

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013****Subject code: 1721504****Date: 03-06-2013****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 = 16 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 = 16 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 1600 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 levels **14**
corresponding to road formation level 0.0 m.
Top of bearing pedestal = -2.2 m
Top of pier cap = -2.6 m, Bottom of Pier Cap = -4.0m, 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 1600 kN. Account only IRC- Class AA type vehicular
load. Neglect External Lateral loads.
