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BICEE-009

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00245

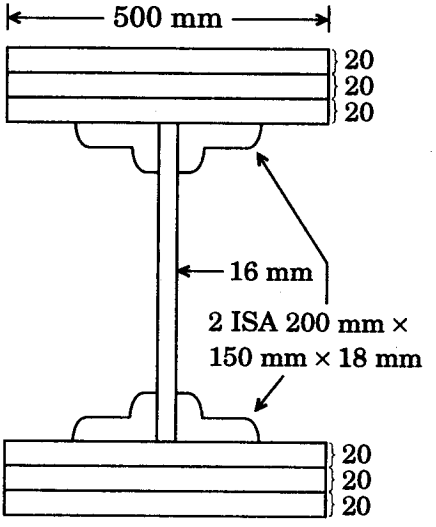
December, 2014

BICEE-009 : ADVANCED STEEL DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any* ***four*** *questions. Assume any missing data suitably. Use of scientific calculator and BIS codes are allowed.*

1. In a through type bridge for single broad gauge track and main line standard loading, a plate girder simply supported at its ends is composed of flange plates, flange angles and web plates. The effective span of plate girder is 27 m subjected to maximum B.M. of 8100 kN-m due to UDL. Determine actual length of the flange plates if they are curtailed. $17\frac{1}{2}$



2. Write down design procedure for the following : $5+5+7\frac{1}{2}=17\frac{1}{2}$

(a) Curtailment of flange plates

(b) Design of connections of flange elements

(c) Design of stiffeners

3. Write design principles of guyed chimney with an example assuming all the suitable data. $17\frac{1}{2}$

4. Design only T-covers and stages of an overhead riveted steel rectangular flat bottom tank of capacity 70,000 liters. The available width of plates is 1·22 m and lengths upto 6·1 m. The staging consists of 4 columns, spaced 4·88 m × 3·66 m and the bottom of the tank is 9·14 m above the ground level. $17\frac{1}{2}$

5. Write in detail about the following supporting it with proper expressions : $8\frac{1}{2}+9=17\frac{1}{2}$

(a) Local buckling of thin elements

(b) Post buckling of thin elements

6. A steel tower is to be erected for transmission line for a single circuit three-phase, 50 cycles per second to transmit 50 MW at 0·75 power factor for 259 km. $17\frac{1}{2}$

(i) Voltage of transmission = 132 kV

(ii) Unit wt. of conductor = 16·76 N/m

(iii) Permissible axial tension = 35·60 kN

(iv) $E = 0{\cdot}842 \times 10^5$ N/mm^2

(v) Coefficient of expansion = 0·00001992/°C

(vi) Shape factor for conductor = 0·67

(vii) Wind = 1·50 kN/m^2

(viii) Variation of temperature = 5°C to 60°C

(ix) Weight span of tower = wind span
= 240 m