

Writing Space

Sub:- Building materials and construction technology  
Semi:- 3rd sem

a)

The good qualities of building stones are:-

- Appearance
- The stones that are to be used for the work of the face should have good appearance.
- Strength of the stone must be able to resist the applying load or overcoming load.
- Durability, dust-effective, hardness and toughness, selfweight and specific gravity.

b)

There are three kinds of rock.

- 1) Igneous Rock
- 2) Sedimentary Rock
- 3) Metamorphic

c)

The properties of good cement are based on

- Fineness of cement
- Soundness
- Consistency
- Strength
- setting time
- Heat of hydration
- Loss of ignition
- Bulk density

d)

→ Igneous rocks form when magma cools and crystallizes either at volcanoes on the surface of the earth or while the melted rocks is still inside the earth.

→ The most common types of ~~rock~~ igneous rocks are andesite, basalt, dacite.

2a) Types of stones used for building construction are

1. Basalt :- Basalt stone, which is also known as trap is commonly used in road construction as aggregate in concrete production, rubble masonry works for bridge piers, viaducts, and dams.

2. Granite :- The application of granite in building construction involves bridge piers, retaining walls, dams, abutments, store columns, as coarse aggregate in concrete, ballast for railways as damp proof course and external cladding of walls.

3. Sandstones :- Sandstones in combination with silica cement are used in the construction of heavy structures. Ex: masonry works, dams, bridge piers, and viaducts.

4. Slate :- Slate shows great variation in its building properties which depend on the thickness of the sheets and the color of the rock. It is used as roofing tiles, slabs, and pavements.

b) Traditional brick :-

\* Traditional bricks are those which have not been standardized in size.

\* The commonly adopted nominal size of traditional brick is  $23\text{cm} \times 11.4\text{cm} \times 7.6\text{cm}$  ( $9'' \times 4\frac{1}{2}'' \times 3''$ )

Modular bricks: - Modular bricks conform to the size laid down by Bureau of Indian Standard Institution  
→ The Actual size of the brick is  $19\text{cm} \times 9\text{cm} \times 9\text{cm}$

c) There are commonly three types of cement grade used in ordinary portland cement (33 grade, 43 grade and 53 grade).

→ 33 grade used for general construction work under normal environmental condition.

→ 43 grade used for plain concrete work and plastering works.

→ 53 grade used in RCC and pre-stressed concrete of higher grades, cement grouts, instant ~~cement~~ plugging mortars etc.

3a) Manufacture process of cement

- 1) Mixing of raw material
- 2) Burning
- 3) Grinding
- 4) Storage and packaging

Mixing of raw materials: -

The raw materials used in the manufacture of cement are Calcium, Silicon, iron, and Aluminium. These minerals are used in different form as the availability of the minerals.

The mixing procedure of the manufacture of cement is done in 2 methods: -

- 1) Dry process
- 2) Wet process

2) Burning of raw materials.

The burning process is carried out in the rotary kiln. While the raw materials are rotated at 1-2 rpm at its longitudinal axis.

3) Grinding of clinkers: - The cooled clinkers are received from the cooling pans and sent into mills. The clinkers are ground finely into powder in ball mill or tube mill. powdered gypsum is added around 2-3% as setting agent during final grinding.

4) Storage and packaging: - The ground cement is stored in silos, from which it is marketed either in containers load or 50 kg bags.

3 b These are four different types of manufacturing process of bricks.

- 1) Preparation of clay
- 2) Molding
- 3) Drying
- 4) Burning

1. Preparation of clay for bricks manufacturing:-

Preparation of clay for bricks manufacturing is done in six steps:-

Unsoiling of clay: The top layer of soil may contain impurities, so the clay in top layer of soil about 20mm depth is thrown away. This is called unsoiling.

Digging:- After the removal of the top layer, the clay is dug out from the ground and spread on the plain ground.

Cleaning: The clay is cleaned of stones, vegetable matter weathering. The cleaned clay is exposed to atmosphere for

softening, Blending:- Small portion of clay into the hands and turning it up and down in vertical direction. This process is called blending of clay.

Tempering:- Water is added to clay and pressed or mixed

The process will be done by cattle or with feet of ~~man~~, pug mill is used as grinder.

2. Molding of bricks are two types

1) Hand molding (for small scale)

2) Table molding (for large scale)

3. Drying of raw bricks:- After molding process the bricks contain some amount of moisture in it, so drying is to be done otherwise they may crack while burning. The drying of raw bricks is done by natural process.

#### 4. Burning of bricks:-

In this process of burning, the dried bricks are burned either in clumps or kilns up to certain degree temperature.

In this ~~process~~ stage the bricks will gain hardness and strength so it is important stage of manufacturing of bricks.