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: 2002**

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. bearing capacity of soil means
a. the load to a subsoil at a point near the ground
b. the load to a subsoil some distance below the ground floor
c. the load that the soil can safely carry with appreciable settlement
d. deformation of soil due to imposed loads
e. the force to be resisted by a foundation

c. the load that the soil can safely carry with appreciable settlement
bearing capacity refers to the maximum load that soil can support without excessive settlement or failure, ensuring the stability of foundations.

ii. sleeper walls are constructed with open spaces (honeycombed) between the bricks with the aim of
a. becoming quicker to build
b. allowing air to circulate under the floor
c. reducing the cost of bricks
d. giving a good appearance
e. allowing people to pass through

b. allowing air to circulate under the floor
honeycombed sleeper walls allow ventilation beneath suspended timber floors, preventing dampness and decay.

iii. the cement commonly used in ordinary works is
a. rapid hardening portland cement
b. high alumina cement
c. white and coloured cement
d. ordinary portland cement
e. extra rapid hardening portland cement

d. ordinary portland cement
ordinary portland cement (opc) is the most commonly used cement for general construction due to its durability, strength, and availability.

iv. a chimney is defined as
a. a shaft projecting above the roof to carry off the smoke and gases from the fireplace
b. a passage for conveying the discharge of an appliance
c. brickwork surrounding the passage from the appliance to convey the gases
d. a tall breast standing chimney
e. a structure supporting the construction hearth

a. a shaft projecting above the roof to carry off the smoke and gases from the fireplace
a chimney is a vertical structure designed to vent smoke and combustion gases safely outside a building.

v. a wall which separates two dwellings is called
a. separating wall
b. fender wall
c. partition wall
d. party wall
e. serpentine wall

d. party wall
a party wall is a shared wall that separates two adjoining properties, commonly found in semi-detached and terraced houses.

vi. the main functions of windows are to
a. admit daylight and ventilation
b. allow people to pass through
c. admit people, daylight, and ventilation
d. weatherproof buildings and admittance of people and their goods
e. allow wind escaping from it

a. admit daylight and ventilation
windows are primarily designed to allow natural light and fresh air into a building, improving comfort and reducing the need for artificial lighting and ventilation.

vii. a communication pipe is
a. that pipe used for communication between the water main and owner
b. part of service pipe between company's main and boundary stop cock
c. pipe connected at the point where a storage tank is installed
d. part of service pipe between boundary stop cock and point of draw off in the building
e. pipe obtaining water from a storage tank

b. part of service pipe between company's main and boundary stop cock
a communication pipe connects the main public water supply to the private service pipe of a property, ensuring a regulated water connection.

viii. the following are the operations in the construction of a short bored piled foundation except
a. site clearance
b. boring the holes for piles
c. forming the shuttering for the reinforced concrete beams or excavating the trenches to serve as shuttering
d. casting the piles
e. casting the beams

e. casting the beams
piled foundations involve driving piles deep into the ground to support loads, whereas beams are cast as part of the superstructure, not directly related to pile foundation installation.

ix. the traditional method of providing heating in domestic buildings is
a. the open convectors
b. the open fireplaces
c. the room heaters
d. the back boiler
e. independent boilers

b. the open fireplaces
historically, open fireplaces were the most common method of heating homes, providing warmth through combustion of wood, coal, or other fuels.

x. the following are the functional requirements of a floor except
a. durability
b. exclusion of wind and rain
c. strength
d. fire resistance
e. transmission of sound

e. transmission of sound
a functional floor should be durable, strong, fire-resistant, and weatherproof, but it should minimize rather than transmit sound for better acoustic performance in buildings.

2. Matching items
List A

i. the workability of concrete
ii. the total load of a building and the nature of the bearing capacity of the subsoil
iii. made-up ground is unsuitable for the foundation of a building
iv. a material used to reduce the consistency of paint
v. actual means of ascending or descending from one level to another
vi. common rafter
vii. a structural member used to receive the load from beams and transmit it to the foundation
viii. the process of preventing twisting or buckling of floor joists
ix. the term used to describe the hardware used in construction
x. the method of preventing foul gases from the drain from entering a building

List B

a. provision of traps
b. thinners
c. individual wedge-shaped bricks in an arch
d. walls constructed to enclose the concrete and hardcore of a ground floor hearth of a fireplace

e. stain
f. the ease at which concrete can be worked (transporting, placing, and compacting)
g. the factors on which the choice of type of foundation depends
h. has low bearing capacity by its nature
i. gives good thermal insulation, keeps the building warm in winter and cool in summer
j. as a hip rafter but forming an internal angle
k. the nature of the ground
l. main load-bearing member of a roof spanning between the wall plate and ridge plates
m. a wall constructed to enclose space
n. a column
o. provision of barrier to the passage of moisture into the building
p. strutting
q. ironmongery
r. kerosene
s. non-return valve
t. newel post

Answers

i - f
ii - g
iii - h
iv - b
v - t
vi - j
vii - l
viii - p
ix - q
x - s

3. state four functional requirements of walls

a. structural stability – walls must support loads from the roof and upper floors without failure
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 prevent the rapid spread of fire within a building

4. a. what is concrete
concrete is a composite construction material made of cement, sand, gravel (aggregate), and water. it hardens over time due to a chemical reaction called hydration, forming a strong and durable material used in construction.

b. why is concrete reinforced
concrete is reinforced with steel bars (rebar) or mesh to improve its tensile strength. while concrete is strong in compression, it is weak in tension. reinforcement prevents cracks and increases its ability to withstand bending and stretching forces.

