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: 2005**

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 purpose of a sole plate as used in shoring work is to

a. distribute the load evenly over a large area
b. provide a fixing point for the various components
c. allow the shores to be easily levelled
d. keep the bottom of the shores in line
e. resist the load between the walls

a. distribute the load evenly over a large area
a sole plate is a horizontal structural member placed at the base of a shoring system to distribute loads across a wider area, preventing excessive pressure on the ground and ensuring stability.

ii. the term "in situ" concrete refers to concrete that has been cast

a. at the factory
b. in a mould box
c. in its location
d. in large units
e. in small units

c. in its location
"in situ" concrete is poured and set directly at the construction site, as opposed to precast concrete, which is molded and cured in a factory before being transported to the site.

iii. the materials for damp-proof courses must be

a. able to stop any expected settlement to a building
b. in comparatively thick sheets
c. completely impervious
d. replaced from time to time
e. adequately permeable

c. completely impervious
a damp-proof course (dpc) must be made of materials that are completely impervious to moisture, such as bitumen, plastic, or lead sheets, to prevent rising damp in buildings.

iv. figure 1 below represents a

a. survey level staff
b. profile board
c. boning rod
d. sighting board

c. boning rod
a boning rod is a tool used in leveling and setting out construction work. it helps in ensuring that trenches or foundations are dug to the correct depth and level.

v. the name given to the intermediate vertical members of a window frame is

a. muntins
b. mullions
c. jambs
d. stiles
e. rails

b. mullions
mullions are the vertical bars that divide the glass panes in a window frame, providing structural support and aesthetic segmentation.

vi. the chimney should be built as vertical as is practicable in order to give

a. minimum flue gas flow
b. maximum flue gas flow
c. maximum retention of heat
d. maximum reflection of heat to the room
e. efficient use of fuel

b. maximum flue gas flow
a vertical chimney ensures an unobstructed and efficient flow of flue gases, reducing smoke accumulation and improving the efficiency of combustion.

vii. one of the disadvantages of the direct system of cold water supply distribution is as follows

a. less water is obtainable during peak periods
b. a large number of pipes is used
c. there is a likelihood of contamination of water at the storage tank
d. no water is obtainable at the mains
e. causes failure of water mains to function efficiently

a. less water is obtainable during peak periods
in a direct water supply system, water is drawn directly from the main supply. during peak hours, demand increases, reducing the available water pressure and quantity.

viii. the pitch line on stair construction

a. is measured horizontally between the two end uses

b. is the accumulation of steps along one flight
c. separates stair flights
d. connects all risings of treads in a flight
e. spans the same as stair headroom

d. connects all risings of treads in a flight
the pitch line is an imaginary line connecting the nosings of all treads in a staircase, indicating the angle or slope of the stairs.

ix. the type of hinge used to fix battened (or matchboarded) doors to frames is

a. parliamentary hinge
b. tee hinge
c. eye hinge
d. butt hinge
e. skew butt hinge

b. tee hinge
tee hinges have a long strap that provides extra support, making them suitable for battened or matchboarded doors commonly used in sheds and rural structures.

x. the roofing member used in pitched roofs and laid over rafters to support the tiles is known as

a. purlin
b. jack rafter
c. batten
d. verge
e. principal rafter

c. batten
battens are thin, horizontal strips of timber fixed over rafters to support tiles or slates, ensuring proper alignment and secure attachment of roofing materials.

2. Matching items
List A

i. Binding
ii. Glazing without beads
iii. Roof covering materials
iv. A structural member used to receive the load from the beam and transmit it to the foundation
v. The term used to describe the hardware used in construction
vi. A wooden member around door and window openings provided to hide the joint between frame and opening and give good appearance

vii. The platform of a fireplace upon which the fuel is directly placed on
viii. The lowest part of the structure on which the building rests
ix. Horizontal joint between two consecutive courses
x. To allow access for inspection and rodding of drains

List B

a. English bond
b. The total load on the foundation
c. Bed joint
d. A thin layer of mortar applied to the walls to fill or blind the open pores on the wall
e. Ironmongery
f. Foundation
g. Floor screed
h. A layer of stonedust laid over hardcore before oversite concrete is spread over
i. Skirting
j. Mitred pieces of wood are used as moulding to fix the glasses
k. Architrave
l. Fireplace opening
m. Shingles
n. Putty is used to fix the glasses
o. Superimposed hearth
p. Inspection chambers are constructed at change of direction and gradient
q. Common rafter
r. Materials used to make nails, screws, and bolts
s. Beam

