

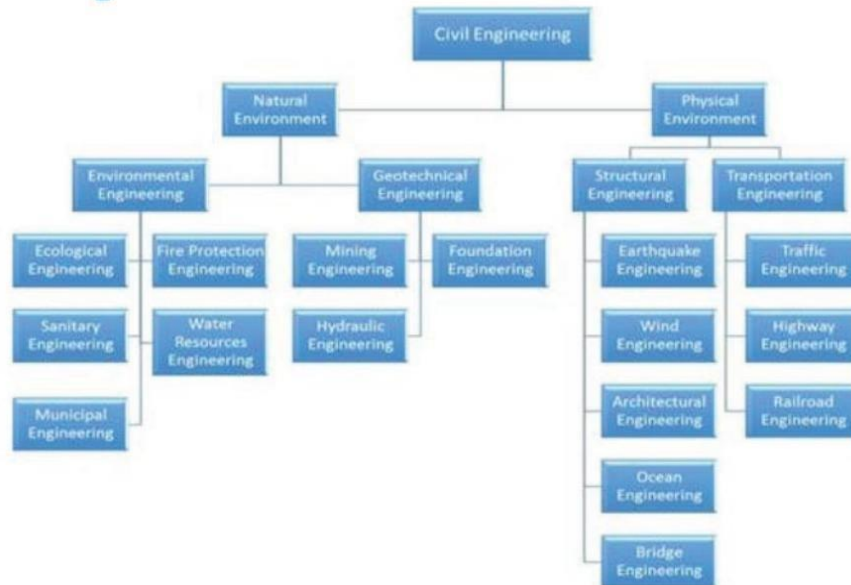
Civil Part

UNIT I – OVERVIEW OF CIVIL ENGINEERING

1. What a civil engineer do?

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including works like roads, bridges, canals, dams, and buildings

2. What are the sub disciplines of civil engineering?



3. What is the role of a structural engineer?

Structural engineering is concerned with the structural design and structural analysis of buildings, bridges, towers, flyovers (overpasses), tunnels, off shore structures like oil and gas fields in the sea, aero structure and other structures. This involves identifying the loads which act upon a structure and the forces and stresses which arise within that structure due to those loads, and then designing the structure to successfully support and resist those loads.

4. What is the role of civil engineers in the society?

Specialists of civil engineering are the main reason behind the beautifying of a society. Even if we look back a few years we will be able to find that the beautiful structures that are currently standing proudly in our midst were not their decades before. This was basically because civil engineering and experts of this field were not much in demand then. One other reason for the rise in demand of civil engineers is the increase in the number of construction sites. In this article we are going to talk about how and why civil engineering is important to the society and what its contributions to the world are.

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5. What does a water resources engineer do?

Water resources engineering is concerned with the collection and management of water (as a natural resource). As a discipline it therefore combines hydrology, environmental science, meteorology, geology, conservation, and resource management. This area of civil engineering relates to the prediction and management of both the quality and the quantity of water in both underground (aquifers) and above ground (lakes, rivers, and streams) resources.

1. Define Surveying.

Surveying is the art of determining the relative position of points on above or beneath the surface of the earth by means of direct or indirect measurements of distances, direction and elevation.

2. What is meant by Objectives of Surveying?

- ✓ *The data obtained by surveying are used to prepare the plan or map showing the ground features.*
- ✓ *When the area surveyed is small and the scale to which its result plotted is large, and then it is known as Plan.*
- ✓ *When the area surveyed is large and the scale to which its result plotted is small, then it is called as a Map.*
- ✓ *Setting out of any engineering work like buildings, roads, railway tracks, bridges and dams involves surveying.*

3. Define Plane Surveying)

- ✓ *The surveying where the effect of curvature of earth is neglected and earth"s surface is treated as plane, is called surveying.*
- ✓ *The degree of accuracy in this type of surveying is comparatively low.*
- ✓ *Generally when the surveying is conducted over the area less than 260 Sq.Km they are treated as plane surveying.*

