Tame:	
oll No. :	
nvigilator's Signature :	

CS/B.TECH(CE)/SEM-8/CE-802/2/2012

2012 **BRIDGE ENGINEERING**

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

GROUP - A (Multiple Choice Type Questions)

Choose the correct answers for the following: 1.

 $10 \times 1 = 10$

- i) Co-efficient of thermal expansion per degree Centrigrade for steel bridge is
 - 11.7×10^{-6} a)
- b) 10.8×10^{-6}
- 11.0×10^{-5} c)
- d) 10.0×10^{-5} .
- ii) If the span of an R.C.C. bridge is 9.0 m, the impact factor for class (IRC) A or B loading is
 - a) 0.45

b) 0.3

c) 0.75

- d) none of these.
- The horizontal seismic force on a bridge structure is iii) computed from the equation
 - a) $F_{eq} = L_a (G + A_h)$ b) $F_{eq} = G (A_h + L_a)$
 - c) $F_{eq} = A_h (G + L_a)$ d) $F_{eq} = G \times A_h \times L_a$.

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iv)	from			m ² and distance of site mum flood discharge		
	a)	$216 \text{ m}^3/\text{s}$	b)	$225 \text{ m}^3/\text{s}$		
	c)	201 m ³ /s	d)	$270 \text{ m}^3/\text{s}.$		
v)	v) The maximum depth of scour <i>D</i> below t severe bend is					
	a)	2·00 dsm	b)	1.75 dsm		
	c)	1.27 dsm	d)	1.5 dsm.		
vi)	For	beam, using grade o	f stee	el Fe ₄₁₅ , the minimum		
	tension reinforcement is					
	a)	0.25% of bd	b)	0.2% of bd		
	c)	0·12% of bd	d)	0·15% of bd.		
vii)	Modulus of elasticity of concrete grade M 40 is					
	a)	0.40×10^5	b)	0.316×10^{5}		
	c)	0.35×10^{5}	d)	$0.45\times10^6.$		
viii)	iii) For economic reasons, the width of the median may					
	kept	low, but should not be	less	than		
	a)	1.5 m	b)	1·30 mm		
	c)	1·2 m	d)	1·0 m.		
ix)	x) The clear distance of wheel from the wheel guard for IRC class AA wheel vehicle of carriageway width over 5.3 m is					
	a)	0.30 m minimum	b)	1.2 m minimum		
	c)	1.20 m maximum	d)	0.30 m maximum.		
x)	l vehicle is					
	a)	3.6 m	b)	4.0 m		
	c)	5.6 m	d)	7·2 m.		
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GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. Describe the advantage and disadvantage of stone masonry bridges.
- 3. Discuss how a bridge may be an aesthetic statement reflecting the quality of life in the community.
- 4. How would you determine the effective flange width of a T-beam and of an L-beam?
- 5. Discuss the principle and area of application of (i) Full Prestress (ii) Limited Prestress (iii) Partial Prestress.
- 6. How is afflux caused and how is its value estimated? How does the magnitude of afflux influence the design of a bridge?
- 7. What is meant by economical span? Derive the condition of an economical span stating clearly the assumptions.

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. Design a deck slab bridge for the following data:

Clear distance between abutment = 6.70 m

Footpath = 1.0 m on either side

Wearing coat (average) = 80 mm

Loading = IRC class AA tracked

vehicle

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Road = National Highway

(2-lanes)

Materials = Grade of concrete

M 20 and grade of steel

Fe 415

9. Design the cantilever portion of a girder bridge for the following data:

Clear width of road = 6.8 mSpan C/C of bearing = 16.0 m

Loading = IRC class A and class

AA vehicle

Wearing coat = 100 mm (average)

Material = Grade of concrete

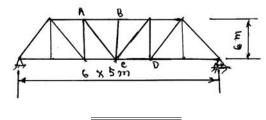
M 25 and grade of

steel Fe 415.

- 10. Discuss in brief, losses in prestress due to Elastic shortening, Creep of concrete, Shrinkage of concrete, Relaxation of steel, Seating of anchorages, Frictional losses.
- 11. What are the factors to be considered in the determination of linear waterway and span length?
- 12. For class A double lane Roadway Steel Truss Bridge as shown in the figure,

Roadway = 7.5 mC/C of Truss = 10.5 m

Find out the vehicular live load in members AB and CD.



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