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(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID :100751 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VII) THEORY EXAMINATION, 2015-16

BRIDGE ENGINEERING

[Time:3 hours] **[Total Marks:100]**

Note: This question paper contain three section. Attempt all sections. Assume any missing data suitable.

Section-A

1. All parts are compulsory. (2×10=20)

   (a) Discuss the various types of abutments.

   (b) What is a well foundation? What are its different types?

   (c) List the loads to be considered in the design of plate girder bridge.

   (d) Describe box culverts & draw sketch.

   (e) What are the causes for longitudinal forces on bridges.

   (f) Explain essential requirements of a good foundations.

   (g) Describe the usual type of bridge piers.

(h) Discuss the different loading causes for the design of a single rent R.C. box culvert.

(i) Define the following terms:

(a) Abutment

(b) Back fill

(j) What is a bridge? What is the importance of studying bridge engineering.

Section-B

Attempt **any five** questions. (5×10=50)

2. Design a R.C. slab culvert for a national highway to suit following data:

Carriage way:	Two lane 7.5 m wide
Footpath:	0.9 m on either side
Clear span:	5m
Wearing coat:	75mm
Width of bearing :	500mm
Materials:	M25 grade concrete: Fe 415
Loading:	IRC Class AA tracked vehicle

Design the R.C. slab deck and sketch the details of the reinforcement in cross section of a slab.

3. Design a reinforced concrete box culvert having a clear ventory of 4m×4m. The superimposed dead load on the culvert is 12.8 kN/m^2.The L.L on the culvert is 60 kN/m^2. Density of soil at site is 18 kN/m^3. Angle of repose=30°. Adopt M20 grade concrete mix and Fe 415 grade for steel. Sketch the details of reinforcement in the box culvert.

4. What essential data is required for the design of a bridge.

5. What are R.C.C bridges. Explain any five of them with neat sketches.

6. Using the following particulars to design a plate girder bridge for a broad gage track.

Span:20m.

Top level of the railway embankment	:	1.15m
Bed level of the stream	:	120m
Ground level suitable for foundation:	:	98m
Stream bund top level		:101.50m.

7. Sketch the elements of plate girder bridge.

8. The foundation for substructure of a bridge consist of 16 piles to carry a total load of 8000 kn. The piles are spaced at 1.5 m k. They are driven through soft ground to a hard straitum available at a depth of 12m. Design the pile foundation using M-20 coecrete & Fe 415 steel.

Section-C

Attempt **any two** questions. (15x2=30)

9. A reaction of 3000 kN is expected at a support of 25 m spaned T-beam bridge. Design a rocker & roller bearing. The details are allowable pressure on roller:5N/mm diameter/mm length. Bearing pressure on rocker pin=30N/mm^2. Allowable pressure on concrete bed block =3.8N/mm^2.

10. What is a bridge foundation? Explain it with neat sketch. What are the various functions & type of foundation.

11. Verify the stability of the abutment shown in fig. The other salient details are given below:

    Material of the abutment : Cancrete

    Line load on the bridge : IRC Class AA (Tracked)

    Density of soil = 18kN/m^3

    Angle of repose=30°

    Coefficient of friction =0.5