4. Define Geodetic Surveying

- ✓ *The effect of curvature is taken into account.*
- ✓ *It is also known as "Trigonometrical Surveying".*
- ✓ *It is a special branch of surveying in which measurements are taken with high precision instruments.*
- ✓ *Calculations are also made with help of spherical trigonometry.*
- ✓ *It is generally adopted by the Great Trigonometrical Survey Department of India".*

5. Mention the Classification of surveying:

- ✓ *Chain Surveying*
- ✓ *Compass Surveying*
- ✓ *Theodolite surveying*

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- ✓ *Plane Surveying*
- ✓ *Tachometric Surveying*

6. What are the primary types of surveying?

1. *Plane surveying*
2. *Geodetic surveying*

7. State any two types of cement and concrete.

Types of cement

1. *Ordinary Portland cement*
2. *Rapid hardening cement*

Types of concrete

- ✓ *The bearing of lines measured from the North is called Whole Circle Bearing.*
- ✓ *The angle is reckoned in the clockwise direction from 0° coinciding with the north.*

11. Define fore bearing and back bearing:

- ✓ *Every line has two bearing namely fore bearing and back bearing*
- ✓ *Fore bearing is the bearing taken in the direction of surveying and back bearing is the bearing taken in the reverse direction.*

12. Distinguish between the fore bearing and the back bearing should be 180°.

- ✓ *It means that one or both stations of the line are subjected to local attraction.*
- ✓ *Thus, local attraction is the influence caused on the measured bearings of lines due to the presence of materials like railway track, current carrying wires or cables, etc.,*

13. Define Leveling.

- ✓ *It is a surveying method used to determine the level of points / objects with reference to the selected datum.*
- ✓ *It is also used to set out engineering works.*

14. Define Back Sight.

- ✓ *It is the reading taken on the staff held at a point, the elevation of which is known already. It is useful to know the new height of the instrument.*

15. Define Foresight.

- ✓ *It is the reading taken on the staff held at a point of unknown elevation. From, F.S., the height of the line of instrument above the point can be obtained. It is useful to find the elevation of the point.*

16. Write the arithmetic equation used in rise and fall method of leveling.

$$\sum B.S - \sum F.S = \sum Rise - \sum Fall = Last R.L - First R.L.$$

17. What are the constituent materials of bricks?

1. *Alumina*
2. *Silica*
3. *Lime*
4. *Oxide of Lime*

5. *Magnesia*

18. What are the uses of stones in building construction?

- ✓ *Stones are used to cover floor of buildings of various types such as residential, commercial, industrial etc.*
- ✓ *Stones are also used as ballast for railway track*
- ✓ *Stones are used as flux in blast furnace.*

19. Mention some important building stones in India?

- ✓ *Granite*
- ✓ *Sand*
- ✓ *Lime stone*
- ✓ *Marble.etc*

20. What are the four distinct operations of brick manufacturing?

- ✓ *Preparation of brick earth*
- ✓ *Moulding of bricks*
- ✓ *Drying of bricks*
- ✓ *Burning of bricks*

21. How bricks are classified?

Bricks are classified on the basis of method of manufacturing as

i) Unburnt or sundried bricks

ii) Burnt bricks

a) First class bricks

b) Second class bricks

c) Third class bricks

d) Fourth class bricks

22. List – out the uses of bricks.

- ✓ Bricks are mainly used for the construction of walls in residential and industrial structures
- ✓ Bricks when moulded in the shape of gutter can be used as drains.
- ✓ Sand – lime bricks are used for ornamental works.

23. State the characteristics of good bricks.

- ✓ Bricks should have uniform copper colour.
- ✓ Bricks should not absorb water more than 20% by weight when immersed in water for 24 hours.
- ✓ Bricks should have even surface with sharp and square edges.

24. What is frog in bricks?

A „Frog“ is a mark of about 10 mm to 20 mm which is placed on the raw brick during moulding. This serves two purposes as i) Indicates the trade name of the manufacturer. ii) It affords a key for mortar when the next brick is placed over it.

