THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION.

784 **BRICKWORK AND MASONRY**

(SUPPLEMENTARY)

Time : 3 Hours **ANSWERS** **Year : 2004**

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 “retaining wall”.

A retaining wall is a structure built to hold back or support soil at different levels, preventing erosion or collapse. It resists lateral pressure from the soil behind it and maintains stability in areas with slopes or excavations.

(b) Mention three types of retaining walls.

Gravity retaining walls rely on their own weight to resist soil pressure. Cantilever retaining walls use a reinforced concrete stem and base slab to counteract lateral forces. Counterfort retaining walls have thin vertical slabs tied to the wall at intervals to strengthen long walls against soil pressure.

(c) Explain the construction procedure of a gravity retaining wall.

Construction begins with excavating a level foundation trench wide and deep enough to support the wall. A concrete footing is then laid to distribute the load. Masonry or concrete is built on the footing in successive layers, ensuring proper bonding and alignment. The wall may be slightly battered (thicker at the base than the top) to improve stability. Finally, drainage provisions, such as weep holes or backfill with free-draining material, are incorporated to relieve hydrostatic pressure behind the wall.

2. (a) What is meant by the term “plinth in buildings”?

A plinth is the portion of a building between the ground level and the floor of the structure above. It serves as a transition from the foundation to the superstructure.

(b) State two functions of a plinth.

The plinth raises the building above ground level to prevent dampness from entering the walls. It also distributes loads from the superstructure evenly to the foundation.

3. (a) Define “bond stone” in masonry.

A bond stone is a stone inserted in a masonry wall at intervals to tie two adjacent walls together or to strengthen the wall, ensuring structural integrity.

(b) State three functions of bond stones.

Bond stones improve the wall's stability by tying separate walls together. They help distribute loads evenly across the masonry. They also reduce the risk of cracking and misalignment in long walls.

(c) Explain the correct positioning of bond stones.

Bond stones should be placed at regular intervals both horizontally and vertically within the wall. They are usually embedded deep enough into adjacent walls to provide an effective mechanical tie. The stones should be level and properly bedded in mortar to ensure maximum strength.

4. (a) List four defects in stone masonry.

Common defects include honeycombing, where voids form in mortar joints; scaling, where the stone surface flakes off; cracks due to settlement or shrinkage; and bulging, where the wall deforms outward.

(b) Explain their causes.

Honeycombing occurs due to poor compaction of mortar or insufficient mortar application. Scaling results from using weak or soft stone exposed to weathering. Cracks arise from uneven foundation settlement or thermal movements. Bulging is caused by lateral pressure from soil or improper bonding within the wall.

5. (a) What is meant by "string course"?

A string course is a horizontal band of masonry, usually projecting, built along the face of a wall to enhance aesthetics or mark levels.

(i) State two purposes of string courses.

String courses help divide the wall visually, creating pleasing proportions. They can also serve as a drip course, directing rainwater away from the wall to reduce dampness.

(ii) With a sketch, describe its construction.

The string course is constructed by laying a continuous row of stones or bricks along a horizontal line in the wall, projecting slightly from the wall face. Mortar is applied to secure each unit, and care is taken to maintain a uniform projection and level alignment across the length of the wall.

6. (a) Differentiate between stretcher bond and header bond.

A stretcher bond consists of bricks laid lengthwise (stretchers) with joints staggered in successive courses, providing a simple yet strong wall pattern. A header bond, on the other hand, has bricks laid widthwise (headers) so that each header overlaps the bricks below, giving more strength in thicker walls.

(b) State one situation where stretcher bond is preferred.

Stretcher bond is preferred for half-brick thick walls or partition walls where a simple, economical bond is sufficient and structural load is minimal.