Answers

i - a
ii - n
iii - m
iv - s
v - e
vi - k
vii - l
viii - b
ix - c
x - p

3. define the following terms as used in fireplaces

a. fireplace – a fireplace is an open structure, usually built into a wall, where a fire is contained and used for heating purposes. it is commonly made of brick, stone, or metal and includes components like the firebox, hearth, and chimney to control combustion and smoke ventilation.

b. chimney – a chimney is a vertical passage, typically made of brick, metal, or concrete, that allows smoke and gases from a fireplace, stove, or furnace to escape into the outside atmosphere. it creates an upward draft, improving air circulation and preventing the buildup of harmful gases inside a building.

c. flue – a flue is the inner duct within a chimney or vent system that directs smoke, heat, and combustion gases safely outside. it is designed to withstand high temperatures and is usually lined with materials like clay or stainless steel to prevent leaks and fire hazards.

d. throat – the throat is the narrow section located just above the firebox and below the flue in a fireplace. it helps regulate airflow and is often equipped with a damper, which can be adjusted to control the amount of heat and smoke escaping through the chimney.

4. define the following

a. shallow foundations – shallow foundations are types of foundations that transfer building loads to the ground at relatively small depths, typically not exceeding three meters. they are used when the soil near the surface is strong enough to support the structure. examples of shallow foundations include:

- strip foundation: a continuous strip of concrete placed under walls to distribute loads evenly.
- raft foundation: a large slab covering the entire footprint of the building to spread the load over a wide area.

b. deep foundations – deep foundations are structural elements used to transfer loads from buildings or structures to deeper, more stable soil layers. they are required when the surface soil is weak or unable to support the weight of the structure. examples of deep foundations include:

- pile foundation: long, slender columns driven deep into the ground to transfer loads to firmer soil or rock.
- caisson foundation: a large watertight chamber that is sunk into the ground and filled with concrete to provide stability for heavy structures like bridges and high-rise buildings.

5. define the following terms

a. water main – a water main is a large-diameter pipeline that transports potable water from a water treatment plant to distribution networks within a city or town. it serves as the primary supply line for public water distribution systems.

b. service pipe – a service pipe is a smaller pipeline that connects individual properties to the main water supply. it carries water from the water main to homes, businesses, or industrial facilities for everyday use.

c. distribution pipe – a distribution pipe is part of a local water network that delivers water from the main supply to different areas within a community. it ensures that households, businesses, and other facilities receive an adequate water supply at the required pressure.

d. drainage – drainage refers to the system designed to remove excess water, sewage, or stormwater from buildings, roads, and land. it prevents water accumulation that could cause flooding, structural damage, or soil erosion. drainage systems can be categorized into:

- surface drainage: collects and channels rainwater away from roads, buildings, and fields.
- subsurface drainage: removes excess water from below the ground, often using perforated pipes or drains to improve soil stability.

6. list down four purposes of providing hardcore in concrete ground floors

a. to provide a stable base for concrete flooring by reducing settlement and ensuring even load distribution
b. to prevent rising damp by acting as a barrier between the ground and the concrete slab
c. to improve drainage by allowing water to filter through and preventing water accumulation under the floor
d. to enhance the structural strength of the floor, making it more resistant to cracking and deformation

7. what are the primary functions of windows
a. to provide natural lighting by allowing sunlight to enter a building, reducing the need for artificial lighting
b. to allow ventilation by enabling the flow of fresh air, improving indoor air quality and comfort
c. to enhance aesthetic appeal by contributing to the design and overall appearance of a building
d. to provide a view of the external environment, creating a sense of openness and connection with the outdoors
8. sketch a putlog scaffold and label the following

a. standard – vertical poles that provide support for the scaffold structure
b. putlog – horizontal members that connect the scaffold to the building wall for stability
c. ledger – horizontal beams that support the working platform

9. differentiate a flat roof from a pitched roof

a flat roof has little to no slope, usually less than 10 degrees, and is commonly used in commercial and modern residential buildings. it provides space for installations such as air conditioning units and solar panels

a pitched roof has a noticeable slope, typically greater than 10 degrees, and is commonly used in residential buildings. it allows efficient water drainage and provides additional attic space

10. explain the difference between a lock and a latch
a lock is a mechanical device that secures a door or window using a key or combination to prevent unauthorized access. locks provide higher security and require a key or password to open

a latch is a simple mechanism that holds a door or window closed without requiring a key. it is used mainly for convenience rather than security, as it can be easily opened from either side

11. what is the difference between the following as related to stairs

a. the rise and riser – the rise refers to the vertical distance between two consecutive steps, while the riser is the vertical component of an individual step

b. going of a step and going of a stair's flight – the going of a step is the horizontal depth of a single tread, while the going of a stair's flight is the total horizontal distance covered by a series of steps from one landing to another