25. What are the raw materials used for the manufacturing of cement?

- ✓ Lime (CaO) - 62%
- ✓ Silica (SiO₂) - 22%
- ✓ Alumina - 5%
- ✓ Calcium Sulphate 4%
- ✓ IronOxide- 3%
- Magnesia - 2%
- ✓ Sulphar - 1%
- ✓ Alkalies - 1%

26. List the uses of cement.

✓

- i) Cement is used for preparation of foundations, foot paths etc.
- ii) Cement is used for manufacture of precast pipes, piles, fencing posts etc.
- iii) Cement mortar is used for masonry work, plastering, pointing etc.

27. State the various types of cement.

- i) Quick setting cement
- ii) Low heat cement
- iii) High alumina cement
- iv) Acid resistant cement.

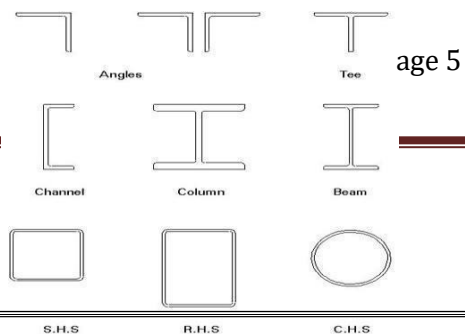
28. State the various properties of good cement.

- i) The colour of cement should be uniform
- ii) Cement should be free from lumps
- iii) If a small quantity of cement is thrown in to a bucket of water, it should sink

29. List down the commercial forms of steel sections used in the construction.

- ✓ Round bars
- ✓ Square bars
- ✓ Plates

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- ✓ Flat bars
- ✓ Angle sections
- ✓ Channel sections

30. What is meant by contouring and its methods?

Contouring in surveying is the determination of elevation of various points on the ground and fixing these points of same horizontal positions in the contour map.

Methods of Contour Surveying

*There are two methods of contour surveying:
Direct method and Indirect method.*

31. List out the characteristics of contouring.

- The contours maps have the following characteristics:*
1. *Contour lines must close, not necessarily in the limits of the plan.*
 2. *Widely spaced contour indicates flat surface.*
 3. *Closely spaced contour indicates steep ground.*
 4. *Equally spaced contour indicates uniform slope.*
 5. *Irregular contours indicate uneven surface.*

32. Write any four uses of contour map?

Contour maps are extremely useful for various engineering works:

1. *A civil engineer studies the contours and finds out the nature of the ground to identify. Suitable site for the project works to be taken up.*
2. *By drawing the section in the plan, it is possible to find out profile of the ground along that line. It helps in finding out depth of cutting and filling, if formation level of road/railway is decided*
3. *Intervisibility of any two points can be found by drawing profile of the ground along that line.*
4. *The routes of the railway, road, canal or sewer lines can be decided so as to minimize and balance earthworks.*
5. *Catchment area and hence quantity of water flow at any point of river can be found. This study is very important in locating bunds, dams and also to find out flood levels.*

33. What is meant by Contour Interval?

A contour interval in surveying is the vertical distance or the difference in the elevation between the two contour lines in a topographical map.

UNIT II - BUILDING COMPONENTS

1. Define Objectives of foundation.

- ✓ *To distribute the total load coming on the structure on a larger area*
- ✓ *To support the structures*
- ✓ *To give enough stability to the structure against various disturbing forces, such as wind and rain.*

2. What is meant by Deep foundation?

Deep foundation consists of pile and pier foundation. Pier foundations are rarely used

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for buildings. This consists in carrying down through the soil a huge masonry cylinder which may be supported on solid rock.

