THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

FORM TWO NATIONAL ASSESSMENT

071 BUILDING CONSTRUCTIONS

Time: 2:30 Hours **ANSWERS** **Year: 2021**

Instructions

1. This paper consists of Section **A, B** and **C** with a total of **ten (10)** questions
2. Answer **al**l questions.
3. Section **A** and **C** carry **fifteen (15)** marks each and section **B** carries **seventy (70)** marks
4. Cellular phones and unauthorized materials are not allowed in the assessment room
5. Write your **Assessment Number** at the top right-hand corner of every page.

FOR ASSESSOR'S USE ONLY

QUESTION NUMBER	SCORE	ASSESSOR'S INITIALS
1		
2		
3		
4		
5		
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7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

SECTION A (15 Marks)

Answer all questions in this section

1. Choose the correct answer from the given alternatives and write its letter in the box provided.

i) How would you categorize the construction works involving water supply, drainage systems, sanitation, electric supply and installation of lifts?

A. Building finishes

B. Building services

C. Building specification

D. Building components

Works involving water supply, drainage, sanitation, electric supply, and lifts are categorized as building services, which ensure the functionality of a building.

Answer: B

ii) The portion of a building structure between the ground surface and the floor level immediately just above the ground is known as

A. Foundation

B. Superstructure

C. Floor

D. Plinth

The plinth is the portion of a building between the ground surface and the floor level just above, acting as a base for the superstructure.

Answer: D

iii) What is the function of fillers in the moulding composition of plastics?

A. To improve mechanical properties

B. To make plastic soft, flexible, and improve toughness

C. To give the required colour to the plastic

D. To facilitate moulding operations by increasing the flow of plastic mix

Fillers (e.g., calcium carbonate) are added to plastics to improve mechanical properties like strength and rigidity while reducing production costs.

Answer: A

iv) Why lead pipe is not recommended for the domestic water supply system?

A. It has corrosive effect

B. It is highly flexible

C. It has poisoning effect

D. It is light in weight

Lead pipes can leach lead into water, causing a poisoning effect that is harmful to health, making them unsuitable for domestic water supply.

Answer: C

v) Suppose you are supervising a site preparation for construction of a classroom; what will be the first task to be performed on a site?

A. Excavation of trenches

B. Timbering to trenches

C. Back filling

D. Site clearance

Site clearance, which involves removing vegetation, debris, and obstacles, is the first task to prepare the site for construction activities.

Answer: D

vi) Which group of buildings include a Parliament house?

A. Sanitaria

B. Institutional

C. Assembly

D. Mercantile

A Parliament house falls under assembly buildings, which are designed for large gatherings, such as legislative or public meetings.

Answer: C

vii) The weight of all walls, partitions, floors, roofs and other permanent structures in the building are termed as

A. Live load

B. Dead load

C. Point load

D. Effective load

The weight of permanent structures like walls, floors, and roofs is classified as a dead load, as it remains constant over time.

Answer: B

viii) What is the disadvantage of tubular scaffold as used in building construction?

A. Have higher fire resisting qualities

B. Are easy dismantling

C. Have high initial cost

D. Have greater durability

Tubular scaffolds, often made of steel or aluminum, have a high initial cost due to the materials and manufacturing, which is a key disadvantage.

Answer: C

ix) When someone suddenly falls ill or injured in the workshop, what kind of assistance needed before treatment process?

A. First aid

B. Clinical

C. Medical

D. Administration

First aid is the immediate assistance provided to someone who is injured or falls ill in the workshop, stabilizing them before professional medical treatment.

Answer: A

x) Excavation of foundation trenches in ground having high water table or waterlogged area needs to be dewatered. What is the method used for shallow excavation?

A. Well point dewatering system

B. Ditches and sumps dewatering system

C. Vacuum method dewatering system

D. Electro-osmosis method dewatering system

For shallow excavation in waterlogged areas, ditches and sumps dewatering systems are used, where water is collected in sumps and pumped out.

Answer: B

2. Match items (i - v) in List A with the corresponding responses in List B by writing the letter of the correct response in the table provided.

