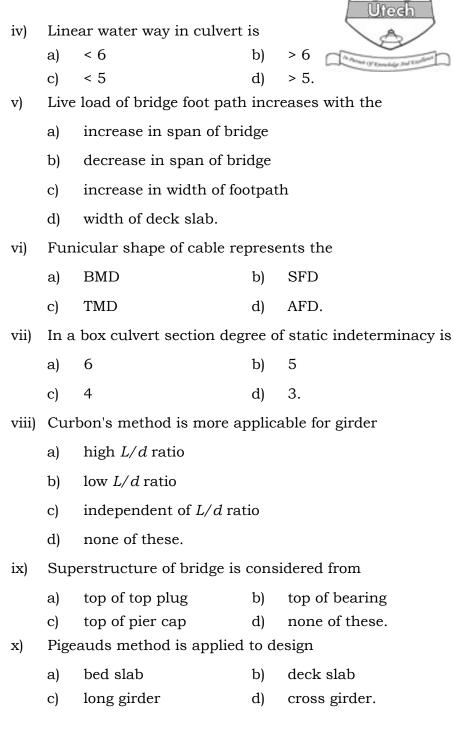
GROUP – A (Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following:

 $10 \times 1 = 10$

- i) Deck slab of bridge is
 - a) always one way
- b) always two way
- c) one way or two way
- d) flat slab.
- ii) Cross girder of the bridge is designed as
 - a) *T*-beam
- b) deep beam
- c) rectangular beam
- d) *I*-beam.
- iii) Crush barrier is a member provided in bridge
 - a) near bearing
 - b) at top of pier
 - c) at side face of deck slab
 - d) at pier cap.

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- xi) The design philosophy recommended by IRC for bridge design is
 - a) working stress method
 - b) limit state method
 - c) un-cracked method
 - d) cracked method.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following.

 $3 \times 5 = 15$

- 2. Discuss the importance of Hydraulic factors in Bridge Design.
- 3. Illustrate with figure the different components of bridge.
- 4. Discuss the different classes of live loads to be considered in deck slab design of a bridge.
- 5. Discuss the design basis of a cable stayed bridge.
- 6. Write a short note on Balanced cantilever bridge.

GROUP - C

(Long Answer Type Questions)

Answer any three of the following.

 $3 \times 15 = 45$

- 7. Design a deck slab of bridge considering 70R tracked vehicle and live load. Given clear road way = 7.5 m; Number of *T*-beam = 3; Spacing of beam = 2.5 m; Effective span = 14.5 m; spacing of cross beam = 3.65 m. Consider M25 grade concrete and Fe415 grade steel.
- 8. Design the cantilever footpath portion of a bridge having a clear overhang of 1600 mm considering live load and most unfavourable vehicular load. Consider M20 and Fe500 combination. Given that width of long girder is 300 mm.

- 9. Design deck slab of a box culvert over a state highway. Given: Width of culvert 12 m; footpath not provided; Clear span = 5m, height of vent = 3 m; Depth of foundation = 1.35 m; Thickness of wearing course = 50 mm. Consider appropriate live load.
- 10. Design a longitudinal girder of a bridge of an effective span 15·5 m using 70R live load class. The girder is provided with three cross girders, two at its end and one at mid-span. Thickness of deck slab = 300 mm. Centre to centre distance of girders = 3 m. Assume all other relevant data required.
- 11. Design a steel longitudinal girder for a steel concrete composite construction. Thickness of RCC deck slab = 250 mm; effective span = 12·25 m. Centre to centre distance of girders = 2·5 m. Consider appropriate live load.

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