

M.E. First Semester (Civil Engineering (Transpo. Engg & Manag.)) (New - CGS)

13108 : Elective - I : Design of Bridges : 1 SFTR 5

P. Pages : 2

Time : Three Hours



AU - 3335

Max. Marks : 80

- Notes :
1. All question carry equal marks.
 2. Answer **any four** questions.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Illustrate your answer necessary with the help of neat sketches.
 6. Use of ECN calculator is permitted.
 7. Use of D.A. Lows "Pocket Book for Mechanical Engineers" is permitted.
 8. Use of pen Blue/Black ink/refill only for writing the answer book.
 9. Use of IRC-6, IRC-21 and IS:456 (Revised) is permitted.

1. a) Explain Indian Road congress loading specification for design of bridges. **10**
b) Explain the following. **10**
 - i) Principle of planning of elevated rail transit system.
 - ii) Grade separation structures.
 - iii) Sub-ways.
2. Design a deck slab for the National highway crossing to suit the following data: **20**
 - i) Clear span = 8m
 - ii) Clear width of carriage way = 7.5m
 - iii) Foot Paths = 0.6m on either side.
 - iv) Wearing coat = 100mm
 - v) Material – M.30 – grade of concrete & Fe-415-steel.
 - vi) Loading = IRC class AA (Tracked)Sketch the details of reinforcements in the longitudinal and cross sections of the slab.
3. Design a reinforced concrete T-beam bridge for carrying a two lane traffic **20**
 - i) Effective span = 16m.
 - ii) Width of carriage way = 7.5m
 - iii) Ar. thickness of wearing coat = 100mm
 - iv) Loading – IRC – class AA (Tracked)
 - v) Material – M35 – grade of concrete & Fe-415 steel
 - vi) Spacing of cross girder = 4m.Sketch the reinforcement details.
4. Design post tensioned prestressed concrete deck slab for the following data. **20**
 - i) Clear span = 12m
 - ii) Clear width of roadway = 7.5m
 - iii) Footpath = 1m on either side.
 - iv) Thickness of wearing coat = 100mm
 - v) Live load – IRC. Class AA (Tracked)
 - vi) Type of structure – Class – I
 - vii) Material – M40 grade of concrete and 7mm dia high strength strands with ultimate tensile strength at 1600mPa. The cable consists of 12 strands anchored at the end with a suitable diameter anchor block.
 - viii) Compressive strength of concrete at transfer (f_{ci}) = 40mPa.Sketch the reinforcement details.

5. a) What are the functions of Piers and abutments. 5
- b) Verify the stability of the abutment of a bridge with the following details: 15
- i) Top width = 1.6m
 - ii) Height = 4m
 - iii) Back batter = 1 in 6
 - iv) Front face of abutment is vertical
 - v) Material = stone masonry
 - vi) Unit weight of soil = 18kN/m^3
 - vii) Angle of repose = 30°
 - viii) Superstructure : T-beam bridge of span = 16m
 - ix) Loading : IRC – class – AA
- Assume suitable dimensions for the components of the superstructure.
6. a) State the criteria for selection of bearings for the bridges. 6
- b) A reaction of 2500kN is expected at the supports of a 20m spanned T-beam bridge. Design a rocker and roller bearing. 8
- The other details are:
- i) Allowable pressure on rollers = 5N/mm^2 /diameter/mm/length
 - ii) Bearing pressure on rocker pin = 30 N/mm^2
 - iii) Allowable pressure on bearing plate = 2000 N/mm^2
 - iv) Allowable pressure on concrete bed block = 3.8 N/mm^2
- c) Explain with the help of diagram different components of well foundations. 6

http://www.sgbauonline.com

Whatsapp @ 9300930012

Your old paper & get 10/-

पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से