Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CE) (2012 to 2017) (Sem.–7)

BRIDGE ENGINEERING

Subject Code : BTCE-820

M.Code : 71879

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Write briefly :

1. Discuss various types of abutments.
2. Define 'scour depth' and 'afflux', essential in determination of design discharge.
3. List the loads to be considered in the design of plate girder bridge.
4. Describe culverts and draw sketch of box culvert.
5. What are the causes of bridge failure?
6. Describe the fixed bearing and elastomeric bearing.
7. Differentiate between balanced cantilever bridges and continuous girder bridges.
8. Discuss the different loading causes for the design of a single rent R.C pipe culvert.
9. Write short note on 'choice of a bridge type'.
10. What are the methods of construction of concrete and steel bridges?

SECTION-B

11. Explain the class A and B loading as per IRC.
12. Discuss about the various forces acting on the "Suspension Bridge". Also define the "Economical Span".

13. What is a bridge foundation? Explain it with neat sketch. What are the various function and types of foundation?

14. A reaction of 2000kN is expected at a support of 20m spanned T-Beam Bridge. Design a rocker and roller bearing. The details are :

    Allowable pressure on roller: 6 N/mm^2

    Bearing pressure on rocker pin: 25 N/mm^2

    Allowable pressure on concrete bed block: 3 N/mm^2

15. What are the functions of bearings in bridges? Sketch an elastomeric bearing and mark its parts.

SECTION-C

16. Draw a typical view of a box culvert. Also discuss why the box culverts are economical. Explain in detail the steps of designing of the following for a box culvert :

    a) Loads and reaction of box culvert

    b) Hydraulic design of box culvert

    c) Structural design of box culvert

17. The foundation for substructure of a bridge construction of 18 piles to carry a total load of 8500 kN. The piles are spaced at 1.5m. They are driven through soft ground to a hard stratum available at a depth of 12m. Design the pile foundation using M20 grade concrete and Fe 415 grade steel.

18. Using the following particulars, design a plate girder bridge for a broad gauge track : Span: 20m

    To level of the railway embankment: 120m

    Bed level of the stream: 110m

    G.L suitable for foundation: 100m

    Stream bond top level: 101.50m

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.