THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

FORM TWO NATIONAL ASSESSMENT

071 **BUILDING CONSTRUCTION**

Time: 2:30 Hours. **ANSWER** **Year: 2024**

Instructions

1. This paper consists of sections **A**, **B** and **C** with a total of **ten (10)** questions.
2. Answer **all** questions.
3. Section A carries **15** marks; section B carries **70** marks and section C carries **15** marks.
4. All writing must be in **black** or **blue** ink and drawings must be in **pencil**.
5. Cellular phones and unauthorized materials are **not allowed** in the examination room.
6. Write your **Assessment Number** at the top-right hand corner of every page.

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	SCORE	EXAMINER'S INITIALS
1		
2		
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4		
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10		
TOTAL		
CHECKER'S INITIALS		

SECTION A (15 Marks)

Answer **all** questions from this section

1. For the item (i)-(x), Choose the correct answer from among the given alternatives and write its letter in the box provided.

(i) What is the moulded and ornamented brick inserted on a wall to support the joist truss and weather shed?

A Cornice B Frieze

C Jamb D Corbel

The correct answer is *D*, *Corbel*. A corbel is an element in the wall that support joist, truss, and ornamental treatment.

(ii) Suppose you are required to construct workshop building with the strongest stone which type of stone will you use?

A Granite B Slates

C Lime D Marble

The correct answer is *A*, *Granite.* The granite are the types of stone originated from the igneous rock from the cooling and crystallization of the magma beneath the earth's surface.

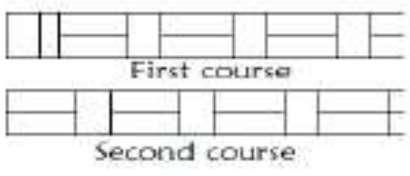
(iii) Which of the following building element is part of the substructure?

A A roof B A door

C A foundation D A window

The correct answer is *C, A foundation*. A foundation is an element of the building that lies below the ground level and is termed as sub structure.

(iv) Study Figure below on the bricks arrangement in the two courses of a brick wall and identify the type of bond used:



A English B Flemish

C Stretcher D Header

The correct answer is *B,* *Flemish*, in which this type of bond, each course is comprised of alternate headers and stretchers.

(v) What member of scaffolds will you use to support a putlog where there is window opening in a wall to be constructed?

A Revel pin B Ledger

C Swivel coupler D Standard

The correct answer is *A,* *Revel pin*, a revel pin is a metal or wooden post, which tighten struts, wedged vertically in window openings used to support putlogs.

(vi) Which building material is not formed naturally?

A Wood B Stones

C Clay D Plastics

The correct answer is *D,* *Plastics*. Plastics are manmade or industrially manufactured materials from natural elements, hydrocarbons and forest products.

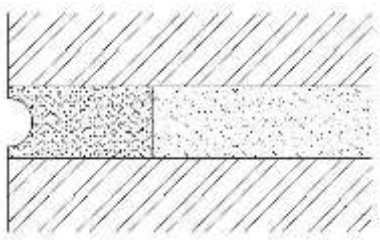
(vii) The background of uncoursed rubble masonry wall need to be plastered what type of plaster would you recommend?

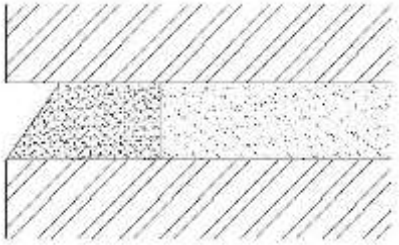
A Cement plastering B Stucco plastering

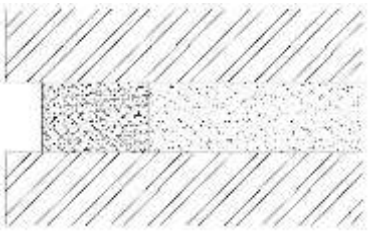
C Lime plastering D Barium plastering

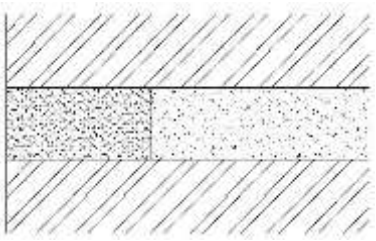
The correct answer is *A,* *Cement plastering*. This is the best mortar for external plastering work since it is non-absorbent and strong compared to other type of plaster.

(viii) Which sketch represents weathered pointing wall finish?

A 

B 

C 

D 

The correct answer is B. A weathered pointing is made by making a projection in the form of V-shape.

(ix) Which machines will you need for removing top soil and reducing the level on the large site?

A Mechanical auger and pneumatic drill

B Backacter and Pneumatic drill

C Dump truck and tipper truck

D Bulldozer and Mechanical shovels

The correct answer is *D*, *Bulldozer and Mechanical shovels*. Bulldozers are mechanical plant purposely for the removal of the top soil and reducing the level on construction site while the mechanical shovels pick the excavated soil from the ground and throw aside or on hauling trucks for various purposes.

(x) There is a danger of sides of a foundation trench to collapse. What temporary structure will you use to support it?

