THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

783 **BUILDING CONSTRUCTION**

Time: 3 Hour. **ANSWERS** **Year: 2007**

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) Define the term “load distribution” in building construction.

Load distribution is the **process of spreading applied loads from one part of a structure to another**, ensuring that each element carries an appropriate portion of the total load. This allows the weight of the building, occupants, equipment, and environmental forces to be transferred safely down to the foundation without overloading any single component.

(b) (i) Mention three elements of a building that help in load distribution.

Beams help carry loads from slabs and transfer them to columns.
Columns support vertical loads and transfer them down to the foundation.
Floor slabs distribute live and dead loads across their span to the supporting beams and walls.

(ii) Explain how improper load distribution can affect a building.

Improper load distribution may lead to **structural overstress**, causing cracks or failure in overloaded members.
It may also result in **uneven settlement** of the foundation, leading to distortion or misalignment of the structure.
In severe cases, it can cause **partial or total collapse** of the building due to loss of balance or inadequate support.

(c) State three methods of ensuring uniform load distribution in multi-storey buildings.

Using **symmetrical structural layout** helps balance loads across all sides of the building.
Incorporating **adequate and evenly spaced columns and beams** ensures that no single member is overstressed.
Proper **design calculations and reinforcement detailing** by qualified engineers ensure structural elements are sized to handle loads appropriately.

2. (a) What is site clearance? Explain its importance before starting any construction activity.

Site clearance is the **removal of obstacles, debris, vegetation, old structures, and unwanted materials** from the building site before construction begins. It is important because it **prepares the ground for layout and excavation**, ensures **worker safety**, and allows for **uninterrupted project execution**.

(b) (i) List four activities carried out during site clearance.

Cutting and removal of vegetation such as grass, trees, and shrubs.
Demolition of old buildings or structures that occupy the site.
Removal of waste materials, rubbish, or debris from previous uses of the land.
Leveling and compacting of ground to prepare for setting out and foundation work.

(ii) Give two consequences of skipping site clearance procedures.

The site may have **hidden obstacles or unstable ground**, which can cause foundation failure or accidents.
Delays and **additional costs** may occur when unexpected issues like buried debris or tree stumps disrupt excavation or layout.

(c) Describe three safety measures to be followed during site clearance operations.

All workers should wear **personal protective equipment** such as boots, gloves, and helmets to avoid injuries.
Machinery should be operated by trained personnel, especially during demolition or earth removal.
The site should be **properly barricaded or fenced** to prevent unauthorized access and protect the public during operations.

3. (a) Explain the term "thermal insulation" in building design.

Thermal insulation refers to the use of **materials or building design techniques to reduce heat transfer** between the interior and exterior of a building. It helps in **maintaining comfortable indoor temperatures**, conserving energy, and reducing dependence on heating or cooling systems.

(b) State four materials used for thermal insulation in buildings.

Fiberglass is widely used in ceilings and walls due to its high resistance to heat flow.
Polystyrene boards are used in floors and walls for their lightweight and good thermal performance.
Rock wool or mineral wool offers both thermal and sound insulation.
Reflective foil insulation is installed under roofs to reflect radiant heat away from the building.

(c) (i) Mention two benefits of thermal insulation to building occupants.

Thermal insulation provides **comfort by maintaining stable indoor temperatures**, regardless of external weather.
It results in **lower energy bills**, as it reduces the need for air conditioning or heating.

(ii) Give two reasons why insulation is important in hot climate zones.

Insulation helps to **minimize heat gain** during the day, keeping indoor spaces cooler.
It also reduces **strain on cooling systems**, leading to more efficient energy use and improved sustainability.

4. (a) Define the term "temporary works" in construction projects.

Temporary works are **structures or systems used to support the construction process** but are not part of the final building. They include facilities or supports required during execution, such as scaffolds, formwork, access platforms, or site fencing.

(b) (i) Give three examples of temporary works used on construction sites.

Scaffolding provides access for workers at heights.
Formwork is used to hold concrete in shape until it sets.
Temporary fencing or hoarding secures the site and ensures public safety.

(ii) Explain the role of temporary works in ensuring project safety and progress.

Temporary works help **protect workers and the public** from hazards by providing stable platforms and barriers.
They ensure **construction activities proceed smoothly**, for example, by providing molds for concrete or access paths for machinery and materials.

(c) State three factors to consider when designing temporary structures.

Stability and strength must be ensured to carry construction loads and resist movement.
Ease of assembly and dismantling is important for saving time and labor.
Safety compliance must be met, aligning with building codes and site safety requirements.

5. (a) What is quality control in construction?

Quality control is the **systematic process of monitoring, inspecting, and testing construction activities and materials** to ensure they meet the required standards, specifications, and client expectations.

(b) (i) Identify three quality control procedures used during construction.

Material testing, such as compressive strength tests for concrete or sieve tests for aggregates.
Inspection of workmanship, including alignment of walls, joints, and finishes.
Verification of reinforcement placement, checking size, spacing, and cover before concrete pouring.

(ii) Explain two risks of ignoring quality control on a project.

It can lead to **structural defects or collapse**, putting lives and property at risk.
Poor quality may result in **client dissatisfaction and costly rework**, affecting budget and project reputation.

(c) Mention three parties responsible for quality assurance on a building site.

The **site engineer or supervisor** ensures construction is done according to specifications.
The **project consultant or architect** checks compliance with design and quality standards.
The **contractor's quality control team** conducts on-site tests, inspections, and documentation to maintain quality.