LIST A	LIST B
i) A wall built with two different materials	A. Parapet
ii) A wall built with two leaves	B. Composite wall
iii) A wall projecting above the roof level	C. Cavity wall
iv) A wall built to support a timber floor	D. Honey combing wall
v) A wall designed to curves in and out along its length	E. Serpentine wall
	F. Boundary wall
	G. Fender wall
	H. Fence wall

i) Wall with two different materials → B (Composite wall)

ii) Wall with two leaves → C (Cavity wall)

iii) Wall projecting above roof level → A (Parapet)

iv) Wall to support a timber floor → G (Fender wall)

v) Wall that curves in and out → E (Serpentine wall)

SECTION B (70 Marks)

Answer all questions from this section

3. Walls of different types made up of different materials are adopted in the constructions of buildings to save various functions:

a) What are the four functional requirements of the partition walls?

i) Space Division: Partition walls divide interior spaces for privacy or functional use (e.g., rooms in an office).

ii) Sound Insulation: They reduce noise transmission between rooms for occupant comfort.

iii) Lightweight Construction: Partition walls should be light to minimize load on the structure.

iv) Fire Resistance: They should provide some fire resistance to enhance safety.

b) Briefly describe four types of partition walls based on the materials of construction:

i) Brick Partition Wall: Made of bricks, often half-brick thick, providing good sound insulation but heavier.

ii) Timber Partition Wall: Constructed with timber studs and panels, lightweight and easy to install but less fire-resistant.

iii) Glass Partition Wall: Uses glass panels or blocks, allowing light transmission and a modern aesthetic.

iv) Concrete Partition Wall: Made of precast concrete panels, offering durability and fire resistance but heavier.

4. (a) Stones are building materials used since ancient times. What are the four reasons that make stones useful materials in constructions?

i) Durability: Stones are highly durable and resistant to weathering, lasting for centuries.

ii) Strength: They provide excellent compressive strength, ideal for load-bearing structures.

iii) Aesthetic Appeal: Stones offer a natural, attractive appearance for building facades.

iv) Low Maintenance: Stones require minimal maintenance, as they don't rot or corrode.

(b) Briefly describe three types of stones used in the constructions of building:

i) Granite: A hard, igneous rock, highly durable and used for foundations, walls, and decorative finishes.

ii) Sandstone: A sedimentary rock, easy to cut, often used for cladding and paving due to its aesthetic appeal.

iii) Limestone: A sedimentary rock, softer than granite, used for walls and decorative elements but less durable.

(c) Identify three conditions that deteriorate stones and show how they deteriorate stones:

i) Weathering: Rain and wind erode the stone surface, causing cracks and material loss over time.

ii) Chemical Attack: Acid rain reacts with stone (e.g., limestone), dissolving minerals and weakening the structure.

iii) Biological Growth: Moss and algae grow on stone surfaces, retaining moisture and causing disintegration.

5. You visited a site where a building of two floors requires temporary support for the constructions to be continued:

a) With aid of a well-labeled sketch, briefly explain three types of shoring to be used:

i) Raking Shore:

Inclined timber supports extend from the building wall to the ground at an angle, providing lateral support to prevent wall collapse.

ii) Flying Shore:

Horizontal timber beams are placed between two walls (e.g., during demolition of an intermediate wall), supported by struts to provide lateral stability.

iii) Dead Shore:

Vertical timber posts are placed directly under a wall or floor to support the load vertically, often used when underpinning a foundation.

(b) Why scaffold is used to accomplish a work?

Scaffolds provide a safe, elevated platform for workers to access higher levels of a building, enabling construction, repair, or maintenance tasks while ensuring safety and stability.

6. A constructor asked you to purchase timber for construction works:

(a) What factors will you consider in making a choice of a quality timber?

i) Strength: Ensure the timber has sufficient strength for its intended use (e.g., load-bearing beams).

ii) Moisture Content: Choose seasoned timber with low moisture to prevent warping or shrinkage.

iii) Durability: Select timber resistant to decay and insect attack (e.g., treated hardwood).

iv) Defects: Check for minimal knots, splits, or cracks that could weaken the timber.

(b) What factors that will observe in deciding the quality of a timber to choose?

i) Grain Pattern: Straight, uniform grain indicates better strength and quality.

ii) Color and Texture: Consistent color and smooth texture suggest good quality and seasoning.

iii) Weight: Heavier timber often indicates denser, stronger wood (e.g., hardwood).

iv) Soundness: Tapping the timber should produce a clear, ringing sound, indicating no internal defects.