A Formwork B Timbering

C Shore D Scaffolding

The correct answer is *B*, *Timbering*, which is a process of preventing the soil from the sides of the excavated trench from collapsing.

2. Match the definition of brick portions in **List A** with correct terminology in **List B** by writing a letter of the corresponding response under the item number in the table provided.

List A		List B
(i)	A portion of brick with the cut made longitudinally.	A. Bevelled bat
(ii)	A portion of brick which is obtained by cutting a brick into two parts lengthwise.	B. Bat
(iii)	A portion of brick obtained by cutting the triangular piece between the centre of one end and the centre of the side.	C. Queen closer
(iv)	A portion of brick whose one end is cut splayed for full width.	D. Mitred closer
(v)	A portion of brick obtained by cutting the brick crosswise.	E. Closer
		F. King closer
		G. Bevelled closer
		H. Full brick

Answers.

(i)	(ii)	(iii)	(v)	(v)
B	C	F	E	D

SEECTION B (70 Marks)

Answer **all** questions from this section.

3. Suppose you have been appointed as a school workshop supervisor:

(a) Differentiate hands from power tools.

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(b) Explain five ways of keeping the tools in good condition

(i) Cleaning tools after use

(ii) ensuring safety when using tools

(iii) Removing loose wristwatches before using machinery

(iv) Developing safety habits when using tools

(v) Avoiding carrying sharp-edged or pointed tools in pockets

(c) Briefly explain the use of the given block work laying tools:

(i) Joint board

The joint board is used to facilitate the filling of cross-joints, prevent mortar from dropping, and aid in laying mortar on the narrow webs of blocks, preparing for the next course of walling.

(ii) Steel square

The steel square is used to check whether the angle formed by two walls is 90 degrees.

4. Glass is a building material which is commonly used in modern buildings.

   (a) Outline five forms of commercial glasses available which are used in construction.

   (i) Sheet glass

   (ii) .Frosted glass

   (iii) Safety glass

   (iv) Wired glass

   (v) Plate glass

   (b) Identify the five uses of glasses in buildings?

   (i) Glazing doors, windows and skylights

   (ii) Constructing partitions

   (iii) Making mirrors

   (iv) Decorating interiors

   (v) Insulating pipes

5. Differentiate The qualities and properties of timber depend on the quality of tree from which it is obtained. Differentiate the softwood from hardwood by considering the factor shown in the following table.

Factor	Soft Wood	Hard wood
Annual ring	It has many annual rings	It has fewer annual rings
Fire resistance	It does not resist fire in high level	It has high fire resistance
Strength	Not stronger	It is stronger
Structure	It has thin leaves	It has broad leaves
Weight	It has weight in comparison to hard wood.	It has high weight.

6. Briefly explain five dewatering methods which can be used in water logged site.

(a) **Pumping**, where water is removed using pump.

(b) **well-point systems**, where water is extracted through ground water pipes wells driven into the ground around the site.

(c) **Sump pumping**, where water is collected using gravity in sumps and channels away from the construction sites.

(d) **Buckets,** where buckets are used to fetch water from the site and pour them far away from the site.

(e) Deep wells.

7. Suppose you were assigned to plaster an external brick wall of a class room building.

(a) Which tools will you need for the work? Identify three tools.

(i) Float

(ii) Mortal board

(iii) Trowels

(b) Briefly explain seven steps that would be followed when plastering the wall.

Plastering a wall involves putting of a finish on the wall It entails pre decoration purposes or any other structural properties and purposes Steps followed when plastering a wall include:

i. Prepare all tools and equipments that will be used when plastering a wall example a trowel and float

ii. Ensure the surface to be plastered is well levelled and is of good condition

iii. Clean the surface to be levelled and remove any threats available on it

iv. Mix the ingredients that will be used for plastering

v. Moisten the surface ready for plastering

vi. Apply the plaster on the wall surface

vii. Maintain the moisture of the wall (cure) the wall. If it is cement based plaster following the time interval for curing but not less than 7 days as it will enhance the strength of the plaster applied on the wall surface.

8. (a) Which service should be provided at a site before commencement of the construction work? Identify four services.
   (i) Water Supply
   (ii) Electrical supply
   (iii) Waste disposal
   (iv) Store.

   (b) Why is it important to do site investigantion before starting construction? Give six reasons.
   (i) To identify the nature of the site including it's history
   (ii) It helps to know different effect caused by the nature of soil and what to be take as an action.
   (iii) It helps to understand the type of soil found there and the appropriate foundation suitable for.
   (iv) It helps to decide on the materials to be used during construction
   (v) Helps to know the geographical location and weather condition of the site
   (vi) It helps to understand the engineering properties of the soil found in the site.