3. Which types of Failures occur in foundation?

1. *Unequal settlement of soil*
2. *Unequal settlement of masonry*

4. Define Superstructure.

- ✓ *Superstructure mainly consists of walls, doors windows and lintels.*
- ✓ *The purpose of superstructure is to provide the necessary utility of the building, structural safety, fire safety, sanitation and ventilation.*

5. What are the different types of dam?

1. Rigid Dams

- ✓ *Solid gravity dam*
- ✓ *Arch Dam*
- ✓ *Buttress dam*
- ✓ *Timber*
- ✓ *Steel dam*

2. Non rigid dams.

- ✓ *Earth Dams*
- ✓ *Rock fills dams.*

6. What are the different types of bridges?

- ✓ *Permanent bridges*
- ✓ *Back bridges*
- ✓ *Through bridges*
- ✓ *Semi through bridges*
- ✓ *Straight bridges*
- ✓ *Skew bridge*
- ✓ *Arch Bridge*
- ✓ *Slab Bridge*
- ✓ *T beam and slab bridge*
- ✓ *Bow string and girder bridge*
- ✓ *Steel Arch bridge*

7. What is concrete?

- ✓ *Concrete is defined as a binding material obtained by mixing cement, fine and course aggregates and water in suitable proportions. The resultant plastic mixture after curing becomes hard mass.*

8. List out the properties of cement concrete.

- ✓ *It is plastic when freshly prepared and can be moulded to any shape.*

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- ✓ *Concrete does not lose its strength with age and does not require maintenance.*
- ✓ *It is durable and not affected by weather.*

9. State the various uses of cement concrete.

- ✓ *Concrete is mainly used in the construction of foundations, columns, floors, roof slabs, beams, lintels, water tanks, sumps etc...*
- ✓ *Concrete is used in massive structures such as dams and bridges. i) Concrete is used in the construction of bunkers, silos etc.*

10. List out the few types of special Cement concrete.

- i) *No- fines concrete*
- ii) *Pre-cast concrete*
- iii) *Fibre reinforced concrete*
- iv) *Pre stresses concrete*

11. What is meant by water cement ratio?

The ration of weight of water used to that of cement is termed as water cement ratio. Water cement ratio depends upon the strength and workability desired and method of compaction.

12. Why are steel rods used in Reinforced Cement Concrete?

Concrete is good in compression and weak in tension. To take all the tension forces steel rods are used in concrete.

13. Define curing of concrete.

The finished concrete surface should be kept wet for at least 7 days to promote continued hydration of cement. This is called curing of concrete.

14. What is meant by 1:2:4 concrete mixes?

In 1:2:4 concrete mix, the materials are measured by the mass like 1 part of cement, 2 parts of fine aggregate 9 sand and 4 parts of course aggregate.

15. How to select the site for foundation?

- ✓ *Soil at the building site should not be of artificially made- up type.*
- ✓ *Site should not be undulating since this leads to increase in cost for leveling the ground.*
- ✓ *The site should have its general slope and the ground water table in the site should not be high.*

16. Define the terms: Bearing capacity, Ultimate bearing capacity and Safe bearing capacity?

- ✓ *Bearing capacity: It is defined as the maximum load per unit area which the soil will resist safely without displacement.*
- ✓ *Ultimate bearing capacity: It is the gross pressure intensity at the base of the foundation at which the soil fails in shear.*
- ✓ *Safe bearing capacity: It is the maximum pressure which the soil can carry safely*

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without risk of shear failure.

17. How to improve the bearing capacity of soil?

(May/Jun 2016)

- ✓ *By increasing depth of foundation*
- ✓ *By cement grating*
- ✓ *By draining the subsoil water*
- ✓ *By compacting the soil*

18. What are the loads acting on foundation?

- ✓ *Live load*
- ✓ *Dead load*
- ✓ *Wind load*

19. List out the requirements of a good foundation?

The foundation should be so located that it is able to resist any unexpected future influence which may adversely affect its performance

20. Mention the types of foundation?

(Apr/May 2015)

Foundations are classified in to two types depends on the depth as

- i) Shallow foundation*
- ii) Deep foundation*

Shallow foundations are those in which the depth is equal to or less than its width.

