1. What is the primary difference between a single section and a compound section in column design?

a) Single section columns have uniform cross-section throughout their length, while compound sections have varying cross-sections.

b) Single section columns are used for light loads, while compound sections are used for heavy loads.

c) Single section columns are made of a single material, while compound sections are made of multiple materials.

d) Single section columns are easier to construct, while compound sections require complex fabrication techniques.

Answer: a) Single section columns have uniform cross-section throughout their length, while compound sections have varying cross-sections.
Explanation: Single section columns have a consistent cross-sectional shape and dimensions along their entire length, whereas compound sections have varying cross-sectional shapes and dimensions, often to accommodate different load requirements at different levels.

2. In laced column design, what is the purpose of the lacing bars?

a) To provide lateral stability to the column

b) To resist axial compression

c) To increase the column’s bending capacity

d) To prevent buckling of the column

Answer: a) To provide lateral stability to the column
Explanation: Lacing bars are inclined members placed between the main vertical members of a laced column to provide lateral stability and prevent buckling under compressive loads.

3. What is the main function of battens in a battened type column?

a) To increase the column’s load-carrying capacity

b) To enhance the aesthetic appearance of the column

c) To provide additional lateral stability

d) To resist shear forces acting on the column

Answer: c) To provide additional lateral stability
Explanation: Battens are flat plates or bars attached to the main vertical member of a column to increase its lateral stability, particularly under eccentric loading conditions.

4. Which type of column base provides the highest resistance against uplift forces?

a) Slab base

b) Gusseted base

c) Grillage foundation

d) None of the above

Answer: b) Gusseted base
Explanation: Gusseted base, with its reinforced connection between the column and the foundation, offers increased resistance against uplift forces compared to slab base and grillage foundation.

5. What is the function of a slab base in column design?

a) To distribute the column load over a larger area

b) To increase the height of the column

c) To enhance the column’s aesthetic appeal

d) To provide additional lateral stability to the column

Answer: a) To distribute the column load over a larger area
Explanation: A slab base spreads the load from the column over a larger area of the foundation, reducing the intensity of pressure on the underlying soil and preventing excessive settlement.

6. Which type of column base is commonly used in tall structures with heavy loads?

a) Slab base

b) Gusseted base

c) Grillage foundation

d) None of the above

Answer: b) Gusseted base
Explanation: Gusseted bases are often preferred in tall structures with heavy loads due to their ability to provide robust connections between the column and the foundation, ensuring stability and load-bearing capacity.

7. What is the primary advantage of using a grillage foundation for column support?

a) Reduced construction time

b) Increased resistance to lateral loads

c) Ability to support heavy loads over weak soil

d) Enhanced architectural flexibility

Answer: c) Ability to support heavy loads over weak soil
Explanation: Grillage foundations consist of multiple layers of beams arranged in a grid pattern, providing significant load-bearing capacity and distributing the load over a larger area, making them suitable for supporting heavy loads over weak or variable soil conditions.

8. In column design, what role does a gusset plate play in a gusseted base?

a) It provides additional vertical support to the column.

b) It connects the column to the foundation and provides lateral stability.

c) It increases the aesthetic appeal of the column.

d) It serves as a load-bearing member in the foundation.

Answer: b) It connects the column to the foundation and provides lateral stability.
Explanation: A gusset plate is a steel plate used to connect the column to the foundation in a gusseted base. It not only transfers the load from the column to the foundation but also enhances lateral stability by resisting horizontal forces.

9. Which type of column base is relatively easier to construct?

a) Slab base

b) Gusseted base

c) Grillage foundation

d) They are all equally complex to construct.

Answer: a) Slab base
Explanation: Slab bases are generally simpler to construct compared to gusseted bases and grillage foundations, as they involve pouring concrete to form a flat base directly on the ground surface.

10. What is the primary purpose of a grillage foundation?

a) To increase the height of the column

b) To provide lateral stability to the column

c) To distribute the load of the column over a larger area

d) To resist axial compression in the column

Answer: c) To distribute the load of the column over a larger area
Explanation: Grillage foundations are designed to spread the load from the column over a larger area of the underlying soil, reducing the pressure on the soil and preventing excessive settlement.