

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

- - -

1. Using effective width method, design a solid slab bridge to carry IRC 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 on either side = 1.3 m clear Width of roadway = 7m, over all width =8m; Using Courbon's theory. Calculate the reaction factor for IRC 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 causes 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

::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 wind 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]

FIRSTRANKER