

- Q.6 i. Define tower. Write down the type of towers.
ii. Distinguish between bunker and silo with the help of diagram.

OR iii. A 50 m High Microwave Antenna Lattice Tower to be built near Kernel. The diameter of Hemispherical Antenna disc, provided at the top is 2.5 m. the mean width of the square platform is 3.75 m. Select a suitable Truss configuration and determine the maximum compressive force and tension in the leg of the tower. Assume suitable data.

4	2	1	1
6	2	1	1,2 3,6
6	4	3	1,2 3,6

Total No. of Questions: 6

Total No. of Printed Pages:4

Enrollment No.....



Duration: 3 Hrs.

Faculty of Engineering

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CE3ES03 / CE3ET03

Advanced Design of Steel Structures

Programme: B.Tech.

Branch/Specialisation: CE

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Marks	BL	PO	CO	PSO
1	2	1	1,2	
1	2	1	1,2	
1	2	1	1,2	
1	2	1	1,2	

A plate girder is used when-

- (a) Span is large and loads are heavy
 - (b) Span is small and loads are heavy
 - (c) Span is small and loads are light
 - (d) Span is large and loads are light

ii. Economical depth of a plate girder corresponds to-

- (a) Minimum weight
 - (b) Minimum depth
 - (c) Maximum weight
 - (d) Minimum thickness

iii. Forces in top chord members in truss bridges are-

- (a) Tension (b) Compression
 (c) Flexural (d) None of these

iv. Truss bridge live load analysis is done using-

- (a) Shear force diagram
 - (b) Bending moment diagram
 - (c) Shear force and bending moment diagram
 - (d) Influence line diagram

v. What are purlins?

- (a) Beams provided in foundation
 - (b) Beams provided above openings
 - (c) Beams provided over trusses to support roofing
 - (d) Beams provided on plinth level

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- vi. Gantry girders are designed to resist-
 - (a) Lateral loads
 - (b) Longitudinal loads and vertical loads
 - (c) Lateral, longitudinal and vertical loads
 - (d) Lateral and longitudinal loads

- vii. A self-supporting steel chimney transmits the lateral forces to the foundation by-
 - (a) Fixed beam action
 - (b) Proposed beam action
 - (c) Cantilever action
 - (d) Simply supported beam action

- viii. The allowable stresses for the design of steel chimney depend upon the ratio of-
 - (a) Area of cylindrical portion of the flared portion
 - (b) Volume of cylindrical portion to the volume of flared portion
 - (c) Weight of cylindrical portion to the weight of the flared portion
 - (d) Effective height to the radius of gyration

- ix. A vertical wall of a circular bunker is subjected to horizontal pressure due to coal stored therein. The wall of the bunker is designed for-
 - (a) Axial tension
 - (b) Hoop tension and shear force
 - (c) Hoop tension and bending moment
 - (d) None of these

- x. What are silos?
 - (a) These are metallic bins for storage
 - (b) Use of neem leaves to protect the grains
 - (c) These are large scale godowns for storage of grains and to protect them from insects, rats and other pests
 - (d) These are wayside storage bins

1 2 1 1,2

[3]

- Q.2 i. Write short notes on plate girder and its uses. 3 2 1 1,2
- ii. Explain the steps involved in the design of gantry girder. 7 4 2 1,2
3
- OR iii. The plate girder of span 20 m is laterally restrained throughout its length. It carries an UDL of 50 kN/m excluding its self-weight. Design the girder without intermediate stiffener. 7 5 4 1,2
3 1
-
- Q.3 i. What are different types of truss bridges? 3 2 1 1
- ii. Design a truss bridge diagonal carrying a pull of 200 kN using double angle section. The center to center distance of inter sections is 3 m. the member is subjected to reversal of stresses. 7 5 4 1,2
3 1
- OR iii. Explain the various types of bridge bearing and discuss elastomeric bearing for bridge structures in details. 7 4 2 1,2
-
- Q.4 i. Write notes on bracing. 2 2 1 1
- ii. Design an I-Section purlin for an industrial building, located at Chennai, with galvanized iron sheets as the roofing material.
Span of the truss = 13 m
Spacing of trusses = 6 m c/c
Spacing of purlins = 1.2 m c/c
Wind pressure intensity = 2 kN/m²
Weight of GI sheets = 130 N/m²
Grade of steel = Fe410 8 5 4 1,2
3,12 1
- OR iii. Draw neat sketches of various types of roof trusses. 8 4 2 1,2
3,12
-
- Q.5 i. Define chimney and its types. 4 2 1 1
- ii. Explain the lining material used for chimney. 6 4 2 1,2
3,6
- OR iii. Design for Bhopal city a self supporting steel stack of height 70 m, the diameter of cylinder shell is 4.75 m foundation is raft resting on medium soil. Assume that 100 mm thick lining is supported by the stack throughout the height. 6 5 4 1,2
3,6 1

- Q.1 (i) (a)
(ii) (a)
(iii) (b)
(iv) (d)
(v) (c)
(vi) (e)
(vii) (c)
(viii) (d)
(ix) (c)
(x) (a)

Q.2 (i) SHORT NOTE ON PLATE GIRDER \rightarrow 2 MARKS
USES \rightarrow 1 MARK

(ii) Each step give ONE MARK
 $\Rightarrow 1 \times 7 \text{ MARK}$
 $\Rightarrow \underline{\underline{7 \text{ MARK}}}$

(iii) (a) Calculation of live load and Dead Load
(1 MARK)

(b) MAX SF (2) MARKS

(c) Max BM. (2) MARKS

(d) DESIGN OF WEB and FLANGE (1) MARK

(e) Diagram (1) MARK

Q. (3) (i) Each type give ONE MARK = 3×1

(ii) each step and correct calculation
give ONE MARKS = $1 \times 7 \cancel{\text{ MARKS}}$
 $= 7 \text{ MARKS}$

(iii) TYPES OF BEARING \rightarrow 3 MARKS

Elastomeric Bearing \rightarrow 4 MARKS

- Q.4 (i) Bracing explanation \rightarrow 2 Marks
(ii) each step give 2 Marks \rightarrow 2 Marks \times 4 steps
 \Rightarrow 8 Marks
- (iii) Each sketches of Roof truss \Rightarrow give 2 Marks
 $= 2 \text{ Marks} \times 4$
 $\Rightarrow 8 \text{ Marks}$
- Q.5 (i) Chimney \rightarrow 1 MARKS
Types \rightarrow 3 MARKS
- (ii) Each Material give ONE MARKS
 \rightarrow ONE MARK \times 6
 $= 6 \text{ MARKS}$
- (iii) Each steps gives 2 MARKS
 $= 2 \text{ Marks} \times 3 \text{ steps}$
 ~~$\Rightarrow 6 \text{ MARKS}$~~
- Q.6 (i) Tower explanation = 2 MARKS
Types = 2 MARKS
- (ii) Each Difference give ONE MARKS
 $= \text{ONE} \times 6 \text{ diff}$
 $\Rightarrow 6 \text{ MARKS}$
- (iii) Each steps gives ONE MARKS
 $\Rightarrow \text{ONE MARK} \times 6 \text{ steps}$
 $\Rightarrow 6 \text{ MARKS}$
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