12. list down four functional requirements of walls

a. structural stability – walls must be strong enough to support loads from the roof and upper floors
b. weather resistance – walls should protect the interior from wind, rain, and temperature variations
c. sound insulation – walls should reduce noise transmission between rooms and from outside sources
d. fire resistance – walls should provide a barrier to slow down the spread of fire within a building

13.(a) describe how to lay floor screed finish to floors

a. prepare the surface by cleaning it and removing dust, debris, and loose particles
b. apply a bonding agent or water to improve adhesion between the screed and the base floor
c. mix the screed material (cement and sand) with water to achieve a smooth, workable consistency
d. pour and spread the screed evenly across the floor using a straightedge to level it
e. allow the screed to set and cure properly before applying any floor coverings

(b) what advantages do concrete floors have over other types of floors

a. durability – concrete floors are highly resistant to wear and tear, making them long-lasting
b. low maintenance – they require minimal upkeep compared to wooden or tiled floors
c. fire resistance – concrete floors do not burn, providing better fire protection
d. versatility – they can be polished, stained, or textured to suit different aesthetic preferences

(c). draw a simple sketch of a stair and show the following

a. tread – the horizontal surface of a step where the foot is placed
b. nosing – the edge of the tread that extends slightly beyond the riser
c. stringer – the inclined structural member supporting the steps
d. flight line – the imaginary line connecting the nosings of all steps in a stair flight

14.(a) what is meant by the term bearing capacity of soil

bearing capacity of soil refers to the maximum load per unit area that the soil can support without undergoing excessive settlement or failure. it determines the type and depth of foundation required for a structure

(b)(i)explain the meaning of the term curing of concrete

curing of concrete is the process of maintaining adequate moisture, temperature, and time conditions to allow concrete to gain its full strength. proper curing prevents cracks, improves durability, and enhances overall performance

(ii) list down four methods of curing of concrete
a. water curing – continuously wetting the concrete surface with water to prevent moisture loss
b. membrane curing – applying a liquid membrane or plastic sheet to seal moisture within the concrete
c. steam curing – exposing concrete to steam to accelerate strength gain, commonly used in precast concrete
d. ponding method – flooding the surface with water, usually for slabs and pavements, to keep it moist

(c) show by sketches the following types of roofs
a. double lean-to roof

a double lean-to roof consists of two sloping roof sections that lean against opposite walls of a structure, forming a ridge at the top where the two slopes meet. it is commonly used in small buildings, sheds, and extensions. this type of roof allows for efficient water drainage and provides more interior space compared to a single lean-to roof.

b. collar roof

a collar roof is a pitched roof where opposing rafters are connected by horizontal beams known as collar ties. the collar ties are positioned higher up along the rafters to prevent them from spreading outward due to roof loads. this type of roof is commonly used in traditional houses and loft conversions because it allows for additional headroom while maintaining structural stability.

c. couple roof

a couple roof is a simple pitched roof where pairs of rafters are leaned against each other and meet at the ridge without additional horizontal support. the weight of the roof is transferred down the rafters to the walls. since there are no collar ties or ceiling joists, couple roofs are mainly used in smaller structures where the walls are strong enough to resist outward thrust.

15. (a) show with sketches the difference between a lintel and an arch

a lintel is a horizontal beam placed above a door or window opening to support the load above it

an arch is a curved structure that distributes weight efficiently, often used for aesthetic and structural purposes

(b) (i) what is the major disadvantage of a hollow core flush door as compared to a solid core flush door

a hollow core flush door is lighter and less expensive but has lower strength, durability, and soundproofing compared to a solid core flush door, which is heavier and provides better insulation and security

(ii) show by sketch a solid core flush door

a solid core flush door is made of a solid filling material inside, such as particleboard or timber, for enhanced strength and durability

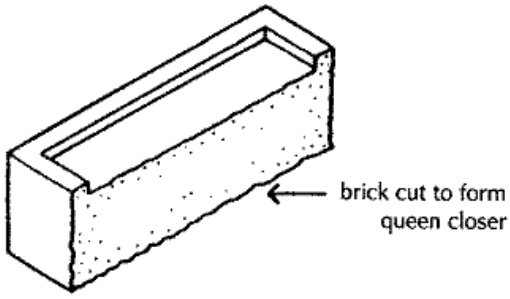
(c) what is pointing and how does it differ from painting

pointing is the process of applying mortar to the joints of brickwork to enhance its durability and appearance

painting is the application of liquid coatings to walls, wood, or metal surfaces for aesthetic and protective purposes

(d) sketch the following bricks

a. queen closer



b. king closer.