No. of Printed Pages : 3

BICEE-009

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00983 **December, 2016**

BICEE-009 : ADVANCED STEEL DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **four** questions. All questions carry equal marks. Assume any missing data suitably. Relevant BIS codes are allowed. Use of scientific calculator is allowed.*

1. (a) What is tension field action in plate girders ? 5

(b) How does a plate girder derive post buckling strength ? 5

(c) Why are end posts required in plate girders ? 5

(d) Explain in brief the manufacturing process of light gauge section. $2\frac{1}{2}$

2. A self-supported steel chimney is 80 m high and its diameter at the top is 3 m. Design flue opening. Adopt the wind force as per IS 875. The intensity of wind pressure up to 30 m height is 1·50 kN/m^2. $17\frac{1}{2}$

3. Design a gantry girder to be used in an industrial building carrying a manually operated overhead travelling crane, for the following data : $17\frac{1}{2}$

   Crane capacity = 200 kN

   Self-weight of crane girder excluding trolley = 200 kN

   Self-weight of trolley, electric motor, hook, etc. = 40 kN

   Approximate minimum approach of the crane hook to the gantry girder = 1·20 m

   Wheel base = 3·5 m

   c/c distance between gantry rails = 16 m

   c/c distance between columns = 8 m

   Self-weight of rail section = 300 N/m

   Diameter of crane wheels = 150 mm

   Steel is of grade Fe 410.

4. Discuss the following :

   (a) Analysis of Towers 7

   (b) Loads acting on towers $3\frac{1}{2}$

   (c) Stresses in the cylindrical portion of a cylindrical steel tank 7

5. Design an elevated water tank, circular in shape, for 1,50,000 litres capacity with circular girder supported on suitable number of columns. The shape of the bottom may be assumed suitably. The roof covering and staging for the tank need not be designed. $17\frac{1}{2}$

6. Find the allowable axial load for a column section shown in Figure 1. The effective length of the column is 3·6 m. Take $f_y = 236\ N/mm^2$. $17\frac{1}{2}$