

II YEAR

**Civil Engineering
CE1201**

**CONSTRUCTION MATERIALS
(Two Mark Question and Answers)**

PART - A

1. What is a stone?

The stone is always obtained from rock. The rock quarried from quarries is called stone. Quarried stone may be in the form of stone blocks, stone aggregate, stone slabs, stone lintels etc.

2. How are rocks classified?

The rocks may be classified in the following 4 ways.

- i. Geological classification
- ii. Physical classification
- iii. Chemical classification

3. What are the geological classification of rocks?

- i. Igneous rocks
- ii. Sedimentary rocks
- iii. Metamorphic rocks

4. What are the physical classification of rocks?

- i. Stratified rocks
- ii. Unstratified rocks
- iii. Foliated or laminated rocks

5. What are the chemical classification of rocks?

- i. Silicious rocks
- ii. Argillaceous rocks
- iii. Calcareous rocks

6. How are igneous rocks classified?

Volcanic igneous rocks	eg. Basalt
Hypabyssal rocks	eg. Dolerite
Plutonic rocks	eg. Granite

7. Give some examples of sedimentary rocks.

Sand stone, limestone, Lignite, slate and shale

8. Give some examples of metamorphic rocks.

Marble, Laterite, Gneiss

9. Give some examples of silicious, argillaceous and calcareous rocks.

Silicious rocks	- Granite, quartzite, trap, basalt, sand stone
Argillaceous rocks	- Laterite, slate
Calcareous rocks	- Limestone, marble, dolomite, kankar

10. Name some hard and soft rocks.

Hard rocks	- Granite, basalt, trap gravel, quartzite
Soft rocks	- Talc, gypsum, sandstone, slate

11. What are rock forming minerals?

Chemically the rocks are composed of mineral earths, alkalies, oxides of iron and manganese etc. Silica (SiO_2), alumina (Al_2O_3), lime (CaO), and magnesia (MgO) are the mineral earths, which are usually found in rocks in one form or the other. Soda (Na_2O) and potash (K_2O) are the usual alkalies present in the rocks.

12. What is meant by texture of rocks?

The way the particles of rock forming minerals, are arranged in the rocks is termed as texture or structure of the rock.

13. What are the different forms of texture of the stone?

Compact crystalline, Granular crystalline, Conglomerate, Glass texture, Foliated texture, Porous granular, Vesicular texture

14. What are the types of fracture of rocks?

- i. Uneven
- ii. Even
- iii. Conchoidal
- iv. Fibrous

15. What are the uses of stone?

- For masonry work
- For lintels and vertical columns
- For covering floors and buildings
- For paving of roads and footpaths
- As an aggregate in cement as well as lime concretes.

16. What is known as natural bed of stone?

The rocks particularly sedimentary type, have distinct plane of division along which stones can be easily split. The plane along which stones can be easily split is known as natural bed of stone.

17. What are the various tests for stones?

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|------------------------------|----------------------------|
| 1. Smith's test | 6. Microscopic examination |
| 2. Freezing and thawing test | 7. Impact test |
| 3. Frost action test | 8. Attrition test |
| 4. Acid test | 9. Crushing test |
| 5. Water absorption test | 10. Hardness test |

18. What are the causes for deterioration of stones?

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|--------------------------------|---------------------|
| 1. Temperature variation | 6. Vegetable growth |
| 2. Wetting and drying of stone | 7. Rain water |
| 3. Frost action | 8. Wind |
| 4. Polluted atmosphere | 9. Water |
| 5. Living organisms | 10. Chemicals |

19. What is an artificial stone?

Cast stone or artificial stone is nothing, but hardened plain cement concrete,

moulded in suitable shape and size. Artificial stone consists of 1.5 parts of coarse aggregate of size 3mm to 6mm and 1.5 parts of coarse aggregate of size less than 3mm.

20. What are the advantages of artificial stones?

- They can be cast in any shape and size.
- They can be made stronger than natural stone.
- They can be easily moulded and seasoned at the site of work.
- They do not require any dressing.
- They can be designed for any strength.

21. What is meant by stone quarrying?

The site from where stones are excavated is known as quarry or quarry site. The process of taking out stones from quarry is known as quarrying of stone.

