# Building Materials & Construction Unit–1 Notes

**UNIT–1 TOPICS**

- Stones
- Bricks
- Cement
- Lime
- Timber
- Concrete and Mortar
- Workability of Concrete
- Strength Properties of Concrete
- Nominal Proportion of Concrete
- Preparation, Compaction and Curing of Concrete
- Foundations
- RCC Footings
- Brick Masonry Walls
- Plastering and Pointing
- Floors and Roofs
- Doors and Windows
- Lintels
- Staircases

## 1. BUILDING MATERIALS

Building materials are materials used for construction of buildings and structures.

**Importance:**
- Provide strength and stability
- Increase durability of structure
- Improve appearance of building

## 2. STONES

Stone is natural construction material obtained from rocks.

**Properties of Good Building Stone:**
- High strength
- Hardness
- Durability
- Weather resistance

**Tests on Stones:**
- Crushing strength test
- Water absorption test
- Hardness test

**Uses of Stones:**
- Foundations
- Roads
- Bridges
- Masonry work

## 3. BRICKS

Bricks are artificial building blocks made from clay and burnt in kilns.

**Properties of Good Bricks:**
- Uniform shape and size
- Hard and durable

• Free from cracks
• Low water absorption

**Tests on Bricks:**
• Water absorption test
• Compression test
• Hardness test

**Uses of Bricks:**
• Wall construction
• Foundations
• Arches

**4. CEMENT**

Cement is binding material used in construction work.

**Types of Cement:**
• Ordinary Portland Cement (OPC)
• Rapid hardening cement
• White cement

**Properties of Cement:**
• Fineness
• Setting time
• Strength

**Tests on Cement:**
• Fineness test
• Soundness test
• Setting time test

**Uses of Cement:**
• Concrete preparation
• Mortar preparation
• Plastering work

**5. LIME**

Lime is binding material obtained from limestone.

**Types of Lime:**
• Fat lime
• Hydraulic lime
• Poor lime

**Uses of Lime:**
• White washing
• Mortar preparation
• Plastering

**6. TIMBER**

Timber is wood suitable for engineering and construction purposes.

**Properties of Good Timber:**
• Strong and durable
• Elastic
• Free from defects

**Uses of Timber:**
• Doors and windows

• Furniture
• Roof trusses

**7. CONCRETE**

Concrete is mixture of cement, sand, aggregates and water.

**Ingredients of Concrete:**
• Cement
• Fine aggregate
• Coarse aggregate
• Water

**Advantages:**
• High compressive strength
• Durable
• Fire resistance

**8. MORTAR**

Mortar is mixture of cement or lime with sand and water.

**Uses:**
• Brick masonry
• Plastering
• Pointing

**9. WORKABILITY OF CONCRETE**

Workability is ease with which concrete can be mixed, placed and compacted.

**Factors Affecting Workability:**
• Water-cement ratio
• Aggregate size
• Admixtures

**10. STRENGTH PROPERTIES OF CONCRETE**

Important strength properties:
• Compressive strength
• Tensile strength
• Flexural strength

**11. NOMINAL PROPORTION OF CONCRETE**

Common nominal mixes:

• M5 = 1:5:10
• M10 = 1:3:6
• M15 = 1:2:4
• M20 = 1:1.5:3

**12. PREPARATION OF CONCRETE**

Steps in preparation:
1. Batching
2. Mixing
3. Transportation
4. Placing
5. Compaction
6. Curing

**13. COMPACTION OF CONCRETE**

Compaction removes air voids from concrete.

**Methods:**
• Hand compaction
• Vibrator compaction

**14. CURING OF CONCRETE**

Curing maintains moisture in concrete for proper hydration.

**Methods of Curing:**
• Water curing
• Membrane curing

**15. FOUNDATIONS**

Foundation transfers load of structure safely to ground.

**Types:**
• Shallow foundation
• Deep foundation

**16. RCC FOOTINGS**

RCC footing is reinforced concrete structure used to distribute load safely.

**Advantages:**
• High strength
• Durability

**17. BRICK MASONRY WALLS**

Brick masonry is construction using bricks and mortar.

**Types:**
• English bond
• Flemish bond

**18. PLASTERING AND POINTING**

**Plastering:**
Applying mortar layer on wall surface.

**Pointing:**
Finishing mortar joints in masonry.

**19. FLOORS**

Floor is horizontal surface provided for living and working.

**Types:**
• Cement concrete floor
• Tile floor
• Marble floor

**20. ROOFS**

Roof is top covering of building.

**Types:**

• Flat roof
• Sloping roof

**21. DOORS AND WINDOWS**

Doors provide entry and exit.
Windows provide light and ventilation.

**22. LINTELS**

Lintel is horizontal member placed above doors and windows to support load.

**23. STAIRCASES**

Staircase provides vertical movement between floors.

**Types:**
• Straight staircase
• Spiral staircase
• Dog-legged staircase

**MOST IMPORTANT 14 MARK QUESTIONS**

1. Explain properties, tests and uses of stones.

2. Explain properties, tests and uses of bricks.

3. Explain types, properties and tests of cement.

4. Explain lime and its uses.

5. Explain properties and uses of timber.

6. Explain workability and strength properties of concrete.

7. Explain nominal proportion and preparation of concrete.

8. Explain compaction and curing of concrete.

9. Explain foundations and RCC footings.

10. Explain brick masonry walls, plastering and pointing.

11. Explain floors and roofs with types.

12. Explain doors, windows, lintels and staircases.

**IMPORTANT 7 MARK QUESTIONS**

1. Define workability of concrete.

2. Explain curing of concrete.

3. Explain compaction methods.

4. Explain English bond and Flemish bond.

5. Explain plastering and pointing.

6. Explain types of staircases.

7. Explain lintels and their uses.

**IMPORTANT NUMERICALS**

1. Concrete mix proportion problems.

2. Water-cement ratio numerical.

3. Strength calculation of concrete.

**EXAM TIPS**

• Draw neat diagrams of building elements.
• Learn concrete mix proportions carefully.
• Revise tests of building materials regularly.
• Practice definitions and uses properly.
• Focus on repeated PYQ topics.