BE (CIVIL) | SEM-VII | ADOSS | R-19 C scheme | 10/6/25.

(3 Hours) [Total Marks: 80]

Notes :

1. Question No **ONE** is **Compulsory.**
2. Answer any **THREE** from the remaining.
3. Draw **FIGURES** wherever necessary. The figures to the right indicate full marks.
4. **WRITE** proper question/sub-question numbers on the left margin allotted in the answer sheet.
5. Each Question carries **EQUAL** marks.
6. **ASSUME** any additional data if necessary and state it clearly.
7. **All relevant IS Codes are allowed.**

1. Design a gantry girder to carry an electrically operated head crane for the following data: 20

i)	The span of the gantry girder:	15 m
ii)	Crane capacity:	350 kN
iii)	Distance between centers of gantry girder:	16 m
iv)	Weight of crab:	80 kN
v)	Minimum approach distance of crane hook:	1.2 m
vi)	Weight of crane girder:	195 kN
vii)	Wheelbase:	4 m
viii)	Height of rails:	80 mm
ix)	Mass of rail section:	30 kg/m
x)	The steel of grade E 250	

2. A 60 m high microwave antenna lattice tower will be built in Nagpur, where the terrain at the site is nearly level ground with the terrain of category 2. The diameter of the hemispherical antenna disc, fixed at the top, is 3.0 meters. The minimum width of the square platform is 5.0 m. Choose a suitable configuration for the tower and determine the maximum compression and uplifting force in the column leg and shear at the base. 20

Weight of antenna disc 15 kN
Weight of platform at top 1.5 kN/m^2
Weight of ladder and cage 0.9 kN /m
Weight of railing at top 0.4 kN/m

3. a An ISLB 450 @ 640.6 N/m transmits an end reaction of 130 KN to the flange of the stanchion ISHB 250 @ 500.3 N/m. Design an unstiffened end connection. 10

b Explain in detail the design of the steel staging of the overhead steel water tank. 10

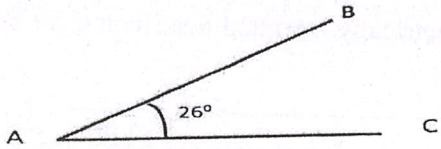
Q. P. Code :- 85243

Program code 1T00637

4. A self-supporting steel chimney of a height of 60 m above the foundation & is situated in Ranchi. The diameter at the top is 3.5 m. The refractory concrete lining has been used, and the thickness of the lining material is 50 mm; a stack supports the lining throughout the height. Design the chimney & check the section at 1/3rd height from the top and 1/4th from the bottom. Design only for wind forces as per IS:875 (Part III). The terrain Category is 2, and the topography at the site is almost flat. Also, design the joint. 20

5. 20

Design the members, principal rafter AB, and main tie AC at joint A of the roof truss as shown in the figure for the following data. Use Yst 240 tubes. for member material. Use tubular sections. Also, design the welded joints for the members, taking the allowable stress in fillet weld as 110 N/mm^2. Sketch the details of the connection.



Sr. no.	Member	Length (m)	Forces due to		
			Dead load (KN)	Live load (KN)	Wind load (KN)
1	AB	2.0	55 (C)	52 (C)	125 (T)
2	AC	1.8	65 (T)	88 (T)	115 (C)

6. Design an elevated cylindrical steel tank with hemispherical bottom for 205 m^3 capacity. The tank has a conical roof. The ring beam of the tank is at a height of 14 m from the GL. The tank is to be built in Pune. Take fy = 250 N/mm^2 20