Total No. of Questions : 10]

SEAT No. :

P2113

[Total No. of Pages : 2

[5254]-504
B. E. (Civil)
STRUCTURAL DESIGN OF BRIDGES
(2012 Pattern) (Elective - I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer 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 where ever necessary.***
5) ***If necessary, assume suitable data and indicate clearly.***
6) ***Use of electronic pocket calculator is allowed.***

Q1) Classify the road bridges with neat sketches. **[10]**

OR

Q2) Explain IRC loadings adopted for railway steel bridges. **[10]**

Q3) Explain Curbon's Method of Design of Bridges. **[10]**

OR

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

Q5) Design the members U_3-U_4, U_4-L_4 for the broad gauge railway steel truss bridge shown in Fig.1. The details are as follows **[18]**

a) Weight of stock rail = 065 kN/m

b) Weight of check rail = 0.75 kN/m

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

d) Unit weight of sleepers = 7.5 kN/m^3

e) Spacing of truss = 5.0 m c/c

f) Equivalent uniformly distributed load for BM and SF are 2174 kN and 3060 kN respectively

g) CDA = 0.31

P.T.O.

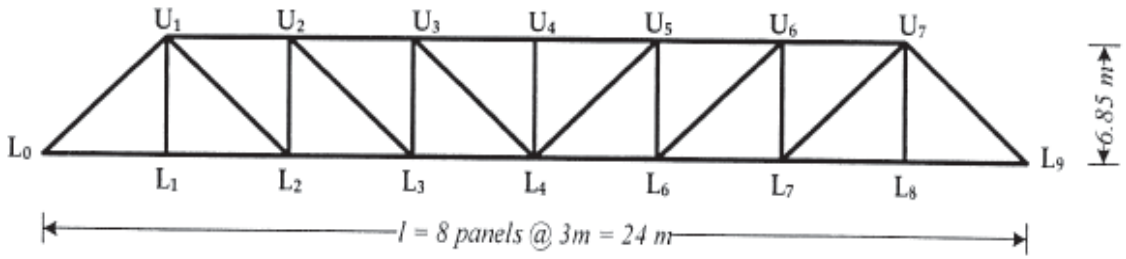

Fig. 1

OR

Q6) For the Problem given in Q.5 design the members U_1-U_2 and U_1-L_2 **[18]**

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

i) Maximum normal load = 4500 kN

ii) Minimum normal load = 950 kN

iii) Lateral load = 50 kN

iv) Longitudinal load = 450 kN

OR

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

b) Explain the design procedure for Rocker and Roller bearing. **[8]**

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

OR

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

a) Span = 16 m

b) Width of carriageway = 10 m

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

d) Dead weight of span = 6800 kN

e) Longitudinal force = 450 kN

f) Height of abutment from the top of footing to bearing level = 12.5 m

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

h) Allowable bearing pressure = 250 kN/m^2

i) Materials = M 30 grade concrete and steel of grade Fe 415