THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION.

784 **BRICKWORK AND MASONRY**

(SUPPLEMENTARY)

Time : 3 Hours **ANSWERS** **Year : 2001**

Instructions

1. This paper consists of sections **six (6)** questions.
2. Answer question number **one (1)** and any other **four (4)** questions.
3. Question 1 carries **thirty-two (32)** marks and the rest carries **seventeen (17)** marks each.
4. Non-programmable calculators may be used.
5. Cellular phones are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

1. (a) Define the term “foundation” as applied in construction.

A foundation is the lowermost part of a building structure that transfers the load of the superstructure safely to the ground. It distributes the loads evenly to avoid settlement and provides stability against external forces such as wind or earthquakes.

(i) Mention two functions of a foundation.

The first function of a foundation is to distribute the weight of the building over a large area so that the bearing capacity of the soil is not exceeded. The second function is to anchor the building against lateral forces and provide overall stability.

(ii) With sketches, describe a stepped footing for a wall foundation.

A stepped footing consists of a series of concrete or stone steps that gradually spread the load of a wall to a wider base. Each step increases the width of the footing at lower levels, ensuring load distribution over a larger soil area. The steps are usually constructed with cement concrete, and the arrangement reduces pressure on the soil while keeping the wall foundation stable.

2. (a) What is a cavity wall?

A cavity wall is a type of wall consisting of two parallel leaves (inner and outer walls) separated by a hollow space or cavity. The cavity is usually filled with air or insulating material and tied together using metal wall ties.

(b) Mention three advantages of using cavity walls.

Cavity walls provide excellent thermal insulation, helping keep buildings warm in cold seasons and cool in hot seasons. They also reduce dampness penetration since the cavity prevents moisture from passing from the outer wall to the inner wall. In addition, cavity walls provide better sound insulation compared to solid walls.

(c) Describe how wall ties are used in cavity wall construction.

Wall ties are metal connectors placed at regular intervals between the inner and outer leaves of a cavity wall. They are embedded in mortar joints on both sides, holding the two leaves together while maintaining the cavity gap. The ties are usually galvanized or stainless steel to resist corrosion and are often designed with a slight slope to prevent water transfer across the cavity.

3. (a) Define the term “finishes in masonry”.

Finishes in masonry refer to the final surface treatments applied to masonry walls to improve their appearance, protect them from weather, and increase durability. These finishes can be internal or external, depending on the location and function of the wall.

(b) Mention four internal finishes.

Plastering is a common internal finish that provides a smooth surface for painting or decoration. Painting is another finish, applied directly on plaster or putty to enhance aesthetics. Wall cladding using tiles or stone is also used as an internal finish for durability and beauty. Whitewashing is another type of finish, involving a thin coat of lime applied to internal walls for a clean appearance.

4. (a) State four qualities of good building stones.

Good building stones should be durable, meaning they resist weathering and decay over time. They should have sufficient strength to carry loads without crushing. Stones should also be hard enough to resist wear, especially if used in floors or pavements. Finally, they should be workable, meaning they can be easily cut, dressed, or shaped for construction.

(b) Suggest three site tests to check the quality of stones.

One test is the hammer test, where a hammer is struck on the stone; if it does not chip or break easily, it is considered strong. Another is the water absorption test, where the stone is weighed before and after immersion in water; good stones should not absorb more than 5% of their weight. A third test is the visual inspection test, where stones are checked for uniform color, absence of cracks, and compact structure, which indicate good quality.

5. (a) Define the term “buttress wall”.

A buttress wall is a projecting wall built at intervals along another wall to strengthen and support it against lateral forces or outward thrust. It acts as a reinforcement to prevent the main wall from overturning or collapsing.

(b) Describe the process of constructing a brick buttress wall bonded to an existing wall.

Construction begins by marking the position of the buttress on the ground adjacent to the main wall. A proper foundation is then excavated and filled with concrete to carry the additional load. The brickwork of the buttress is built simultaneously with the existing wall, interlocking bricks at intervals to bond the two walls together. The buttress gradually tapers in thickness as it rises, ensuring stability while reducing material use. Finally, the top of the buttress is finished flush with the main wall to give a uniform appearance.

6. (a) Differentiate between load-bearing walls and partition walls.

A load-bearing wall is a structural wall that carries the weight of the roof, floors, and other loads from above, transferring them safely to the foundation. In contrast, a partition wall is a non-load-bearing wall used only to divide internal spaces in a building; it carries no structural load other than its own weight.

(b) Suggest two suitable materials for partition walls and explain why.

Gypsum boards are suitable for partition walls because they are lightweight, easy to install, and provide good fire resistance. Glass blocks are also suitable, as they allow light penetration while maintaining privacy, and they are durable and easy to clean.