THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

783 **BUILDING CONSTRUCTION**

Time: 3 Hour. **ANSWERS** **Year: 2013**

Instructions

1. This paper consists of sections **five (5)** questions.
2. Answer all questions.
3. Each question carries **twenty (20)** marks.
4. Non-programmable calculators may be used.
5. Communication devices and any unauthorized materials are **not** allowed in the examination room
6. Write your **Examination Number** on every page of your answer booklet.

1. (a) State three functions of external walls in a building.

External walls provide **enclosure and protection**, shielding the interior of the building from weather elements such as rain, wind, sun, and dust.

They offer **security and privacy** by forming a physical barrier between the occupants and the outside environment or adjacent properties.

External walls also help in **supporting structural loads**, especially in load-bearing construction, where they carry the weight of the roof and upper floors.

(b) When selecting wall materials, the **climate** is an important factor. In hot regions, materials with high thermal mass are preferred to keep interiors cool, while in cold areas, insulation capability is prioritized.

Durability and maintenance needs are also essential considerations. Materials that resist moisture, pests, and wear will reduce long-term repair costs and ensure building longevity.

Aesthetic appeal and compatibility with the surroundings should also be considered. Wall finishes and textures affect the appearance and acceptance of the structure in its environment.

(c) One defect is **cracking**, which may be caused by poor workmanship, uneven settlement, or use of weak mortar mixes.

Another defect is **dampness or water seepage**, often due to the absence of proper waterproofing or failure to install a damp-proof course.

Bulging or leaning walls can result from poor bonding, inadequate wall ties, or weak foundations, affecting structural stability and appearance.

2. (a) Describe the importance of proper site drainage before and during construction.

Proper site drainage prevents **accumulation of water**, which can lead to erosion, weakening of foundations, or delayed construction activities due to muddy or flooded conditions.

It helps in maintaining **worker safety and equipment access**, by keeping the site dry and minimizing slips, trips, or machinery malfunctions.

Good drainage also protects **building materials and partially completed works**, reducing the risk of water damage to stored supplies and fresh concrete or masonry.

(b) **Open ditches or channels** are shallow trenches that guide surface water away from the construction area.

Graded slopes use the natural contour of the land to direct water flow toward safe discharge points or drains.

Catch basins or stormwater pits collect rainwater from the surface and direct it into underground drainage systems or soak pits.

(c) Poor site drainage can lead to **foundation failure**, as water saturation weakens the supporting soil, causing differential settlement or collapse.

It can cause **dampness and mold growth** in lower building levels, especially basements or ground floors, making spaces uninhabitable.

Water pooling on site may **delay construction progress** and increase costs due to the need for additional site preparation and repair of damaged materials.

3. (a) Define the term “plastering” and state its purpose in building construction.

Plastering is the process of **applying a layer of cement or gypsum-based mixture** onto walls and ceilings to create a smooth, protective surface.

The main purpose of plastering is to **provide a clean and uniform finish**, ready for painting or decoration. It also **protects the masonry** underneath from moisture, dust, and impact.

(b)
Poor surface preparation, such as applying plaster on a **dusty or oily surface**, prevents proper bonding and leads to delamination or peeling.

Excessive or **rapid drying of the plaster**, often caused by high temperatures or wind, reduces adhesion before proper curing takes place.

Using **incompatible materials**, such as applying cement plaster over a gypsum base, can lead to weak bonding and cracking over time.

(c) Before plastering, the wall surface should be **cleaned and wetted** to remove dust and ensure better adhesion between the plaster and the substrate.

The plaster should be **applied in thin, even coats**, building up gradually to avoid sagging or cracking, especially on vertical surfaces.

Proper **curing must be done** for several days after application to allow gradual setting and to prevent shrinkage cracks or surface failure.

4. (a) Describe three types of doors commonly used in residential buildings and where each is best applied.

Panel doors consist of wooden or composite frames with sunken panels. They are suitable for entry and room doors due to their strength and aesthetic value.

Flush doors are flat, plain-surfaced doors with a solid or hollow core. They are ideal for interior applications like bedrooms and toilets because of their simple, modern appearance.

Louvered doors contain slats or vents that allow air movement. They are used in wardrobes or bathrooms where ventilation is needed without sacrificing privacy.

(b) Flush doors are **lightweight and cost-effective**, making them ideal for interior partitions where heavy-duty doors are unnecessary.

They are **easy to maintain and clean**, as their smooth surfaces resist dust and stains, which is beneficial in high-use residential areas.

Flush doors also provide a **neat and modern finish**, complementing various architectural designs and requiring minimal finishing work.

(c) Over time, doors may **warp or swell** due to moisture absorption, especially in humid or poorly ventilated areas.

Loose hinges or misalignment may occur due to repeated usage or improper installation, affecting smooth operation.

Surface damage, such as scratches, peeling veneer, or delamination, may reduce the door's lifespan and appearance if not properly maintained.

5. (a) Explain the term "building orientation" and give two reasons why it is important in design.

Building orientation refers to the **positioning of a building on its site relative to the sun, wind, and other natural elements** to optimize environmental comfort and energy use.

It is important because proper orientation can **maximize natural lighting and ventilation**, reducing dependence on artificial energy sources.

It also helps **control internal temperatures** by minimizing heat gain in hot climates and maximizing solar exposure in cooler regions, improving occupant comfort.

(b) The **direction of prevailing winds** influences window placement and ventilation strategies to enhance airflow through the building.

Sun path and intensity determine how walls and roofs are shaded or exposed, affecting heat gain and cooling needs.

Topography of the site impacts how the building is positioned to take advantage of views, drainage, and natural protection.

Surrounding buildings or vegetation may cast shadows or block airflow, which must be considered to optimize the building's microclimate.

(c) Poor orientation may lead to **excessive heat gain**, making indoor spaces uncomfortable and increasing the need for mechanical cooling systems.

It can also result in **poor lighting**, forcing occupants to rely on artificial lights during the day, increasing electricity consumption.

Inadequate natural ventilation due to bad orientation may cause **stuffy indoor conditions**, leading to discomfort and poor indoor air quality.