When the depth is more than the width, it is termed as a deep foundation.

21. Mention the different types of shallow foundation?

- ✓ *Isolated column footing*
- ✓ *Wall footing*
- ✓ *Combined footing*
- ✓ *Cantilever footing*
- ✓ *Continuous footing*
- ✓ *Inverted arch footing*
- ✓ *Stepped footing*

22. List out the different types of bond in brick masonry? *(May/Jun 2014) (Nov/Dec 2014)*

- ✓ *English bond,*
- ✓ *Flemish bond,*
- ✓ *Stretching bond,*
- ✓ *Heading bond,*
- ✓ *Garden wall bond,*
- ✓ *Facing bond,*
- ✓ *Raking bond,*
- ✓ *Dutch bond.*

23. Mention the different types of deep foundation?

(Apr/May 2015)

- ✓ *Pile foundation*
 - ✓ *Pier foundation*
-

[BASIC CIVIL AND MECHNAICAL ENGINEEIRNG]

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- ✓ *Well foundation*

24. What are the causes of failure of foundation?

- i) *Unequal settlement of the sub-soil*
- ii) *Shrinkage of the sub-soil due to the variations in the depth of water table*
- iii) *Sudden earthquake and heavy rains*

25. What are the remedial measures for the failure of foundation?

- ✓ *Foundation should be taken down to a depth where no ground water movement occurs.*
- ✓ *The soil moisture content is maintained constant.*
- ✓ *The sides of the foundation should be protected by proper drainage.*

26. Write down a purpose of a dam.

- ✓ *To store and control the water for irrigation*
- ✓ *To store and divert the water for domestic uses*
- ✓ *To supply water for Industrial uses*
- ✓ *To develop hydroelectric power plant to produce electricity*
- ✓ *To increase water depths for navigation*
- ✓ *To create storage space for flood control*
- ✓ *To preserve and cultivate the useful aquatic life.*

Part – B

UNIT I – OVERVIEW OF CIVIL ENGINEERING

1. Explain about the different branches of civil engineering?
2. How civil engineers contribute to the society?

1. Summaries the principles of surveying. (May/June 2009) (Apr/May 2015)
2. Explain the various types of bricks based on quality. (May/June 2009)
3. Describe the different types of cement. Explain their properties and uses. (May/June 2010)
4. Describe the tests conducted on building bricks. (May/June 2014)
5. Classify the various types of surveying and explain any two. (Nov/Dec 2012)
6. What are the sources of sand? State the properties of good sand. (Nov/Dec 2012)
7. What are the requirements of a good building stone? List out the various uses of stones. (Nov/Dec 2009) (Apr/May 2015)
8. Sketch any four steel sections that are commonly used in civil engineering. (Nov/Dec 2012)
9. What are the ingredients of cement? State the functions of the ingredients. What are the requirements of good cement? (Apr/May 2011)
10. What is cementing concrete and what are the tests carried out in cement concrete? (Apr/May 2015)
11. Describe the different types of concrete. (Nov/Dec 2014)

UNIT II - BUILDING COMPONENTS

1. What are the requirements of good foundation?
2. Explain in detail about the functions of various masonry works.
3. What are methods of improving bearing capacity of soil?
4. Explain the following terms:
(1) Internal and external forces (2) Stress and strain (3) Modulus of elasticity.
5. Describe with neat sketches:
(i) Anyone type of shallow foundation and (ii) Pile foundation.
6. (b) Describe with neat sketches
(i) Arch culvert and (ii) T Beam and Slab Bridge.
7. With the help of sketches, briefly explain the Random rubble masonry.
8. Distinguish between 'Un coursed rubble masonry' and 'Coursed rubble masonry'.
9. Explain with neat sketches: (1) Rock fill Dam, (2) Gravity Dam and (3) Arch Dam.
10. Explain briefly the various types of foundations.
11. What is meant by roof? Explain any two types of roofs.

******All the best******