22. What are the methods of quarrying stones?

1. Digging or excavating
2. Heating
3. Wedging
4. Blasting

23. What is meant by dressing of stones?

Stones obtained from quarry are in irregular sizes and shapes and cannot be used as such in masonry work, without dressing. Dressing of stones is a process, carried out with the help of hand tools, to give proper shape and surface to the stone, before its use in masonry or any other work.

24. What is the purpose of dressing of stones?

- To get the appearance of stone masonry
- To suit the requirements of stone masonry
- To make the transportation of stone easy and economical from the quarry.

25. What are the various operations of blasting?

- Boring or drilling of holes
- Charging of the holes with explosive
- Tamping of the holes with clay
- Firing

26. Name some blasting materials.

Detonators

Fuse

Explosives – Gun powder, Dynamite, Gun cotton, Cordite, Blasting gelatin

27. Define plastering.

Plastering is an art of covering rough walls and uneven surfaces in the construction of houses and other structures with a plastic composition called plaster. In order to obtain an even, smooth, regular and clean surface of ceilings and walls, a thin covering of plastic mortar is applied on the surfaces. This thin covering is known as plastering.

28. What are the ingredients of a good brick earth?

A good brick earth mainly consists of silica (sand), alumina (clay), lime, oxide of iron and magnesia.

29. What are the classification of bricks?

1. First class bricks
2. Second class bricks
3. Third class bricks
4. Over burnt or Jhama bricks
5. Under burnt or pilla bricks

30. What is the crushing strength of first class bricks?

The crushing strength of first class brick is 10.5 N/mm^2 .

31. What is the crushing strength of second class bricks.

The crushing strength of second class brick is 7.5 N/mm^2 .

32. What are class A and class AA bricks?

Bricks having a compressive strength 14 N/mm^2 are called class A bricks and those having a compressive strength between 7 N/mm^2 and 14 N/mm^2 are called class AA bricks.

33. What is the standard size of a brick?

19cm x 9cm x 9cm.

34. What is meant by pugging or tempering of clay?

Pugging or tempering of clay means breaking up of prepared clay, watering and kneading till the earth becomes a homogeneous mass.

35. What are the methods of moulding of bricks?

1. Hand Moulding - Ground moulded and table moulded bricks
2. Machine Moulding - Plastic clay method, Dry pressed clay method

36. What are the objects of drying the bricks?

- To remove moisture from the bricks so as to save time and fuel during the burning
- To avoid the chances of cracking and distortion of bricks during the burning
- To increase the mechanical strength of bricks.

37. What is the purpose of burning of bricks?

Burning imparts strength and hardness to the bricks and makes them dense and durable.

38. Name the types of kilns used for burning bricks.

Intermittent kiln and continuous kiln

39. What is meant by 'frog'.

Frog is a depression of about 1 to 2 mm in depth made on the face of bricks during moulding.

40. What are the functions of frog.

1. The mortar accumulated in the frog forms a very good key for the subsequent course of brick above it.
2. Manufacturers generally engrave their trade name in the frog which causes a very good advertisement of the firm, manufacturing the bricks.

41. What are called 'pazawah'.

Clamps which are used for burning of bricks are also called pazawah'.

42. What are the tests for bricks?

- | | |
|---------------------------|--|
| 1. Absorption test | 4. Shape and size test |
| 2. Crushing strength test | 5. Soundness test |
| 3. Hardness test | 6. Test for presence of soluble salts. |

43. What is meant by surkhi?

Surkhi is fine powdered under burnt bricks. It is also known as artificial pozzolona

44. What are pozzolonas?

These are silicious materials which, while having no cementitious values within themselves, will chemically react with calcium hydroxide at ordinary temperature and in the presence of moisture to form compounds possessing cementitious properties.

45. Name any 2 natural pozzolonas.

Clay and shales, opalinc cherts, diatomaceous earth, volcanic tuffs and pumicites.

46. Name any 2 artificial pozzolonas.

Surkhi, flyash, blast furnace slag, silica fume, rice husk ash, metakaoline.

47. What are refractory bricks?

The term refractory is used to indicate the materials which are able to withstand the effects of high temperatures, without affecting the structural strength of the material, by appreciable amount. These

48. What is meant by fire clay?

Fire clay is a form of refractory material.

