

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00313

June, 2018

BICEE-009 : ADVANCED STEEL DESIGN

Time : 3 hours

Maximum Marks : 70

Note : *Use of IS 800 and SP 6 codes are permitted. Assume suitable data, if any. Use of scientific calculator is permitted. Attempt any four questions.*

1. Design a simply supported gantry girder for the following data :

$17\frac{1}{2}$

Crane capacity = 160 kN

Self weight of crane girder = 200 kN

Self weight of trolley, electric motor,

hook, etc. = 50 kN

Minimum approach of crane hook to the gantry

girder = 1.6 m

Wheel base = 2.8 m c/c

Distance between gantry rail = 12 m c/c

Distance between column = 6 m

Self weight of section = 300 N/m.

Check the section for maximum bending moment due to vertical forces, lateral forces and longitudinal forces.

2. A pressed water tank $3.6 \text{ m} \times 3.6 \text{ m} \times 2 \text{ m}$ has got a total weight of 40 kN. The tank is supported on 4 columns at corners of a square $3 \text{ m} \times 3 \text{ m}$ staging of height 12 m; wind force = 1.0 kN/sq.m, SBC of soil = 150 kN/sq.m. $17\frac{1}{2}$

Design

- (i) Columns and braces,
- (ii) Foundation (base plate, anchor bolt and bed block).
3. Describe the steps involved in the design of self-supported steel chimney with lining including foundation. $17\frac{1}{2}$
4. A welded plate girder is simply supported over an effective span of 16 m. It carries a uniformly distributed load of 80 kN/m in addition to its self weight and two concentrated loads of 400 kN each at 4 m from either supports. If the cross-section is an I-section having overall depth as 2040 mm, width of flange as 500 mm, thickness of flange as 20 mm, web thickness as 10 mm, then $17\frac{1}{2}$
- (a) Design the bearing stiffener.
- (b) Design the intermediate stiffeners.

5. Two channel sections without bent lips $200 \text{ mm} \times 50 \text{ mm}$ are connected with webs to act as a beam. The thickness of channel is 2.5 mm. The effective span of simply supported beam is 4 m. Determine the maximum uniformly distributed load inclusive of self weight which can be supported by the beam. The beam is laterally supported throughout its length. $17\frac{1}{2}$
6. Design a horizontal tension member carrying a load of 600 kN. The length of the member is 3 metres. The member is connected to 4.5 cm thick gusset plate by 20 mm rivets. $17\frac{1}{2}$
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