THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

074 CARPENTRY AND JOINERY

(For Both School and Private Candidates)

Time: 3 Hours **ANSWERS** **Year: 2015**

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.

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1. (i) The following are the factors that govern the type of timbering required for a particular excavation except

A. The depth of the trench
B. The nature of the ground
C. Trial pits exploration
D. The presence of ground water
E. Vibrations due to traffic

The correct answer is C. Trial pits exploration. Timbering methods depend on the depth, soil conditions, and presence of water, but trial pits exploration is a preliminary site investigation method, not a direct factor affecting timbering.

(ii) The process of removing a centre from its position is known as

A. Casting
B. Polling
C. Shaping
D. Striking
E. Timbering

The correct answer is D. Striking. Striking refers to the removal of temporary supports, such as formwork, after concrete has set.

(iii) The purpose of using mould oil on formwork is to

A. Oiling the formwork
B. Stop the concrete adhering
C. Help the concrete set
D. Clean unwanted particles
E. Stop the formwork rotting

The correct answer is B. Stop the concrete adhering. Mould oil is applied to formwork to create a non-stick surface, preventing concrete from bonding to the mould.

(iv) A large opening for a shop front is to be made in the front wall of a structurally sound building. To provide support to the structure during the alteration work, it is necessary to

A. Block off the opening
B. Erect a flying shore
C. Create a heading
D. Erect a vertical shore
E. Strike the inner wall

The correct answer is B. Erect a flying shore. A flying shore is used to support walls when openings are made in existing structures, ensuring stability during construction.

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(v) When erecting stud partition, the following operations are carried out:
- House and fix head plate
- Cut and fix the wall studs
- Cut and fix intermediate studs and noggins
- Plumb down from the head plate and fix the soleplate

The correct sequence is
A. 1, 2, 4, 3
B. 4, 2, 3
C. 2, 1, 3, 4
D. 4, 3, 1, 2
E. 4, 3, 1, 2

The correct answer is D. 4, 3, 1, 2. Fixing the soleplate first ensures that the wall frame is accurately aligned before installing the studs and head plate.

(vi) When constructing a panelled door, we normally leave 50 mm horn on each end of the stile because it
A. Enables the frame to be fixed in the wall
B. Enables the joint to fit in its position
C. Prevents splitting of the joint
D. Provides support to panel and glazing
E. Receives the panel or glazing

The correct answer is C. Prevents splitting of the joint. The horn provides additional material to prevent the stile from breaking at the joint.

(vii) Glazed doors are constructed when
A. Enough air is needed
B. More light is required
C. Security is of less importance
D. There is an intermediate support
E. The opening is too wide

The correct answer is B. More light is required. Glazed doors have glass panels that allow natural light to pass through, improving interior lighting.

(viii) When making a window frame, the operation to be carried out directly after planing the timber should be
A. Chopping mortises
B. Making a rebate
C. Marking out the timber
D. Preparing rod

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E. Trapping sides of the tenons

The correct answer is C. Marking out the timber. Proper marking ensures accurate cutting and fitting of joints during window frame construction.

(ix) What is the total going of a flight?
A. Vertical distance between first and last riser
B. Total thickness of a flight
C. Horizontal distance between first and last riser
D. Inclined distance of a flight
E. Total length of carriage piece

The correct answer is C. Horizontal distance between first and last riser. The total going is the sum of all individual treads in a staircase flight.

(x) A good time for felling timber trees ready for conversion is
A. During harvesting period
B. During summer
C. At the end of summer
D. At mid of summer
E. At winter

The correct answer is E. At winter. Timber is best felled in winter when sap content is low, reducing the risk of decay and shrinkage.

1. Match the items in List A with the responses in List B by writing a letter of the corresponding response beside the item number in the answer booklet provided.

List A
(i) A piece of timber nailed to the bottom member at the ends of the trussing system to spread out the load.
(ii) Diagonal members of the wall frame used to stiffen and strengthen the wall.
(iii) Members that form the bottom of a window opening.
(iv) Short pieces of timber installed to maintain the regular spacing of the upright members.
(v) Short upright members that line the sides of an opening.
(vi) Short members above and below an opening.
(vii) The bottom horizontal member of the wall frame.
(viii) Top horizontal member of the exterior wall frame that supports the second-floor joist.
(ix) The top horizontal member of a wall frame.
(x) The vertical member of the wall frame.