49. What are fire bricks?

Bricks made from fire clay are known as fire bricks. These bricks are manufactured from specially designed earth, so that after burning they may withstand very high temperatures without affecting its shape, size and strength. These bricks are used for lining of chimneys, furnaces etc.

50. Name the types of fire bricks?

Acidic fire bricks – Fire bricks, silica bricks

Basic fire bricks – magnesite bricks, dolomite bricks, bauxite bricks

Neutral fire bricks - chrome bricks, chrome magnesite bricks, spinal bricks, forsterite bricks.

51. Define calcination.

The process of heating the limestone to redness in the presence of atmospheric air is

known as calcination.

52. What is Quick lime.

The lime obtained from the calcinations of pure limestone is known as quick lime.

53. What is known as setting of lime.

When lime converted to paste form is exposed to atmosphere, it gradually hardens. This phenomenon of slow hardening of lime in exposed conditions is known as setting of lime.

54. What is meant by slaking.

Quick lime has very large affinity for moisture. Adding water in sufficient quantity to quick lime is known as slaking. When water is added to quick lime, it swells and cracks. Lot of heat is also generated during slaking and quick lime gets converted into hydrated lime or calcium hydrate.

55. Define slaked lime.

The product obtained by slaking of quick lime is known as slaked lime or hydrated lime.

56. Define the term hydraulicity.

It is the property due to which the lime sets in damp places or under water or in thick masonry walls, here there is no free access of air. Hydraulicity is due to the crystallizing power of the aluminate and the silicate of lime.

57. What are the constituents responsible for producing hydraulicity in lime.

Clay, soluble silica, carbonate of magnesia, alkalies and metallic oxides and sulphate.

58. What are the classification of lime.

1. Fat lime
2. Hydraulic lime
3. Poor lime

59. What are the varieties of lime.

1. Stone lime – It is almost pure lime.
2. Kankar lime – It is impure or adulterated lime.
3. Shell lime – It is purest form of lime.

60. Define fat lime.

This lime is obtained by burning comparatively pure limestone or by slaking quick lime is known as fat lime. This lime is also sometimes known as **pure lime, rich lime, white lime or high calcium lime.**

61. What are the uses of fat lime?

1. For white washing
2. For plastering
3. Its mortar with sand may be used for thin masonry works
4. Its mortar with surkhi develops good setting and hydraulic properties.

62. Define hydraulic lime.

This lime has the property of setting under water. It is obtained by burning lime stone,

containing lot of clay and other substances which develop hydraulicity. Hydraulicity of this lime depends upon the amount of clay and type of clay present in it.

63. Define poor lime.

This lime contains more than 30% clay. It slakes very slowly. It does not dissolve in water. It forms a thin plastic paste with water. This lime is also known as **lean lime or impure lime**.

64. What are the classification of lime according to I.S. 712-1984.

Class A lime, Class B lime, Class C lime, Class D lime, Class E lime, Class F lime

65. What is natural cement.

Natural cement is manufactured by burning and then crushing the natural cement stones. Natural cement stones are such stones which contain 20 to 40% of argillaceous matter i.e. clay, and remaining content mainly calcareous matter which is either calcium carbonate alone or a mixture of calcium carbonate and magnesium carbonate.

66. What is artificial cement.

Artificial cement is manufactured by burning approximately proportioned mixture of calcareous and argillaceous materials at a very high temperature and then grinding the resulting burnt mixture to a fine powder.

67. What is the function of gypsum in the manufacture of cement.

In order to delay the setting action of cement, when mixed with water, a little percentage of gypsum is added in the clinker before grinding them to fine powder.

68. What is known as clinker.

Artificial cement is manufactured by burning approximately proportioned mixture of calcareous and argillaceous materials at a very high temperature and then grinding the resulting burnt mixture to a fine powder. The burnt mixture of calcareous and argillaceous matter is known as clinker.

69. What are the constituents of ordinary cement.

Alumina or clay, silica, lime, iron oxide, magnesia, sulphur trioxide, alkalies, calcium sulphate (gypsum).

70. What are the harmful constituents of cement.

Alkalies which are oxides of potassium and sodium, and magnesium oxide are the harmful constituents of cement.