7. Glasses are used as a part of building components:

(a) Why someone should opt for glasses in building?

i) Natural Light: Glass allows natural light to enter, reducing the need for artificial lighting.

ii) Aesthetic Appeal: Provides a modern, transparent look, enhancing the building's design.

iii) Energy Efficiency: Insulated glass can improve thermal efficiency, reducing heating/cooling costs.

iv) Space Perception: Glass partitions or walls make spaces feel larger and more open.

(b) Give six types of glasses that can be used and show how they differ from one another:

i) Float Glass: Standard flat glass, smooth and clear, used for windows and mirrors.

ii) Tempered Glass: Heat-treated for strength, breaks into small, safe granules, used for doors.

iii) Laminated Glass: Two layers with a plastic interlayer, provides safety and sound insulation, used in skylights.

iv) Tinted Glass: Colored to reduce glare and heat, used in facades for energy efficiency.

v) Frosted Glass: Etched or sandblasted for privacy, used in bathroom windows or partitions.

vi) Insulated Glass: Double or triple panes with air gaps, improves thermal insulation, used in energy-efficient windows.

8. You are at the construction site where there is an argument concerning the appropriate procedures of making concrete. Identify five stages of making concrete:

i) Batching: Measuring and mixing cement, sand, gravel, and water in the correct proportions (e.g., 1:2:4).

ii) Mixing: Thoroughly combining the materials to form a uniform concrete mix, manually or with a mixer.

iii) Transporting: Moving the mixed concrete to the placement site using wheelbarrows or pumps.

iv) Placing: Pouring the concrete into formwork or molds, ensuring proper placement without segregation.

v) Curing: Keeping the concrete moist for 7-28 days to ensure proper hydration and strength development.

9. Suppose you are appointed as a team member for analyzing the construction of a school toilet:

(a) What four functions of foundations will you consider?

i) Load Distribution: Foundations distribute the building's load evenly to the soil to prevent settlement.

ii) Stability: They provide stability against overturning or sliding due to wind or seismic forces.

iii) Prevent Moisture Infiltration: Foundations protect the structure from groundwater by elevating it.

iv) Level Base: They provide a level base for constructing the superstructure.

(b) Outline six factors which will make a foundation to fail:

i) Poor Soil Conditions: Weak or expansive soil (e.g., clay) can cause settlement or heaving.

ii) Inadequate Depth: Shallow foundations in unstable soil lead to failure.

iii) Overloading: Excessive load beyond the foundation's capacity causes cracking or collapse.

iv) Water Table Changes: High groundwater levels can erode soil beneath the foundation.

v) Poor Construction Quality: Using substandard materials or improper techniques weakens the foundation.

vi) Seismic Activity: Earthquakes can cause foundations to crack or shift if not designed for seismic loads.

SECTION C (15 Marks)

Answer all questions

10. Mtakuja Village plans to make a new police station with a single room measured 2 m × 4 m.

(a) Describe two main activities to be done on site before the commencement of the setting out:

i) Site Clearance: Remove vegetation, debris, and obstacles to prepare a clear area for setting out.

ii) Site Survey: Conduct a survey to establish boundaries, levels, and reference points for accurate setting out.

(b) With the aid of well-labeled sketches, describe the procedures which should be followed in setting out the building:

- Establish a Baseline: Set a straight baseline parallel to the building's front using a theodolite or tape (e.g., along the 4 m side).
- Mark Corners: From the baseline, measure and mark the corners of the 2 m × 4 m building using pegs, ensuring right angles with the 3:4:5 triangle method.
- Set Profiles: Place profile boards 1 m outside each corner to hold strings marking the wall lines and foundation trenches.
- Check Diagonals: Measure diagonals (e.g., $\sqrt{(2^2 + 4^2)} = \sqrt{20} \approx 4.47$ m) to ensure the rectangle is square.
- Mark Trenches: Use strings on profiles to mark the foundation trench outlines on the ground.

(c) If a site plan measured 15 m × 10 m, prepare a well-labeled sketch plan which shows six necessary site accommodation services:

Site Office: A small cabin (e.g., 3 m × 3 m) in one corner for administration.

Material Storage: A 4 m × 3 m area for storing cement, sand, etc., near the entrance.

Workers' Rest Area: A shaded 3 m × 2 m area for breaks.

Toilet Facility: A 2 m × 1 m portable toilet for workers.

Water Tank: A 2 m × 2 m area for water storage for construction use.

First Aid Station: A 2 m × 1 m area for emergency medical supplies.