THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION.

784 **BRICKWORK AND MASONRY**

(SUPPLEMENTARY)

Time : 3 Hours **ANSWERS** **Year : 2012**

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).

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1. Define the term "shoring". Provide four reasons why shoring is essential in masonry construction, and outline three safety measures to follow when installing and dismantling shoring on a construction site.

Shoring is the temporary support provided to a structure, excavation, or masonry wall to prevent collapse during construction or repairs.

Shoring is essential because it prevents structural failure during construction, supports loads from partially built walls, ensures worker safety, and maintains alignment of walls until permanent elements set.

Safety measures include ensuring the shoring is adequately braced and stable before use, inspecting shoring regularly for defects or displacement, and never overloading the shoring beyond its designed capacity.

2. (a) What is a "cavity wall"?

A cavity wall consists of two separate masonry walls (leaves) with a gap or cavity between them.

(b) List three common materials used in cavity wall construction.

Materials include clay bricks, concrete blocks, and stone units.

(c) Explain the step-by-step process of constructing a cavity wall with weep holes and cavity ties.

First, construct the inner leaf with proper bonding and mortar joints. Insert cavity ties at specified horizontal and vertical intervals to connect inner and outer leaves. Build the outer leaf while maintaining the designed cavity width. Provide weep holes at regular intervals near the base to allow water drainage. Finish with proper pointing to protect mortar joints.

3. Briefly describe the following terms in bricklaying:

(i) Bat – a brick cut to fit in tight spaces or corners. Used to maintain bonding at ends of walls.
(ii) Perpend – the vertical joint between two bricks in a course. Ensures wall alignment and proper bonding.
(iii) Bull header – a brick laid flat with the shorter face visible on the wall face. Provides structural

strength and decorative effect.

(iv) Squint quoin – an angular brick placed at the corner to maintain the bond. Helps keep corners square.

(v) Gauge rod – a rod used to measure and mark courses for consistent brickwork height. Ensures uniform course thickness.

4. (a) Identify four weather-related factors that impact the setting of concrete blocks.

Factors include temperature extremes (hot or cold), high humidity, rainfall, and wind.

(b) Describe how each factor can affect the strength of the blocks and overall stability.

High temperatures can cause rapid drying, leading to cracking. Cold can slow curing, reducing strength. Rain can wash out mortar, weakening bonds. Strong wind can accelerate moisture loss, causing uneven curing and reduced durability.

(c) Recommend suitable on-site techniques to control these weather influences.

Use shading or temporary shelters to protect blocks from direct sun and wind. Cover blocks during rainfall. Heat or insulate materials in cold weather. Maintain consistent water content during mixing and curing.

5. For a garden wall in a coastal region with high salinity:

(i) Suggest three design modifications to improve its resistance to corrosion.

Use waterproof coatings or renders, raise the wall plinth above ground, and install expansion joints to accommodate movement.

(ii) Recommend an appropriate mortar mix for these conditions, and justify your choice.

A cement-sand mortar with a 1:3 or 1:4 ratio is ideal due to its low permeability, high durability, and resistance to saline attack.

(iii) Describe methods to incorporate expansion joints for movement control.

Introduce vertical and horizontal joints at regular intervals, fill with compressible filler, and seal with flexible sealant to allow thermal and moisture-induced movement.

6. (a) Distinguish between coursed rubble masonry and uncoursed rubble masonry.

Coursed rubble masonry has stones laid in regular horizontal layers, while uncoursed rubble has stones arranged irregularly without continuous courses.

(b) State two benefits and two drawbacks of coursed rubble masonry in foundation work.

Benefits: uniform load distribution and easier alignment. Drawbacks: requires more skilled labor and careful stone selection.

(c) Identify scenarios where uncoursed rubble masonry might be preferred over coursed rubble.

Uncoursed rubble is suitable for retaining walls, rural or low-cost construction, or where appearance is less critical.