List B
A. Blocking

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B. Brace
C. Cripple stud
D. Jack studs
E. Kicker
F. Lintels
G. Nogging
H. Plates
I. Punchons
J. Rail
K. Ribbons
L. Rough sill
M. Sole
N. Stile
O. Studs

Answers:
(i) A. Blocking
(ii) B. Brace
(iii) L. Rough sill
(iv) G. Nogging
(v) O. Studs
(vi) I. Punchons
(vii) M. Sole
(viii) K. Ribbons
(ix) H. Plates
(x) N. Stile

3. The spindle moulder is one of the most dangerous machines in woodworking. State four safety measures that you need to take when using the machine.

i. Always wear protective gloves and safety goggles to prevent injury from flying wood chips.
ii. Ensure the cutter guard is properly in place before operation to minimize exposure to the rotating blades.
iii. Maintain a firm grip on the workpiece and use push sticks when feeding small pieces to avoid hand injuries.
iv. Avoid wearing loose clothing or jewelry that could get caught in the rotating spindle.

4. List the common shapes of files used in woodwork and state the main use of each.

i. Flat file – Used for general smoothing and shaping of flat surfaces.
ii. Round file – Used for enlarging holes and filing curved surfaces.
iii. Half-round file – Used for both flat and concave surfaces, making it versatile for shaping.
iv. Triangular file – Used for sharpening saw teeth and working on angled cuts.

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v. Square file – Used for precision filing in square-shaped openings and keyholes.

5. What is the function of a wheel brace?

A wheel brace is a hand tool used for driving screws or drilling holes. It has a rotating handle that allows the user to apply even torque when driving fasteners into wood or other materials.
6. (a) Briefly explain two simple precautions that should be observed in order to prevent dry rot.

i. Ensure proper ventilation in storage and construction areas to prevent excessive moisture buildup.
ii. Apply wood preservatives to timber before installation to protect it from fungal decay.

(b) Briefly describe two causes of warping in timber.

i. Uneven drying – When one side of the wood dries faster than the other, it causes bending and twisting.
ii. Exposure to high humidity – Moisture absorption causes swelling, which leads to warping over time.

(c) Differentiate between a latch bolt and a dead latch.

A latch bolt is a spring-loaded bolt that retracts when the handle is turned, allowing the door to open and close freely. A dead latch, on the other hand, has a mechanism that locks it in place, preventing it from being forced open without the key.

(d) Briefly explain how the spring latch operates.

A spring latch works by using a coiled spring mechanism to push the bolt into the strike plate when the door is closed. When the handle is turned, the spring compresses, retracting the bolt and allowing the door to open.

7. With the aid of a sketch, show the difference between a stopped trench and a through trench.

A stopped trench is a groove cut into wood that does not extend fully across the piece, creating a concealed joint. A through trench, on the other hand, runs completely across the width of the wood, allowing another piece to fit into it fully.

8. Briefly describe four preparations which are necessary for gluing timber.

i. Ensure the surfaces to be glued are clean and free from dust or oil to allow proper adhesion.
ii. Roughen the surfaces slightly using sandpaper to improve glue penetration.
iii. Apply glue evenly to both surfaces to create a strong bond.
iv. Clamp the pieces together for the recommended drying time to ensure a firm joint.

9. Describe any four specifications that should be mentioned when ordering screws.

i. Screw length – Determines how deep the screw will penetrate into the material.
ii. Screw gauge – Specifies the thickness of the screw for compatibility with the workpiece.
iii. Head type – Identifies whether it is flat, round, or countersunk for aesthetic and functional purposes.
iv. Thread type – Indicates whether the screw has coarse or fine threads depending on the material it is being used on.

10. (a) Briefly explain the components parts of a fully glazed door.

i. Glass panel – The main transparent or translucent section of the door.
ii. Frame – The wooden or metal structure that holds the glass in place.
iii. Rails and stiles – Horizontal and vertical members that provide structural support.
iv. Glazing bead – A strip used to secure the glass panel within the frame.

(b) Name two methods of fixing the glass panes in a fully glazed door.

i. Using glazing putty to hold the glass securely in place.
ii. Using beading strips and screws to frame and lock the glass.

10. (a) By giving two examples, explain the circumstances where a revolving door is preferred to a hinge door.

i. In high-traffic commercial buildings where airflow control is needed, a revolving door reduces air exchange between the interior and exterior, maintaining indoor temperature.
ii. In places with limited space, such as busy entrance areas, a revolving door allows continuous movement without the obstruction of swinging doors.

(b) State four reasons for staining timber.

i. Enhances the natural grain and appearance of wood.
ii. Protects wood from moisture, rot, and insect damage.
iii. Reduces the effects of sunlight exposure, preventing fading.
iv. Increases the lifespan of the timber by sealing its surface.

10. What are the chief points to consider in the erection of any system of shoring?

i. Soil conditions – The type of soil determines the method of shoring required.
ii. Depth of excavation – Deep excavations require stronger shoring systems.
iii. Load-bearing capacity – The shoring should be strong enough to support lateral pressures from the surrounding ground.
iv. Type of construction – The method of shoring should align with the overall structural design and stability needs.

13. (a) What is a skylight window?