71. What are ball mills.

Ball mills are used for grinding the clinkers. The ball mills consist of 2 to 2.5m diameter steel cylinder. The clinkers to be ground are fed into the cylinder and the cylinder is rotated about its horizontal axis to carry out the grinding action.

72. What are the types of cement.

Ordinary portland cement, rapid hardening cement, low heat cement, blast furnace slag

cement, sulphate resistant cement, air entraining cement, white and coloured cement, high alumina cement, pozzolanic cement, super sulphate cement, expansive cement, quick setting cement, water repellent cement, water proofing cement.

73. What are the 2 methods of manufacture of cement

1. Dry process
2. Wet process

74. Define mortar.

The mortar is a paste like substance prepared by adding required amount of water to a dry mixture of sand or fine aggregate with some binding material like clay, lime or cement.. I

75. Define lime mortar.

If lime is used as a binding material, the resulting mortar is known as lime mortar.

76. Define mud mortar.

When clay is used as a binding material, the resulting mortar is known as mud mortar

77. What is known as bulking of sand?

Bulking of sand means increase in its volume. Fine aggregates or sands, increase in volume when they possess some moisture. Bulking is due to formation of a thin film of water around the fine aggregate or sand particles. Thickness of water film goes on increasing with more and more moisture and consequently increase in volume continues. But after certain percentage of water, volume of sand starts decreasing with increasing amount of water. At certain percentage of water, increase in volume completely vanishes and volume occupied by sand becomes equal to the volume of dry sand.

78. What are the types of mortars?

1. Mud mortar
2. Lime mortar
3. Gauged mortar

79. What is meant by grading of aggregates?

Grading of aggregate means particle size distribution of the aggregate. If all the particles of an aggregate were of one size, more voids will be left on the aggregate mass. Properly graded aggregate produces dense concrete and needs smaller quantities of fine aggregate and cement.

Grading determines the workability of the mix, which controls segregation, bleeding, water-cement ratio, handling, placing, and other characteristics of the mix.

80. What are the methods of proportioning of concrete mixes?

1. Arbitrary standard method
2. Minimum voids method
3. Fineness Modulus method
4. Maximum density method

81. Define Abram's water cement law.

According to Abram's water cement law, the strength of concrete depends on the water cement ratio used.

82. Define bleeding.

The tendency of water to rise to the surface of freshly laid concrete is known as bleeding.

83. Define laitance.

The water rising to the surface during bleeding carries with it, particles of sand and cement, which on hardening form a scum layer known as laitance.

84. What are the steps adopted to control bleeding.

- By adding more cement
- By using more finely ground cement
- By using little air entraining agent
- By increasing finer part of fine aggregate
- By properly designing the mix and using minimum quantity of water.

85. Define Segregation.

The tendency of separation of coarse aggregate grains from the concrete mass is called segregation.

86. What are the methods adopted to avoid segregation of concrete.

1. Addition of little air entraining agents in the mix.
2. Restricting the amount of water to the smallest possible amount.
3. Concrete should not be allowed to fall from larger heights.

87. Define workability.

Workability is that property of concrete which determines the amount of internal work necessary to produce full compaction. It is a measure with which concrete can be handled from the mixer stage to its final fully compacted stage.

88. What are the factors affecting workability.

1. Quantity of water in the mix
2. Proper grading of the aggregate mix
3. Ratio of fine aggregate and coarse aggregate
4. Maximum size of coarse aggregates
5. Method of compaction of concrete

89. What are the factors affecting proportioning of concrete mixes.

1. Water cement ratio
2. Cement content
3. Temperature
4. Age of concrete
5. Size, shape and grading of aggregate
6. Curing

90. Define mixing of concrete.

The process of mixing cement, water, fine aggregate and coarse aggregate in suitable proportion is known as mixing of concrete.

91. What are the methods of consolidation or compaction of concrete.

1. Hand compaction

2. Machine compaction – i) Internal vibrators
ii) Form vibrators
iii) Surface vibrators

92. Define curing of concrete.

Curing is the operation by which moist conditions are maintained on finished concrete surface, to promote continued hydration of cement .

93. What are admixtures.

Admixtures are ingredients other than cement, fine aggregate and coarse aggregate to improve the quality of concrete. The addition of an admixture may improve the concrete with respect to its strength , hardness, workability, water resisting power etc.

