THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

783 **BUILDING CONSTRUCTION**

Time: 3 Hour. **ANSWERS** **Year: 2010**

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 “reinforced concrete” and explain its advantage over plain concrete.

Reinforced concrete is a **composite material made by combining concrete with steel reinforcement bars** to improve its structural strength.

The main advantage of reinforced concrete over plain concrete is that it can **resist both compression and tensile forces**. While plain concrete is strong in compression, it is weak in tension. The addition of steel bars compensates for this weakness and allows the structure to bear heavier and more complex loads.

(b) One common defect is **cracking**, which may appear due to shrinkage, overloading, or structural movement.

Another defect is **honeycombing**, which results from poor compaction during placement, leaving voids in the concrete mass.

Corrosion of reinforcement can also occur, especially when there is poor concrete cover or exposure to moisture, leading to structural weakening.

(c) Cracks in reinforced concrete beams can be caused by **overloading**, where the beam carries more weight than it was designed for.

Insufficient reinforcement or improper bar placement may also lead to cracking, as the steel cannot carry the tensile forces effectively.

Poor curing after casting can cause shrinkage cracks as the surface dries too quickly, leading to early cracking and reduced durability.

2. (a) State four reasons why supervision is important during construction activities.

Supervision ensures that **work is done according to drawings and specifications**, maintaining structural integrity and client satisfaction.

It helps in **monitoring quality control**, making sure materials and workmanship meet required standards.

Supervision improves **site safety**, ensuring workers follow procedures and wear protective equipment.

It also ensures **efficient resource use**, reducing wastage of time, materials, and labor during construction.

(b) The site supervisor must **coordinate daily construction activities**, ensuring that tasks are carried out in the right sequence and with proper personnel.

They are responsible for **checking the quality of work and materials** used on site, rejecting substandard work where necessary.

The supervisor also ensures **compliance with safety procedures**, helping to prevent accidents and injuries on site.

(c) One challenge is **labor management**, especially when workers are unskilled, uncooperative, or insufficient.

Supervisors may also face **delays in material delivery**, which can stall progress and affect the project timeline.

Another challenge is **conflict resolution**, dealing with disagreements between workers, subcontractors, or client representatives.

3. (a) Explain the importance of soil testing before starting foundation work.

Soil testing determines the **type, strength, and stability of the soil** at a construction site, helping engineers design appropriate foundations.

It prevents **foundation failure and settlement problems**, as unsuitable soils can shift, shrink, or expand under load.

Soil testing also informs **cost estimation and safety planning**, ensuring that the foundation design is efficient and suitable for the site conditions.

(b) **Standard Penetration Test (SPT)** measures soil strength and compaction level by driving a sampler into the ground.

Soil moisture content test determines the amount of water in the soil, which affects its load-bearing capacity.

Atterberg limit tests identify the plasticity and behavior of fine-grained soils, especially clays, under varying moisture conditions.

(c) Building on expansive soil without investigation can lead to **differential settlement**, where parts of the building sink unevenly, causing cracks.

It may cause **uplift during wet seasons**, as clay swells with water, pushing the foundation upward and damaging the structure.

There's also risk of **long-term structural instability**, requiring costly repairs or rebuilding due to shifting soil.

4. (a) What is a bill of quantities (BOQ)? State two uses of BOQ in a construction project.

A bill of quantities (BOQ) is a **document that itemizes all materials, labor, and work components** needed for a construction project, including their quantities and estimated costs.

It is used to **prepare accurate cost estimates** for the project and to guide budgeting and financial planning.

It also serves as a **reference document during bidding**, allowing contractors to quote prices based on consistent quantities and descriptions.

(b) A BOQ typically includes **site preparation works**, such as excavation or demolition.

It lists **structural items**, such as concrete, steel reinforcement, and formwork.

Finishing items, including plastering, painting, tiling, and doors, are also included.

It covers **preliminaries and general items**, such as site offices, temporary works, and contractor's overheads.

(c) An inaccurate BOQ may result in **underestimation or overestimation of costs**, leading to budget overruns or unused resources.

It can cause **conflicts during contract execution**, especially if the quantities don't match actual work required.

Errors in the BOQ may lead to **poor decision-making** by the client or contractor, affecting procurement, planning, and project delivery.

5. (a) Define the term "contractor's site diary" and explain its role in project management.

A contractor's site diary is a **daily record kept by the contractor** to document site activities, events, personnel, weather, and other relevant details.

It plays a vital role in project management by **providing a factual reference** for monitoring progress, resolving disputes, and verifying claims or delays.

(b) It should record the **date and weather conditions**, as these may affect site operations or progress.

Labor and equipment used on site should be listed daily to monitor productivity and resource usage.

Work completed or in progress is noted to track adherence to the schedule.

Deliveries, inspections, or incidents are documented to support coordination and accountability.

(c) Poor recordkeeping may result in **inability to support claims** for delays, extra work, or variations, weakening the contractor's position.

It can lead to **miscommunication between site and office teams**, affecting coordination, planning, and payments.

Lack of reliable records may cause **legal or financial disputes**, as there is no written proof of work done or issues encountered.