

**THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN TECHNICAL EDUCATION EXAMINATION.**

784

BRICKWORK AND MASONRY

(SUPPLEMENTARY)

Time : 3 Hours

ANSWERS

Year : 2014

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. (a) Define "damp-proof course" (DPC).

A damp-proof course (DPC) is a horizontal barrier, usually made of impervious material, incorporated within walls near the base to prevent the upward movement of moisture from the ground into the masonry.

(b) State four roles of DPC in wall systems.

DPC prevents rising damp that can damage plaster and finishes. It protects timber elements from moisture. It reduces the risk of mold and fungal growth. It preserves the durability of the masonry by minimizing salt deposition and deterioration.

(c) Describe the installation technique for embedding DPC in a brick wall base.

After constructing the foundation, a continuous layer of DPC material, such as bituminous felt or polyethylene sheet, is placed on top of the foundation level. The masonry is then built over this layer, ensuring that the DPC is continuous, level, and properly lapped at joints to maintain an effective moisture barrier.

2. (a) What is a "flush joint" in mortar?

A flush joint is a type of mortar joint finished so that the mortar is level with the surface of the brick or stone, providing a smooth, flat appearance.

(b) Identify four variations of mortar joint finishes.

Flush joint, recessed joint, weathered joint (sloping outward), and struck joint (sloping inward).

(c) Discuss how joint finish selection influences weather resistance and aesthetics in walls.

A weathered or struck joint sheds water efficiently, enhancing weather resistance. Flush joints offer a clean, modern look but may be less effective at directing water away. Recessed joints create shadow lines for decorative effects but may trap moisture if not properly finished. Correct joint selection ensures both durability and visual appeal.

3. (a) What function does a "plinth" serve in a building?

A plinth is the portion of a wall between the foundation and the ground level that raises the superstructure above external ground to prevent moisture ingress and provide a level base for construction.

(b) List three materials suitable for plinth construction.

Concrete, stone, and burnt clay bricks.

(c) With a sketch, explain building a concrete plinth over a brick foundation.

Excavate to the required depth and lay a compacted sub-base. Build the brick foundation to the designed height. Place formwork for the concrete plinth and pour the concrete mix into the mold, ensuring proper compaction and alignment. After curing, remove the formwork, and the plinth provides a solid, level, and damp-proofed base for the superstructure.

4. (a) Give four criteria for choosing sand-lime bricks in construction.

Uniform size and shape, high compressive strength, low water absorption, and durability against weathering.

(b) Compare the properties of common burnt clay bricks and fire clay bricks.

Common burnt clay bricks are durable, have good compressive strength, and suitable for general walling. Fire clay bricks can withstand higher temperatures, making them suitable for chimneys, furnaces, or fireplaces, but they are more expensive and less common in general construction.

(c) Outline three field tests for assessing brick durability.

Water absorption test – soak bricks and calculate percentage absorption. Hardness test – scratch or tap to check for resistance. Soundness test – strike two bricks together; a clear ringing sound indicates good quality.

5. (a) What is a "pad foundation"?

A pad foundation is an isolated shallow foundation that supports a single point load, such as a column, distributing the load to the soil beneath.

(b) Explain three cases where pad foundations are used instead of raft foundations.

For individual columns in low-rise buildings, where loads are moderate. On sites with good soil bearing capacity, where wide-area raft foundations are unnecessary. When construction is staged, and isolated support is more economical.

(c) Sketch the arrangement of a stone masonry pad foundation supporting a column.

Excavate to the required depth. Place a compacted layer of concrete or stone to form the pad base. Construct the masonry or concrete pad to the required dimensions, ensuring proper leveling and alignment to transfer the column load to the soil.

6. (a) (i) Define "efflorescence" in masonry.

Efflorescence is the deposit of soluble salts that appear as a white powdery substance on the surface of masonry walls due to moisture migration.

(ii) Name three causes of efflorescence.

Excessive moisture penetration, use of salt-contaminated materials, and poor drainage around the structure.

(b) Describe four impacts of efflorescence on building materials.

It causes aesthetic discoloration, weakens the mortar joints, encourages decay in masonry units, and can indicate persistent moisture problems that may lead to structural damage.

(c) Suggest three techniques to mitigate efflorescence in new walls.

Ensure proper DPC and damp-proofing measures are in place. Use clean, salt-free water and materials. Provide adequate drainage around walls and allow proper curing to reduce water movement through the masonry.