94. Name the types of joints in concrete.

- | | |
|------------------------|---------------------|
| 1. Construction joints | 2. Expansion joints |
| 3. Contraction joints | 4. Working joints |

95. What are the types of concrete used.

Plum concrete, light weight concrete, air-entrained concrete, no-fines concrete, vacuum concrete, water-proof concrete, reinforced cement concrete, pre-stressed concrete, cellular or aerated concrete, foamed concrete, pre-cast concrete.

96. What is timber?

Timber is obtained from trees. Timber denotes structural wood

97. What is standing timber?

A standing living tree is known as standing timber.

98. What is rough timber?

When tree has been cut and its stem and branches are roughly converted into pieces of suitable lengths, it is known as rough timber.

99. What is converted timber?

When roughly converted timber is further sawn and converted into commercial sizes such as planks, logs, battens, posts, beams, etc, it is called converted timber.

100. What is conversion of timber?

The process by which timber is cut and sawn into suitable marketable sizes is known as conversion of timber.

101. Define seasoning of timber?

A freshly felled tree contains lot of moisture which is usually in form of sap. The excess of moisture have to be removed, before timber can be used for any structural purposes. The process of removing excess surplus moisture from freshly converted timber is known as seasoning of timber.

102. Name some common diseases of timber.

1. Dry rot
2. Wet rot

103. What are the methods of seasoning of timber.

Natural seasoning

Artificial seasoning – Water seasoning, boiling seasoning, kiln seasoning, chemical seasoning, electrical seasoning.

104. What is meant by distempering.

It is a process of applying wash or coating like white-washing or colour washing on the surface.

105. What is meant by varnish?

Varnish is a solution of some resinous substance in alcohol, oil or turpentine. The process of covering the surface with varnish is known as varnishing. Varnishing is done on wooden surface.

106. What are the constituents of the varnish?

1. Resinuous material
2. Driers
3. Solvents

107. What are the constituents of oil paints?

A base, an inert extender or filler, a vehicle or carrier, a drier, a solvent or thinner, a colouring pigment.

108. Name some of the clay products used in building construction.

Bricks, tiles, terra-cotta, stoneware, earthen ware, porcelains etc.

109. Define glazing.

It is a process of covering the earthen ware, stone ware and porcelain products with an impervious film of glaze. It is a glassy coat of about 0.1 to 0.2 mm thickness, applied on the surface and then fused into the product by burning at high temperature.

110. Define pointing.

In pointing, only joints of masonry walls are treated and filled with lime or cement mortar. In case of cement mortar pointing, ratio of mortar may be 1:2 to 1:3.

PART - B

1. Give the main classification of rocks. Explain each classification in brief.
2. What are the various tests conducted to test the suitability of stones for structural use.
3. What are the factors affecting the durability of a good building stone.
4. What are the causes of decay of stones.
5. What are the methods of preservation of stone.
6. What are the constituents of a good brick earth ? State the harmful ingredients in brick earth.
7. What are the classification of bricks. Explain each type with their properties.
8. Explain the various operations in the manufacture of bricks.
9. Explain the working of Hoffman's kiln in the burning of bricks.
10. What are the tests conducted to confirm the suitability of a good brick.
11. Enumerate the properties and uses of lime.
12. Explain the laboratory tests for cement.
13. Explain with the help of a neat sketch, the dry process of manufacture of ordinary cement.
14. Explain with the help of a neat sketch, the wet process of manufacture of ordinary cement.
15. What do you understand by bulking of sand. Explain its importance in relation to mortar.
16. What are the methods of proportioning of concrete mixes.
17. Explain the various properties of cement concrete.
18. Define the term workability. What are the various tests conducted to determine the workability of concrete and explain them.
19. Explain the types of cement concrete used.
20. What do you understand by the term grading of aggregates. What importance this term carries as far as design of concrete mix is concerned.
21. Define seasoning of timber. Explain the methods of seasoning of timber.
22. What are the methods of preservation of timber.
23. What are the commercial forms of timber.
24. How colouring is imparted in paints and name the colouring pigments used.
25. What are the commercial forms of glass.
26. Explain fibre reinforced plastic and their types.
27. How is fly ash obtained. What are the practical applications of fly ash.

- Refer Class Notes