

Total No. of Questions : 8]

SEAT No. :

**P5287**

**[5562]-139**

[Total No. of Pages : 2

**M.E. (Civil - Structures)**

**ADVANCED DESIGN OF STEEL STRUCTURES**

**(2017 Course) (Semester-I) (501003) (Credit)**

*Time : 3 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates:*

- 1) *Attempt Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 and Q. 7 or Q. 8.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*
- 4) *Assume suitable data if necessary and clearly state.*
- 5) *Use of cell phone is prohibited in the examination hall.*
- 6) *Use of electronic pocket calculator and relevant IS code are allowed.*

**Q1)** Calculate the wind pressure and design forces on hoarding of 10 m long and 5 m in height to be fixed at the roof of 24 m high building near Delhi. The base of the hoarding board is 2 m above the roof level. **[9]**

OR

**Q2)** A 60 m microwave tower consist in four parts, top 15 meter portion is straight. Width at top 3.0 m, width at bottom 6.0 m. It is subjected to total gravity load of 450 kN. The lateral load of 25, 50, 100, 150 and 200 kN are acting at 52.5, 37.5, 22.5 and 7.5 m respectively from the base of tower. Determine the maximum compressive and tensile force in the leg at the base. **[9]**

**Q3) a)** Two channel sections with bent lips 180 mm × 80 mm are connected with webs to act as a column. The thickness of channel section is 2.5 mm. The depth of lips is 25 mm. The effective length of column is 4.0 m. Determine the safe load carrying capacity of the section. Adopts properties of the channel section from IS: 811-1961. **[6]**

b) Define stiffened element, flat-width ratio and effective design width for cold formed light gauged section. **[3]**

OR

**P.T.O.**

**Q4)** Find the geometry and draw elevation of the tower to be erected for transmission line at 0.85 power factor with the following data: Power conductor: 40 mm dia. aluminium cable steel reinforced conductors consist of 60 strands of 3 mm dia of aluminium and 10 strands of 3 mm dia of steel to be used, Unit weight of conductor: 20 N/m, Permissible axial tension: 40.0 kN, Young's modulus of elasticity:  $0.85 \times 10^5$  N/mm<sup>2</sup>, Coefficient of expansion: 0.00001992/°c, Shape factor: 0.67, Ground wire: 12 mm diameter galvanised steel wire with permissible axial tension = 30.0 kN. [9]

**Q5)** A self supporting steel stack is 80 m high and its diameter at the top is 3 m. Height of flared portion is 20 m and diameter at base is 4.5 m. Determine wind pressure and overturning moment due to wind load at every 10 m from top to bottom as per IS 875. [16]

OR

**Q6)** a) State and explain different design forces for the chimney. [8]

b) State and explain different lining materials for chimney. [8]

**Q7)** A steel chimney carries wind load moment 11590 kNm and dead load 950 kN rest on M15 grade of concrete. Design base plate and anchor bolt for the chimney. [16]

OR

**Q8)** a) State and explain design criterion for foundation of steel chimney. [8]

b) State and explain in details stability of steel chimneys. [8]

