Total No. of Questions :10]

SEAT No. :

P3655

[4959] - 1004

B.E. (Civil)

STRUCTURAL DESIGN OF BRIDGES

(Elective - I) (2012 Course) (Semester - I)

Time : 2½ Hours]   *[Max. Marks :70*

Instructions to the candidates:

   1)   *Attempt Q.1 or Q. 2; Q. 3 or Q. 4; Q. 5 or Q. 6; Q. 7 or Q. 8; and Q.9 or Q.10.*

   2)   *Figures in bold to the right indicate full marks.*

   3)   *IRC: 6, IRC: 112, IS 456, IS 800, IS 1343 and Steel table are allowed in the examination.*

   4)   *Neat diagrams should be drawn wherever necessary.*

   5)   *If necessary, assume suitable data and indicate clearly.*

   6)   *Use of electronic pocket calculator is allowed.*

Q1) Explain the loadings considered on highway RC bridges.   **[10]**

OR

Q2) Write a note on different loadings adopted for railway steel bridges.   **[10]**

Q3) Explain Pigeaud's curves with an example?   **[10]**

OR

Q4) Explain the procedure to obtain maximum bending moment and shear force on an intermediate longitudinal girder.   **[10]**

P.T.O.

Q5) Design the members L_0-L_1, L_0-U_1 for the broad gauge railway steel truss bridge shown in Fig. 1. The details are as follows.   **[18]**

a)   Weight of stock rail = 0.55 kN/m,

b)   Weight of check rail = 0.5 kN/m

c)   Sleepers of size = (0.25 × 0.25 × 2.5) m @ 0.40 m c/c

d)   Unit weight of sleepers = 7.8 kN/m³

e)   Spacing of truss = 4.50 m c/c

f)   Equivalent uniformly distributed load for BM and SF are 2874 kN and 3161 kN respectively
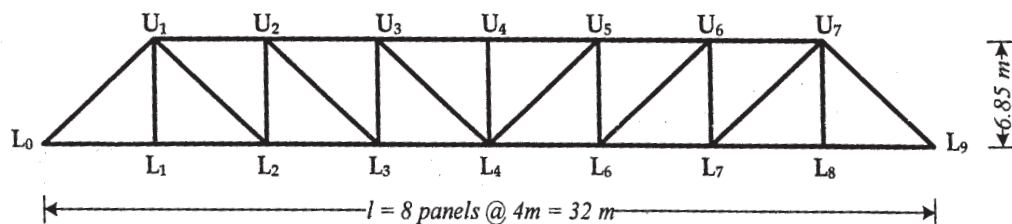
g)   CDA = 0.361

Fig. 1

OR

Q6) For the Problem given in Q.5 design the members U_1-L_2 and U_1-L_1.   **[18]**

Q7) Design a rocker bearing for the given data and also sketch the details.   **[16]**

a)   Maximum normal load = 2250 kN

b)   Minimum normal load = 750 kN

c)   Lateral load = 48 kN

d)   Longitudinal load = 110 kN

OR

Q8) a) Explain the classification of various types of bearings with neat sketches. **[8]**

b) Explain the design procedure for elastomeric bearing. **[8]**

Q9) Explain the steps involved in design of abutment. **[16]**

OR

Q10) Design a RC abutment for a RC T-beam deck slab bridge with the following data. **[16]**

a) Span = 10m

b) Width of carriageway = 7.5 m

c) Live load on the deck slab = IRC Class AA

d) Dead weight of span = 3500 kN

e) Longitudinal force = 250 kN

f) Height of abutment from the top of footing to bearing level = 9.85 m

g) Unit weight of backfill soil = 18 kN/m^3

h) Allowable bearing pressure = 225 kN/m^2

i) Materials = M 30 grade concrete and steel of grade Fe 500

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