THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION.

784 **BRICKWORK AND MASONRY**

(SUPPLEMENTARY)

Time : 3 Hours **ANSWERS** **Year : 2009**

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) What is meant by the term “wall tie”?

A wall tie is a metal strip or rod used to connect the inner and outer leaves of a cavity wall. It ensures structural stability by holding the two walls together while allowing for slight differential movement between them.

(b) State four functions of wall ties in cavity wall construction.

Wall ties stabilize the two leaves of a cavity wall, preventing bulging or separation. They transfer lateral loads from the outer leaf to the inner leaf. They maintain the correct cavity width between the walls. They also provide anchorage for insulation or finishes applied within the cavity.

(c) Describe the correct method for placing wall ties during masonry work.

Wall ties are placed at regular horizontal and vertical intervals, usually every 900 mm horizontally and 450 mm vertically. They are embedded into mortar joints on both inner and outer leaves, ensuring they span the cavity without sagging or bending. The ends are covered with mortar to prevent corrosion, and ties must not be in direct contact with soil or exposed to water ingress.

2. (a) Define the term “pointing” in masonry.

Pointing is the process of finishing and compacting the exposed joints of masonry after the mortar has partially set. It improves both the durability and aesthetics of the wall.

(b) State three types of pointing finishes used in brickwork.

Flush pointing, where the mortar is level with the brick face. Recessed pointing, where the mortar is indented slightly from the brick surface. Weathered or weather-struck pointing, sloped outward to shed water efficiently.

(c) Explain how the choice of pointing finish affects the durability and aesthetics of a brick wall.

Flush pointing provides a smooth appearance and is easier to clean but may allow water to penetrate if not dense. Recessed pointing creates shadow lines, enhancing the visual texture, but can trap water if

poorly executed. Weathered pointing sheds water effectively, protecting the wall from dampness, and also provides a neat, professional look.

3. (a) What is a coping on a wall?

A coping is a protective top layer or covering placed on the upper surface of a wall to prevent water penetration and protect the masonry below.

(b) State three purposes of copings in masonry construction.

Copings prevent rainwater from seeping into walls, reducing dampness. They protect the mortar joints from weathering. They enhance the visual appearance of the wall by providing a neat finish.

(c) With the aid of a sketch, describe the construction of a brick coping with a concrete capping.

Bricks forming the top course of the wall are laid slightly projecting outward. Mortar is applied between them, and a concrete layer is cast on top to form the capping. The concrete is shaped with a slight slope to direct water away from the wall. The capping provides protection while maintaining a clean edge.

4. (a) State four defects that may occur in freshly constructed walls.

Common defects include cracking, bulging, honeycombing, and uneven courses.

(b) Explain the causes of each defect mentioned in 4(a).

Cracking can result from settlement, shrinkage of mortar, or thermal expansion. Bulging occurs due to lateral pressure or improper bonding. Honeycombing arises from poor mortar compaction. Uneven courses result from lack of leveling and alignment during construction.

(c) Suggest one preventive measure for each defect.

Use proper compaction and curing to reduce cracking. Provide adequate wall ties and proper bonding to prevent bulging. Apply mortar uniformly and compact it well to avoid honeycombing. Use a plumb line and spirit level to maintain even courses.

5. (a) Explain the term “battered wall” in masonry.

A battered wall is a wall with a slight taper, thicker at the base than at the top, designed to resist lateral earth or water pressure, often used in retaining structures.

(b) State three advantages of constructing battered walls in retaining structures.

They provide increased stability by lowering the center of gravity. They resist overturning and sliding more effectively. They reduce the need for additional reinforcement or buttresses.

(c) Describe the construction process of a battered retaining wall using brickwork.

Excavate a trench for the foundation, ensuring proper depth. Lay bricks in successive courses, tapering the wall inwards as it rises. Ensure proper bonding, mortar joints, and vertical alignment. Provide weep holes or drainage behind the wall to relieve hydrostatic pressure. Top the wall with coping stones or capping for protection against rainwater.

6. (a) Define the term “precast concrete block”.

A precast concrete block is a masonry unit manufactured by casting concrete into molds away from the construction site, then cured and transported for use in walling.

(b) State four advantages of using precast concrete blocks in walling.

They ensure uniform quality and size. They speed up construction as blocks are ready-made. They provide good compressive strength and durability. They reduce wastage of materials compared to on-site casting.

(c) Describe the process of manufacturing solid precast concrete blocks at the site.

Prepare a mix of cement, sand, and aggregates according to design proportions. Place the mixture into molds and compact it using vibration or manual tamping. Allow the blocks to cure under moisture conditions for several days to gain strength. Remove the blocks from molds and store them in a shaded area until ready for use in wall construction.