A skylight window is a window installed in the roof or ceiling of a building to allow natural light to enter interior spaces. It is often used in rooms where traditional wall windows are not feasible, such as attics, lofts, and hallways. Skylights improve ventilation, reduce dependence on artificial lighting, and enhance aesthetic appeal by providing an open and bright atmosphere.

(i) Draw a diagram of a skylight window and label its parts.

A skylight window consists of several key components, including:
i. Frame – The structural support that holds the glass in place.
ii. Glazing – The transparent or translucent glass or plastic that allows light to enter.
iii. Flashing – Waterproofing material installed around the skylight to prevent leaks.
iv. Curb – A raised border that helps secure the skylight and provides insulation.

(b) Give any two common sizes of windows and explain their use in residential buildings.

i. Standard casement window (600 mm × 1200 mm) – This window size is widely used in bedrooms, kitchens, and living rooms as it allows for ample ventilation and light. It is hinged at the side and swings outward like a door.
ii. Sliding window (1200 mm × 1500 mm) – This type is commonly used in larger openings such as patios and balconies. It consists of one or more sliding sashes that move horizontally within a frame, offering easy operation and space efficiency.

(c) With the aid of a neat sketch, describe the construction of a stairwell opening on an upper timber floor.

A stairwell opening is a space created in an upper floor to allow a staircase to pass through, providing access between different levels of a building. The construction process includes:
i. Marking the stairwell location based on architectural plans.
ii. Cutting and removing floorboards within the marked area.
iii. Installing double joists or headers around the opening to reinforce the structure.
iv. Attaching stair stringers to the framing for stair installation.
v. Ensuring that the opening is properly aligned and supported before finalizing construction.

14. (a) Enumerate the main procedure of fitting a mortise lock.

i. Marking the mortise area on the door edge using a template or measurements.
ii. Drilling pilot holes and chiseling out the mortise cavity to fit the lock body.
iii. Inserting the mortise lock into the cavity and securing it with screws.
iv. Aligning and installing the strike plate on the door frame.
v. Testing the lock mechanism to ensure smooth operation.

(b) Draw an L-shaped roof framing plan and label its parts.

An L-shaped roof framing plan consists of:
i. Ridge beam – The horizontal beam at the peak of the roof that supports rafters.
ii. Rafters – Sloped beams extending from the ridge beam to the walls, providing support.
iii. Purlins – Horizontal members that stabilize rafters and help distribute loads.
iv. Hip rafter – A diagonal rafter forming the junction of two roof slopes.
v. Valley rafter – A rafter installed where two roof slopes meet inwardly, forming a valley.

(c) State the steps that are involved in the construction of an L-shaped roof around the valley.

i. Marking and preparing the roof layout according to the building design.
ii. Installing ridge beams and positioning rafters to create the L-shape.
iii. Fixing hip and valley rafters to support intersecting slopes.
iv. Attaching purlins and battens to enhance stability.
v. Laying roofing sheets or tiles, ensuring proper overlapping at the valley to prevent leaks.
vi. Applying flashing around the valley area to improve waterproofing.

15. (a) Explain the following components of scaffolding.

i. Ledgers – Horizontal tubes or wooden planks that connect vertical standards, providing support and stability to the scaffold structure.
ii. Bearers – Cross members placed on ledgers to support working platforms and distribute loads evenly.
iii. Bridles – Structural elements used to bridge openings such as doorways and windows, preventing obstruction during construction.
iv. Poles – Vertical members that bear the entire load of the scaffolding system and transfer it safely to the ground.

(b) Outline any five important things to look for during the inspection process of scaffolding.

i. Stability of the base – Ensuring that the scaffold is placed on a firm and level ground to prevent tilting or collapse.
ii. Integrity of joints and fasteners – Checking that all connections are secure and properly tightened.
iii. Condition of planks – Verifying that all working platforms are free from cracks or excessive wear.
iv. Load capacity – Confirming that the scaffold can safely support the intended weight of workers and materials.
v. Presence of guardrails – Ensuring that safety rails and toe boards are properly installed to prevent falls.

(c) With the aid of a neat diagram, describe a mason's scaffold, label its parts and explain its suitability.

A mason's scaffold is a temporary structure designed to support bricklayers, masons, and other construction workers while they perform masonry work at elevated heights. It consists of:

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i. Base plates – Provide a stable foundation for the scaffold.
ii. Standards – Vertical poles that bear the weight of the scaffold.
iii. Ledgers – Horizontal bars that connect standards and support working platforms.
iv. Planks – Wooden or metal boards where workers stand.
v. Guardrails – Protective barriers installed at the edges to prevent falls.

Mason's scaffolds are suitable for construction projects where workers need stable and durable platforms to lay bricks, plaster walls, or install heavy building components. Their adjustability and strength make them ideal for varying heights and worksite conditions.