**R09**

**Code No: C8707**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**M.Tech I Semester Examinations March/April-2011**
**BRIDGE ENGINEERING**
**(HIGH WAY ENGINEERING)**

**Time: 3hours** **Max.Marks:60**

**Answer any five questions**
**All questions carry equal marks**
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1. Using effective width method, design a solid slab bridge to cavy I RC class A loading, if the clear width of roadway=7m clear span = 4.5m, average thickness wearing coat = 80mm. use M 20 grade of concrete and Fc 415 grade tor steel. Fix up the depth of slab and reinforcement assuming other data. */Sketch the details. [12]

2. In a girder bridge, there are 3 girders of span 16m. The thickness of deck slab is 200mm, $c_{/c}$ of girders =2.6, cantilever projection or either side = 1.3 m clear Width of roadway = 7m, over all width =8m; Using Courbon's theory. Calculate the reaction factor for I RC class A loading and hence the live load B.M and shear at mid – span. Assume any other data suitably. [12]

3. a)List the various caused for the loss of prestress due to friction.
b) With the help of neat sketches illustrate the Freyssinet system of prestressing. [12]

4. Explain the analysis of continuous bridges with variable moment of inertia (girder with parabolic soft it.). What is the advantage of having variable M.I.? [12]

5. Carry out the preliminary design of a 2- lane pre-stressed concrete bridge for the following data.
Clear width of roadway = 7 m
$c_{/c}$ of bearings = 36 m
Concrete mix: M 35 grade for girder
M 20 for deck slab
No of girders = 2 (4m $c_{/c}$)
thickness of deck slab: 250 mm
( reducing to 150mm in cantilever portion)
stiffness are provided at 6m $c_{/c}$.
Live load IRC class AA (tracked) [12]

**Contd……2**

6. Design a suitable pier for a 16m girder bridge having clear width of roadway = 7m.Live load: IRC class AA (tracked) Mt. of pier = 8m; mean velocity of Current = 3m/sec; H.F.L = 7m.
Dead load of super structure per span = 1500 KN
Weight of bearings, plates = 100KN.
Reaction due to live load =770 KN max. Longitudinal force due to live load = 140 KN. Unbalanced friction force at pier top = 240 Kn. Design wrid load = 110 KN.
Force due to water pressure = 114KN. [12]

7. Illustrate the analysis of bridge decks by Harmonic analysis and folded plate theory. [12]

8. Write short notes on any Three:-
a) Magnel method of End block design
b) Temperature effects in bridges.
c) Two – stage prestressing
d) Seismic loads. [12]

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