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BICE-017

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00806

June, 2015

BICE-017 : STRUCTURAL DESIGN AND DRAWING – II

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks. Assume any data, if necessary. Use of IS 456 – 2000 is permitted. Use of IS 800 is permitted.*

1. Design the bottom ring beam and bottom spherical dome of an Intze type water tank of 1 million litres capacity supported on an elevated tower comprising of 8 columns. The base of the tank is 16 m above the ground level. Depth of the foundation is 1 m below the ground level. Adopt M-20 grade concrete and Fe-415 grade for steel. *14*

2. Write down the design steps for trussed girder railway bridges. *14*

3. Design the side walls and hopper bottom of a 3 m × 3 m square bunker to store 30 tonnes of coal. Density of coal = 9 kN/m^3. Angle of repose = 30°. Adopt M-20 grade concrete and Fe-415 HYSD bars. *14*

4. Write short notes on the following : *2×7=14*

   (a) Design criteria of culverts

   (b) IRC loadings on bridges

5. A prestressed concrete beam 300 mm deep and 200 mm wide has fifteen 5 mm diameter wires located 65 mm from the bottom of the beam and three 5 mm wires located 25 mm from the top of the beam. If the wires are initially tensioned to a stress of 850 N/mm^2, calculate the percentage loss of stress in steel immediately after transfer. Allow for the loss of stress due to elastic deformation of concrete only. *14*

6. A reinforced concrete chimney 50 m high above the ground has an outside diameter of 4 m. The thickness of shell is 20 cm at the top and it is increased to 25 cm and 30 cm at 18 m and 30 m from the top. Vertical steel bars = 1% of the cross-sectional area throughout. The total wind load above the section at 18 m from the top may be taken as 93 kN. Find the stresses developed due to wind load and dead loads at the section 18 m from the top of the chimney. Assume modular ratio m = 13. *14*

7. Compare pre-tensioning and post-tensioning of prestresses giving their detailed procedure, advantages and disadvantages. *8+3+3=14*