Section-D

8. (a) Explain the salient feature of solid bridge Piers. 10

   (b) Write the steps for designing of curved and skew bridges, explain briefly. 10

9. Design an exterior longitudinal girder of a T-beam bridge for the following data : 20

   Effective span = 20 m

   Clear width of roadway = 7.5 m

   Foothpath = 0.85 m wide on either side

   Live load : IRC class AAA Tracked vehicle

   Slab thickness = 0.25 m

   Also sketch details of reinforcement.

M.Tech. 2nd Semester (Civil Engg.)

Examination, July–2022

BRIDGE ENGINEERING

Paper–CE-617

Time allowed : 3 hours] *[Maximum marks : 100*

Before answering the questions, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in the regard, will be entertained after examination.

Note : *Attempt any **five** questions in all, selecting **one** question from each section. **Question no. 1 is compulsory**. All questions carry equal marks.*

1. Describe the following : 20

   (a) Historical bridges

   (b) Score depth

   (c) Code provision for bridges

   (d) Articulation

   (e) Orthotropic deck

Section-A

2. (a) What is the economical span for bridge designing and factor that affects the span of the bridge ? 10

(b) Explain IRC class 70R loading in details with neat sketch. 10

3. (a) Discuss Soil Exploration and factor affecting the selection of site of bridge. 10

(b) The following are the costs of one pier and one superstructure span of multi span bridge for various span lengths. The cost of superstructure span excludes the costs of railing and flooring system. Calculate the economic span : 10

Span in meter	3	6	9	12
Superstructure cost in Rs.	1,500	6,000	12,000	22,000
Substructure cost in Rs.	20,000	22,200	23,000	24,500

Section-B

4. (a) What are T-beams bridges ? Draw a typical cross section of T-Beam. 10

(b) What are the advantages of composite bridges over steel bridges ? 10

5. (a) Explain truss bridges ? What analysis should be done while designing the truss bridge ? 10

(b) Design a RC slab culvert to be constructed over a NH if clear span is 6.0 m. Footpath of 1.5 m width is to be provided on both sides. Also sketches reinforcement details. 10

Section-C

6. (a) Design one of the post tensioned prestressed concrete T-Beam and slab deck to suit the following data : 20

Effective span = 30 m spacing of main girder = 2.4 m

Spacing of cross girder = 5.0 m carriageway = 7.0 m

kerbs = 0.65 m wide on either sides of the road

Loading = IRC class AA tracked vehicle loading

Use M45 Grade concrete and High tensile steel strands

Confirming to IS:6006

LOS ratio =0.85

7. Explain the following : 20

(a) Expansion joints

(b) Drainage and lighting system