THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

783 **BUILDING CONSTRUCTION**

Time: 3 Hour. **ANSWERS** **Year: 2003**

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.

(a) Define site layout and explain its significance during construction project execution.

Site layout refers to the planned physical arrangement of construction activities, materials, personnel, and equipment within the construction site. It ensures that all elements required for the project are positioned in a way that maximizes efficiency, safety, and smooth workflow during the project duration.

A well-designed site layout helps prevent congestion, improves productivity, enhances safety, and allows better supervision. It also minimizes time wasted in transporting materials and tools across the site.

(b) (i) List three essential facilities that must be provided on a site layout.

One essential facility is the material storage area, which holds building materials such as cement, timber, and sand. It must be easily accessible to avoid delays.

Another is the site office, where supervision, documentation, and coordination take place.

The workers' welfare area, such as toilets and rest shelters, is also essential for maintaining health, morale, and labor efficiency.

(ii) Explain two consequences of poor site layout planning.

Poor site layout can result in frequent accidents or injuries due to unsafe positioning of equipment or pedestrian paths intersecting with heavy machinery.

It also leads to project delays, as materials may be hard to reach, and movement within the site becomes inefficient.

(c) Mention three ways in which site layout contributes to safety on a construction site.

A good site layout reduces the risk of accidents by separating traffic routes from pedestrian paths and clearly marking hazardous areas.

It ensures emergency access routes are kept open, making evacuation and response faster in case of fire or injury.

It also allows proper positioning of fire extinguishers, first aid stations, and safety signage, ensuring quick access when needed.

2. (a) What is the role of project cost estimation in construction planning?

Project cost estimation involves predicting the total financial requirement for executing a construction project. It plays a critical role in helping stakeholders make informed decisions, plan for finances, secure funding, and establish budgets. Without accurate cost estimates, a project may run out of funds before completion.

(b) (i) Identify four key components considered when preparing a cost estimate.

Material costs are a major component, including all quantities and unit prices of construction materials.

Labor costs are also important, covering wages for skilled and unskilled workers.

Equipment and machinery costs include rental or purchase of construction tools and transport.

Contingency allowances account for unexpected expenses such as price fluctuations or delays.

(ii) State two sources of data used for accurate estimation.

One source is historical cost records from similar past projects, which provide reference values for materials and labor.

Another source is market surveys, where prices are collected from suppliers and service providers to ensure up-to-date values.

(c) Give three challenges encountered during cost estimation in building projects.

One challenge is fluctuation in material prices, especially for imported items, which makes it difficult to predict final costs.

Another is incomplete project designs, where missing details cause estimators to make assumptions that may not reflect actual needs.

A third challenge is inaccurate quantity take-offs, which arise from mistakes in measurements or calculations, leading to underestimation or overestimation.

3. (a) Define curing of concrete and explain why it is important.

Curing is the process of maintaining adequate moisture, temperature, and time conditions to allow concrete to

achieve its desired strength and durability after placement. It prevents rapid loss of moisture which can cause cracks and weak surfaces.

Curing is important because it helps in the hydration of cement, which directly affects the strength development of concrete. Proper curing also minimizes surface shrinkage and increases resistance to weathering.

(b) (i) List four methods of curing concrete used in the field.

Ponding involves keeping water pooled on the surface of flat concrete elements.

Spraying or fogging applies water using nozzles or hoses to maintain surface moisture.

Wet covering uses burlap or hessian soaked in water to cover the concrete surface.

Membrane curing applies a curing compound that forms a film, reducing evaporation.

(ii) State two effects of improper curing on the final strength of concrete.

Improper curing leads to incomplete cement hydration, resulting in low compressive strength.

It also causes surface cracking and dusting, making the concrete more susceptible to water penetration and damage.

(c) Mention three site conditions that influence the choice of curing method.

Weather conditions, such as hot, dry, or windy environments, affect how quickly water evaporates and determine the need for continuous moisture application.

Type of concrete surface, whether horizontal or vertical, influences whether ponding, spraying, or membranes are more effective.

Availability of water on site determines whether water-intensive methods like ponding are practical or if alternatives are needed.

4. (a) What is a contract document?

A contract document is a legally binding agreement between the client and contractor, outlining the terms, conditions, scope, cost, and timeline of a construction project. It ensures that both parties understand their responsibilities and obligations throughout the project.

(b) (i) Name three examples of documents that make up a complete contract package.

Drawings and specifications provide technical details on design and materials.

Bill of quantities outlines the quantities and costs of all work items.

Conditions of contract define legal clauses, rights, and duties of each party.

(ii) Explain two reasons why contract documents must be reviewed before project start.

Reviewing ensures that errors or ambiguities are corrected before execution, preventing future disputes.

It also allows all stakeholders to align expectations and responsibilities, promoting smooth coordination during the project.

(c) Describe three risks that arise when contract documents are incomplete or misunderstood.

An incomplete contract can lead to scope creep, where work outside the agreement is performed without additional payment.

Misunderstanding terms can cause payment disputes and affect contractor cash flow.

It can also lead to project delays, as unclear instructions or changes during construction interrupt the schedule.

5. (a) Define the term “construction waste management.”

Construction waste management is the systematic approach to minimizing, handling, and disposing of waste materials generated on a building site in a way that is environmentally responsible and efficient. It includes reuse, recycling, and safe disposal methods.

(b) (i) State four common types of construction waste generated on site.

Concrete debris, resulting from formwork trimming and demolition.

Wood off-cuts, from carpentry and formwork activities.

Packaging materials, such as plastic, paper, and cardboard from deliveries.

Scrap metal, from reinforcement bars and plumbing fittings.

(ii) Explain two strategies for reducing construction waste during the building process.

Using prefabricated components minimizes on-site cutting and waste.

Implementing material control procedures, such as ordering exact quantities and safe storage, reduces loss and damage.

(c) Describe three environmental benefits of effective construction waste management.

It reduces landfill use, preserving land and reducing harmful emissions.

It conserves natural resources, as recycling reduces the need for new raw materials.

It limits air and water pollution, caused by improper dumping or burning of construction waste.