

**GUJARAT TECHNOLOGICAL UNIVERSITY****M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013****Subject code: 1721504****Date: 31-12-2013****Subject Name: Analysis and Design of Bridges****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of all IRCs and Pigeaud's Curve are permitted.

- Q.1** (a) Explain the criteria for selection of type of bridge. **07**  
(b) Explain Courbon's Method in Detail. **07**
- Q.2** (a) Classify the types of live load with neat sketches. **07**  
(b) What do you understand by economical span of bridge? Discuss various parameters involved in deciding economical span of bridge. **07**
- OR**
- (c) Write advantages of Prestressed Concrete bridges. **07**
- Q.3** Design an RCC T-beam girder bridge for following details. **14**  
(1). Clear Width of road way = 7.5 m  
(2). Span of bridge = 20 m  
(3). Live Load = IRC - Class AA Tracked Vehicle  
(4). Thickness of wearing coat = 80 mm  
(5). Use M-25, Fe-415  
Design deck slab and main girder. Draw typical sketches.
- OR**
- Q.3** Calculate vehicular live load design bending moment (without distribution factor) at L/2 for a two lane bridge on NH having c/c span of 21.5 m and overall slab length 23.5 m. Consider any two type of vehicular loads. **14**
- Q.4** (a) Draw different types of superstructure layout and designate each element of all superstructure options. **07**  
(b) Write short note on Pigeaud's Curves and their uses. **07**
- OR**
- Q.4** Design a post tensioned prestressed concrete for following data. **14**  
(1). Clear span = 12 m  
(2). Width of bearing = 400mm  
(3). Clear width of road way = 7.5m  
(4). Footpath of 1 m on either side, kerbs of 500 mm size  
(5). Wearing coat = 80 mm thick  
(6). Live Load: IRC- Class AA Tracked Vehicle  
(7). M-40 grade concrete and High strength wires of 1500 MPa strength  
(8) Fe-415 for other reinforcement  
(9) Loss ratio = 0.8, Compressive strength at transfer = 35 MPa
- Q.5** (a) Elaborate design steps of well. **07**  
(b) Explain design of balanced cantilever bridges in detail. **07**

**OR**

**Q.5** Calculate design moments and axial force at the base of pier for following **14**  
levels corresponding to road formation level 0.0 m.  
Top of bearing pedestal = -2.4 m  
Top of pier cap = -2.7 m, Bottom of Pier Cap = -4.3m, Bottom of Pier = -12.3m  
Assume suitable c/s of pedestal block, pier cap and pier which carries  
superstructure of span 22 m on both sides. The dead load reaction from each  
side of superstructure is 1800 kN. Account only IRC- Class AA type vehicular  
load. Neglect External Lateral loads.

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