THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

071 BUILDING CONSTRUCTION

(For Both School and Private Candidates)

Time: 3 Hours **ANSWERS** **Year: 2003**

Instructions

1. This paper consists of sections A, B and C with total of fifteen questions

2. Answer all questions in section A and B, and two questions in section C.

i. the person who represents the contractor on site for running the work is the
a. general foreman
b. engineer
c. architect
d. clerk of works
e. quantity surveyor

d. clerk of works
a clerk of works is responsible for overseeing construction activities on behalf of the contractor, ensuring that the project is executed according to plans and specifications.

ii. the bend of a communication pipe near the main man is known as
a. an elbow bend
b. a tee-bend
c. an offset bend
d. a u-bend
e. an expansion bend

d. a u-bend
a u-bend is a curved section of pipe used in drainage systems to prevent foul gases from escaping through plumbing fixtures.

iii. a quarter-turn stair has
a. a landing along a quarter-shaped flight
b. a landing between two flights of stairs
c. a single flight of stairs terminated by a landing
d. two flights separated by a tread and riser
e. two landings connected by a single flight of stairs

b. a landing between two flights of stairs
a quarter-turn stair changes direction by 90 degrees with an intermediate landing connecting two flights.

iv. the component that locks the tops of the rafters on roofs is known as
a. king post
b. strut
c. purlin
d. ridge board
e. wall plate

d. ridge board
a ridge board is a horizontal structural element placed at the peak of a roof to which the tops of the rafters are attached, ensuring roof stability.

v. a good mortar used in brickwork should satisfy certain requirements except the following
a. adequate strength
b. good workability
c. retention plasticity for a short period of time
d. durable over a long period
e. bond well to the bricks
c. retention plasticity for a short period of time
mortar should maintain plasticity for a sufficient period to allow proper application and bonding before setting.
vi. the purpose of d.p.c. in buildings is to
a. stop moisture which passes through the floor, cracks, and roof
b. prevent cracks within the building and dry floor
c. provide dry floor finish and good appearance of the building
d. make sure that the anticipated strength of the building is achieved at low cost
e. provide a barrier to the passage of moisture from external sources into the fabric of the building

e. provide a barrier to the passage of moisture from external sources into the fabric of the building
a damp-proof course (d.p.c.) prevents moisture from rising through walls and floors, protecting buildings from damp-related damage.

vii. the framework of horizontal, vertical, and inclined members to provide a temporary platform for the convenience of workers on a construction site is known as
a. shoring
b. scaffolding
c. formwork
d. underpinning
e. arch centering

b. scaffolding
scaffolding is a temporary structure used to provide safe working platforms for construction workers at height.

viii. a slump test is used to determine the
a. density of concrete
b. workability of concrete
c. durability of concrete
d. weakness of concrete
e. correct mix of concrete

b. workability of concrete
the slump test measures the consistency and workability of freshly mixed concrete, indicating its fluidity and ease of placement.

ix. which of the following is in a group of matchboarded doors
a. fully glazed door
b. half glazed door
c. ledged, braced, and battened door
d. flush door
e. panelled door

c. ledged, braced, and battened door
a ledged, braced, and battened door consists of vertical wooden battens held together with horizontal ledges and diagonal braces, commonly used in sheds and external structures.

x. all of the following are fixing devices which penetrate wood except
a. tower bolt
b. screws
c. threaded bolts
d. nails
e. plugs
e. plugs
plugs are used as wall anchors for screws in masonry or concrete rather than penetrating wood directly.

2. Matching items
List A

i. compression member which transfers the loads of a purlin in double roof to a suitable load-bearing support
ii. screen used to seal an opening in a building or between rooms
iii. the behaviour of a cohesive soil
iv. the effect of transporting concrete at long distances or placing them at great heights
v. a trap provided at the point where the house drain joins into the public sewer
vi. wood lintel is not preferred for use nowadays because
vii. a freestanding column of brickwork
viii. to prevent people from falling off a stair and to increase stability of the stair
ix. the major difference between a lock and a latch
x. the horizontal timber members that support poling

List B

a. baluster
b. pier
c. king post
d. pile
e. the former is operated by a handle while the latter is operated by a key
f. strut
g. intercepting trap

h. wallings
i. compaction
j. leaves
k. balustrade
l. the particle constituents are closely integrated and stick together
m. gully trap
n. door
o. segregation
p. pile
q. the former is operated by a key while the latter is operated by a handle
r. sight rail and boning rod
s. an intermediate member of a window frame
t. the wall above it collapses after some time due to rotting

Answers

i - c
ii - n
iii - l
iv - o
v - g
vi - t
vii - b
viii - k
ix - e
x - f

3. show by means of sketches the following types of roofs

a. a couple roof – a simple pitched roof consisting of two sloping rafters leaning against each other at the ridge, without additional support like a collar tie.

b. a lean-to roof – a single sloping roof that rests against a higher wall, commonly used in extensions, sheds, and verandas.

4. list four functions of hardcore
a. provides a stable base – hardcore offers a firm foundation for concrete floors, preventing settlement and movement.
b. improves drainage – it allows water to filter through and prevents water accumulation under the concrete slab.
c. prevents rising damp – acts as a barrier to stop moisture from the ground from reaching the floor surface.
d. distributes loads – spreads the weight of the floor evenly to reduce stress on the subsoil.

5. (a) define a building line

a building line is a predetermined boundary set by local planning authorities, beyond which no part of a building can extend. it ensures uniformity in street alignment, allows for adequate ventilation, and prevents obstruction of public accessways.

