Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (OLD) – • EXAMINATION – SUMMER 2016

Subject Code: 1721504 **Date:19/05/2016**

Subject Name: Analysis and Design of Bridges

Time:10:30 am to 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. **Draw figures with pencil only.**
5. **Use of IRC-5, 6, 21 codes are permitted**
6. **Take M25 grade of concrete and Fe500 grade of steel, if not specified.**

Q.1	**(a)**	Elaborate on the economical span length of a bridge.	**07**
	(b)	Determine the footpath live load for a bridge having effective span of 24 m and width of footpath of 1.2 m	**07**
Q.2	**(a)**	Discuss on Pigeaud's curve. Explain how it will be used in two way slabs of bridge.	**07**
	(b)	Elaborate the design steps of balanced cantilever bridge.	**07**
		OR	
	(b)	Elaborate the design steps of box girder bridge.	**07**
Q.3		Following are the data of RCC T-beam girder bridge. (1). Clear Width of road way = 8.0 m (2). Span of bridge = 24 m (3). Live Load = IRC - Class 70R Tracked Vehicle (4). Thickness of wearing coat = 80 mm (5). Use M-30, Fe-415 Design deck slab and main girder of this bridge. Draw typical sketches	**14**
		OR	
Q.3		A two lane bridge has 24m centre to centre distance between supports and overall slab length is also 24m. It consists of three girders with greatest distribution factor 0.40 for central girder. Assume a suitable cross section of central girder near end support and design it for shear. Consider Class AA tracked vehicles as critical load and total dead load of superstructure as 120 kN/m length. The end consists of 12 bars of 32mm diameter longitudinal steel. Take concrete grade M25 and steel grade Fe 415.	**14**
Q.4		Design a post tensioned prestressed concrete for following data. (1) Clear span = 24 m (2) Width of bearing = 400mm (3) Clear width of road way = 7.5m (4) Footpath of 1.2 m on either side, kerbs of 400 mm size (5) Wearing coat = 85 mm thick (6) Live Load: IRC- Class 70R Tracked Vehicle (7) M-45 grade concrete and High strength wires of 1680 MPa strength (8) Fe-415 for other reinforcement (9) Loss ratio = 0.84, Compressive strength at transfer = 35 MPa	**14**
		OR	
Q.4		Draw a suitable cross section for a national highway two lane bridge having 25m centre to centre span and 27m overall span and compute dead load design bending moment at L/4 without considering distribution factor.	**14**

Q.5	Enlist and explain in detail various steps to analyze and design substructures at pier location consisting of well foundation.	**14**

OR

Q.5	Enlist and explain in detail various steps to analyze and design substructures at abutment location consisting of open foundation.	**14**

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