5. state two functions of fireback
a. to reflect heat into the room, improving the efficiency of a fireplace
b. to protect the masonry wall behind the fireplace from excessive heat and damage

6. a. why is it necessary to provide openings in building walls
openings such as windows and doors allow natural light, ventilation, and access to and from the building. they also enhance the functionality and aesthetics of the structure.

b. what is a threshold
a threshold is a strip, often made of wood, metal, or stone, placed at the bottom of a doorway. it provides a transition between different floor levels and helps seal the gap between rooms to prevent drafts, water, and dust from entering.

7. state two aims of carrying out site exploration or investigation
a. to determine the soil properties and bearing capacity before designing the foundation
b. to identify potential hazards such as underground water, weak soil, or existing structures that may affect construction

8. what is the difference between a manhole and an inspection chamber
a. a manhole is a larger access point in underground drainage or sewer systems, allowing maintenance workers to enter and inspect pipelines
b. an inspection chamber is a smaller access point used to check and clean underground drainage systems, typically found near junctions or changes in pipe direction

9. state four types of shallow foundations commonly used in our country
a. strip foundation – a continuous strip of concrete that supports load-bearing walls
b. pad foundation – a single isolated footing used under columns
c. raft foundation – a large slab of concrete covering a wide area, distributing the building's load evenly
d. trench fill foundation – deep trenches filled with concrete to support walls without using traditional brick footings

10. list down four factors on which the type of floor finish depends

a. the type of use – different finishes are required for residential, commercial, or industrial buildings
b. durability – floors must withstand wear and tear, especially in high-traffic areas
c. maintenance requirements – some finishes require more frequent cleaning and upkeep than others

d. cost – budget constraints influence the selection of floor finishes, balancing affordability with quality

11. state two advantages of applying paints to wall surfaces
(a). protection – paint acts as a barrier against moisture, dust, and weathering, prolonging the lifespan of walls
(b) aesthetics – paint enhances the appearance of walls by adding color, texture, and decorative finishes

12. define the following terms
(a). communication pipe – a communication pipe is a section of a water supply pipe that connects the main public water source to the private service pipe of a property
(b). supply pipe – a supply pipe is the portion of the water distribution system that delivers water from the communication pipe to fixtures within a building

13. (a) define paint
paint is a liquid coating applied to surfaces such as walls, wood, or metal to provide protection, color, and decorative finishes. it consists of pigments, binders, solvents, and additives.
(b). explain briefly the following
i. priming paints – priming paints are base coats applied before the main paint to improve adhesion, seal porous surfaces, and enhance durability
ii. undercoat paints – undercoat paints are intermediate layers applied between the primer and topcoat to improve coverage, smoothen the surface, and enhance the final finish
(c). why is clay for making bricks weathered
clay is weathered to break down large particles, remove impurities, and improve workability. this process enhances the uniformity and strength of bricks when molded and fired.

(d) differentiate between a drain and a private sewer
a. a drain is a pipe that carries wastewater or rainwater from a single property to a sewer or disposal system
b. a private sewer is a network of drains that serve multiple properties before connecting to the main public sewer system

14.(a) list down four functions of roofs
a. protection – roofs shield buildings from rain, sun, wind, and snow
b. insulation – roofs help regulate indoor temperatures, keeping buildings warm in winter and cool in summer
c. structural stability – roofs provide support and integrate with the overall framework of a building
d. aesthetic value – roofs contribute to the architectural style and appearance of buildings

(b). state disadvantages of timber flat roofs
a. prone to decay – timber can rot when exposed to moisture over time
b. lower durability – timber flat roofs have a shorter lifespan compared to concrete or metal roofs
c. fire hazard – wood is highly flammable and requires special treatment for fire resistance
d. requires maintenance – regular treatment and repairs are needed to prevent insect attacks and weathering

(c) describe briefly how to lay a floor screed on a concrete floor to form a jointless floor finish
a. clean the concrete surface to remove dust, debris, and contaminants
b. apply a bonding agent or wet the surface to improve adhesion
c. mix and pour the screed evenly across the floor area
d. use a straightedge or float to level and smooth the screed
e. allow the screed to set and cure properly before applying any additional finishes

(d) state two methods of ensuring safety when working in trenches
a. trench shoring – installing timber, metal, or hydraulic supports to prevent the trench walls from collapsing
b. proper access and exit – using ladders or ramps to provide safe entry and exit points for workers .

15. a. define the following terms

i. intrados – the inner curve or underside of an arch, which faces the opening below it.
ii. voussoirs – the wedge-shaped blocks that make up an arch, with the central one known as the keystone.
iii. axed arches – arches constructed using roughly dressed or squared stones, where the shape is achieved using an axe rather than precise cutting tools.

b. differentiate between shoring and underpinning

shoring is the temporary support provided to structures during construction or repairs to prevent collapse, often used in excavation or unstable walls.

underpinning is a permanent method used to strengthen and stabilize an existing foundation by extending its depth or width to support additional loads.

c. state four advantages that reinforced concrete stairs have over other types of stairs

i. durability – reinforced concrete stairs are highly resistant to wear, fire, and moisture, making them long-lasting.
ii. strength – they can bear heavy loads and are suitable for high-traffic areas.
iii. low maintenance – they require minimal upkeep compared to wooden or metal stairs.
iv. flexibility in design – they can be molded into various shapes, including curved or spiral staircases.

d.define a butt hinge
a butt hinge consists of two rectangular metal plates joined by a central pin, allowing doors or windows to swing open and close smoothly.