Seat No.: _____ Enrolment No._____

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. (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.	**14**
		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. (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	**14**
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 corresponding to road formation level 0.0 m. **14**

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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