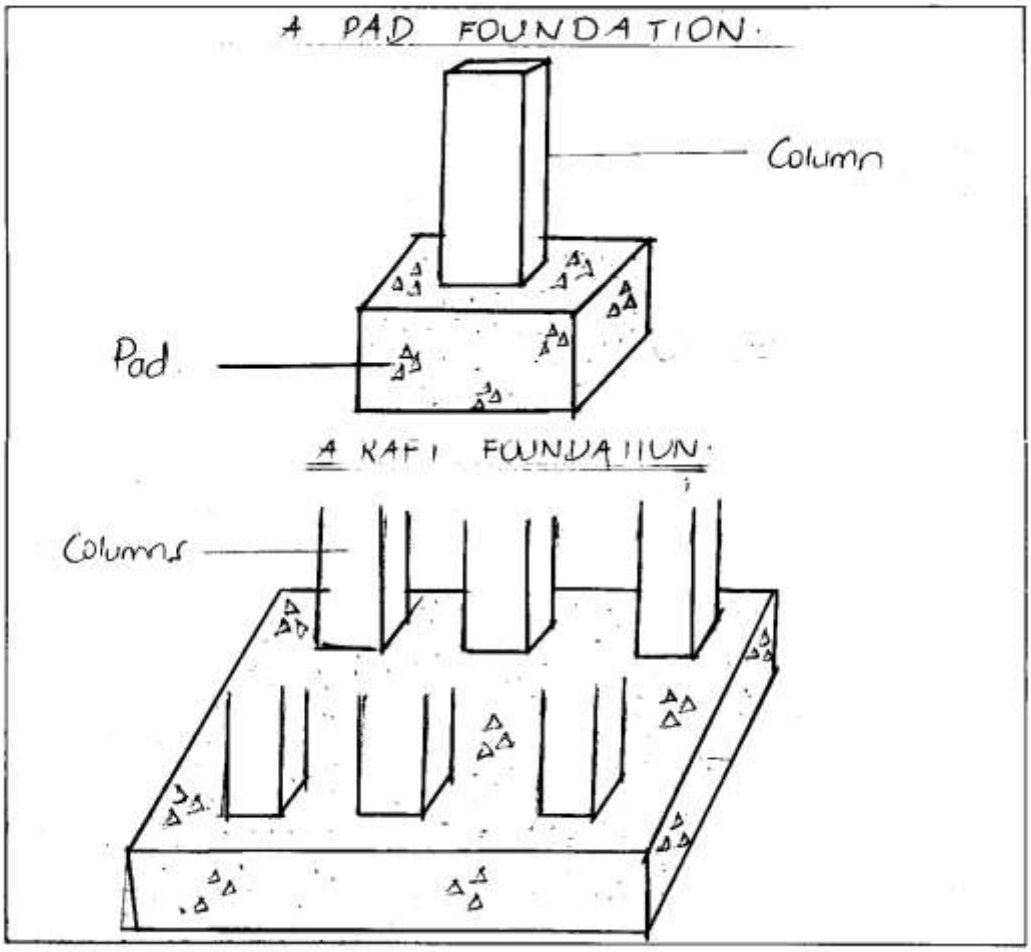
9. (a) What are the four functions of the foundation in building?
   (i) Supporting the structure
   (ii) Distributing loads
   (iii) Preventing settlements
   (iv) Providing stability

   (b) With the aid of sketches, distinguish between pad foundation and raft foundation.

   A **pad foundation** is designed to transmit a concentrated load from a single column or pier to a specific bearing area in the soil.
   A **raft foundation** also known as a mat foundation spreads the total load of the entire structure over the whole plan area of the building.
   Pad foundations are typically used when the supporting soil has a high or adequate bearing capacity so that individual footings are sufficient to carry the loads.

Raft foundations are necessary when the soil's bearing capacity is low or when the loads from columns are so close that individual footings would cover more than half the building area.
Pad foundations are generally more economical and simple to construct as they involve excavating and pouring concrete at isolated points under each column.
Raft foundations involve significantly more excavation and concrete making them more costly and complex to build.
A pad foundation is suited for light or medium-weight structures where loads are relatively small and the foundation depth is not great.
A raft foundation is often chosen for heavy structures like high-rise buildings or those built on highly compressible or problematic soils.

A sketch of pad foundation.



SECTION C (15 Marks)

Answer question number **ten (10)**.

10. Suppose you are supervising pouring of concrete in a class room building.

(a) What are the four properties of aggregates to be used for the work?

(i) The aggregates must be durable to resist weathering and wear over time.

(ii) The aggregates must have the correct size and grading to ensure proper compaction and minimum voids.

(iii) The aggregates should be clean and free from impurities like clay or organic matter which can affect concrete quality

(b) What are the four factors that may affect the workability of a fresh concrete?

(i) the amount of water to cement ratio in the mix.

(ii) The size and grading of the aggregates affect the ease with which the concrete can be placed and compacted.

(iii) The shape and surface texture of the aggregate particles also determine how easily they slide past each other during placement.

(iv) The addition of chemical admixtures like plasticizers can greatly modify and improve the workability of the fresh concrete mix.

(c) Briefly explain two methods of checking the strength of harden concrete.

(i) Compression test which involves crushing concrete cubes or cylinders in a laboratory to find their ultimate compressive strength.

(ii) Another method is the rebound hammer test a non destructive test where a spring loaded hammer impacts the concrete surface to estimate its surface hardness and strength.