(b) explain two ways in which excessive construction works can be avoided or minimized
a. proper planning and design – ensuring that a project is well-designed before construction begins can prevent unnecessary modifications, reducing material waste and labor costs.
b. efficient material use – using standard-sized construction materials and pre-fabricated components minimizes off-cuts and excess work, leading to cost and time savings.

6. what are the roles of the following people in construction work

a. client – the client is the person or organization funding and commissioning the construction project. they define the project requirements, approve designs, and ensure the project aligns with their expectations and budget.

b. structural engineer – a structural engineer is responsible for designing the structural framework of a building, ensuring it can safely withstand loads and forces. they determine the materials and construction methods to provide stability and durability.

7. a. what is the function of damp proof course in buildings

damp proof course (dpc) prevents moisture from rising through walls and floors, protecting buildings from damp-related issues such as mold, structural weakening, and deterioration of finishes.

b. what is dpm

damp proof membrane (dpm) is a plastic sheet or waterproof layer placed under concrete floors or within walls to prevent moisture from seeping into a building from the ground.

8. what are the objects of fireplace design

a. to provide efficient heating while ensuring safe ventilation of smoke and gases
b. to enhance the aesthetic appeal of an interior space
c. to improve fuel combustion and maximize heat output
d. to ensure proper air circulation and minimize the risk of smoke entering the living area

9. a. when is concrete said to be workable

concrete is considered workable when it can be easily mixed, placed, compacted, and finished without segregation or excessive bleeding of water. good workability ensures proper bonding and durability.

b. what is the function of water in concrete

a. activates the cement, starting the hydration process needed for strength development
b. provides workability, making it easier to mix, transport, and place the concrete
c. helps in curing by maintaining moisture content during the hardening process

10. define the following

a. stair – a stair is a series of steps that provide a means of moving between different levels in a building.

b. ramp – a ramp is an inclined surface used as an alternative to stairs, allowing easy access for wheelchairs, trolleys, and people with mobility issues.

c. going of flight – the going of a flight refers to the total horizontal distance covered by a stair flight from the start of the first step to the end of the last step.

d. straight flight stair – a straight flight stair consists of a continuous series of steps without turns or landings, connecting two levels in a direct line.

11. explain how door frames are fixed in position on the walls

a. the frame is positioned in the door opening and temporarily supported using wooden wedges
b. metal or wooden fixing lugs are used to secure the frame to the wall at multiple points
c. cement mortar or foam filler is applied around the frame to ensure a firm hold
d. the door frame is checked for alignment before final securing with screws or nails

12. differentiate between soakaway pits and cesspits

a. soakaway pits – these are drainage pits that allow rainwater or wastewater to seep into the surrounding soil through perforated walls, preventing surface water accumulation.

b. cesspits – these are sealed underground tanks that store sewage and wastewater, requiring regular emptying as they do not allow liquid to drain into the soil.

13. a. what is

i. setting out of foundation – setting out a foundation involves marking the exact position of the building's foundation on the ground using pegs, strings, and profile boards before excavation begins.

ii. excavation – excavation is the process of removing soil or rock to create space for foundations, basements, drainage systems, or other underground structures.

b. draw a typical sketch of a profile board in position and label

i. trench width – the horizontal distance across the trench, determined by foundation size requirements.
ii. foundation wall thickness – the thickness of the foundation walls that support the building.
iii. main wall thickness – the thickness of the primary structural walls above the foundation.

c. for what purpose are the egg-shaped sewers tapered at the bottom

a. to maintain higher velocity during low flow conditions, preventing sediment buildup
b. to improve the self-cleansing ability of the sewer, reducing the need for frequent maintenance

d. a joiner fixed a casement window to open inwards but when the building inspector visited the site, he ordered to change it in order to open outwards. write down two reasons for the change

a. outward opening casement windows provide better weather resistance, preventing rainwater from entering the building
b. outward opening windows improve ventilation efficiency by capturing more airflow compared to inward opening windows.

14. a. define chimney stack

a chimney stack is the part of a chimney that extends above the roofline, designed to safely release smoke and gases from a fireplace or heating system into the atmosphere.

b. what is the greatest problem of chimney stacks
the greatest problem of chimney stacks is the buildup of soot and creosote, which can lead to blockages and chimney fires. structural deterioration due to weather exposure is also a common issue.
c. when is each of the following fittings used in the arrangement of drainage as it collects water from roofs through rainwater down pipes
i. rainwater shoe – used at the bottom of a rainwater downpipe to direct water away from the building and prevent splashing on walls
ii. back inlet gully – used to collect surface water and wastewater from low-level drains while allowing trapped access to prevent foul smells

d. with the help of sketches, show how the following positions of inspection chambers are differentiated
i. at the change of direction of the drain – inspection chambers are placed where drains change direction to allow for easy maintenance and cleaning
ii. at the change of gradient of the drain – inspection chambers are installed where drain slopes change to prevent blockages and ensure proper flow

15. a. define the following
i. flight – a flight is a continuous series of steps between landings in a staircase
ii. landing – a landing is a flat platform between flights of stairs, providing a resting space and facilitating changes in direction
b. with the help of sketches, show the different methods of jointing risers to treads and alternative nosings

c. with the aid of a sketch, explain the construction of winders in a staircase
winders are wedge-shaped steps used in staircases to allow changes in direction without the need for a landing. they are commonly found in spiral and l-shaped staircases.