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: 2009**

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.

1. (i) The term "ease the centre" means
A. adjusting the centre
B. constructing the centre
C. lower and remove the centre
D. set and tip the centre in position
E. make formwork for an arch

The correct answer is C. Lower and remove the centre. "Easing the centre" refers to the gradual lowering and removal of the centering structure used to support an arch during construction to prevent sudden stress that could cause collapse.

(ii) The joint commonly used for flooring and paneling work is called
A. side joint
B. shouldered joint
C. framing joint
D. dovetail joint
E. tenon joint

The correct answer is A. Side joint. Side joints, such as tongue and groove joints, are commonly used in flooring and paneling to provide smooth and strong connections between adjacent boards.

(iii) The following is not a type of wood finishes
A. natural finishes
B. stressed finishes
C. paint finishes
D. stained finishes
E. dry finishes

The correct answer is E. Dry finishes. Wood finishes typically include natural, stressed, painted, and stained finishes, while dry finishing is not a recognized wood finishing method.

(iv) _____ glue is unworkable if used in damp conditions.
A. soya bean
B. animal
C. contact
D. casein
E. mahogany

The correct answer is D. Casein. Casein glue, which is made from milk protein, loses its adhesive properties in damp or humid conditions.

(v) The process of refilling the soil in the trench after removing the timbering structure is known as
A. ramming

B. reinforcing
C. hardening
D. surfacing
E. throwing

The correct answer is A. Ramming. Ramming involves compacting the soil back into the trench to restore stability after excavation and timbering removal.

(vi) The _____ is the half dimension of the span of a roof.
A. span
B. pitch
C. run
D. eaves
E. bird's mouth

The correct answer is C. Run. The run of a roof is half the total span, measured from the outer edge of the supporting wall to the center of the roof.

(vii) The _____ is the horizontal intermediate member supporting the rafters.
A. battens
B. purloin
C. collar
D. wall plate
E. strut

The correct answer is C. Collar. A collar tie is a horizontal member that connects opposite rafters, providing support and preventing roof spread.

(viii) The oval brad head nail has the following quality in carpentry and joinery work.
A. It is hot dip galvanized to prevent rusting.
B. It has quality to make fine work.
C. It is coated with a resinous center, which during driving into timber it melts the compound and increases the holding power of the nail.
D. It provides improvement in the strength of nail joints due to its rings.
E. It has less tendency to split the timber.

The correct answer is E. It has less tendency to split the timber. The oval brad head nail is designed with a shape that reduces the likelihood of splitting timber, making it suitable for fine joinery and finishing work.

(ix) The following member is fixed on the wooden stair only for decorative purposes.
A. wood block
B. baluster
C. Scotia mould

D. Wedge
E. Tread

The correct answer is C. Scotia mould. Scotia molding is used decoratively on stairs to enhance appearance and provide a finished look.

(x) The oil applied inside the formwork before the concrete is poured
A. helps in strengthening concrete
B. smoothens the concrete
C. helps fast removal of timber formwork after work
D. helps curing
E. reduces cracking of concrete

The correct answer is C. Helps fast removal of timber formwork after work. The oil prevents the concrete from sticking to the formwork, making it easier to remove without damaging the concrete surface.

2. Match the statements in List A with the responses in List B by writing the letter of the correct response beside the item number.

List A:
i. Vertical member dividing the door frame into two.
ii. A possible danger when working on machines.
iii. These are main load-bearing members of a roof.
iv. They can be used on a span over 4500 cm to give a lower floor area free of internal walls.
v. Is a type of nail recommended for fixing the plasterboard.
vi. Is among the reinforcements used in timber upper floor construction.
vii. It consists of bridging joists spanning between walls or partitions and bearing usually on wall plates or other members to distribute the load.
viii. Intermediate support to rafter suitably spaced between eaves and ridges.
ix. Newel.
x. Are the common materials adopted in stair construction.

List B:
A. Steel string
B. Reinforced concrete, steel, stone, and timber
C. Purlin
D. Herring-bone strutting
E. Double floors
F. Up and over door
G. Jamb
H. Timber, reinforced concrete, plastic, and glass
I. Mullion

J. Single floor in timber
K. Common rafter
L. Galvanized nail
M. Its function is to support the inclined handrail at each end.
N. Loose long sleeves
O. Balustrade
P. Sill
Q. Flight
R. Herringbone
S. Muntin
T. Horn

Answers:
i - S. Muntin
ii - N. Loose long sleeves
iii - C. Purlin
iv - E. Double floors
v - L. Galvanized nail
vi - K. Common rafter
vii - D. Herringbone strutting
viii - A. Steel string
ix - M. Its function is to support the inclined handrail at each end
x - B. Reinforced concrete, steel, stone, and timber

3. What type of hinges are best for built-in or drive-in gates and garage doors?

i. tee hinges – These hinges are long and strong, providing support for heavy doors such as gates and garage doors.
ii. strap hinges – They offer additional support and are used in large doors where durability is essential.
iii. butt hinges – Heavy-duty butt hinges are sometimes used for built-in garage doors to allow smooth operation.

4. List down four functional requirements of a door when closed.

i. security – The door should provide protection against unauthorized access.
ii. insulation – It should prevent heat loss or gain, ensuring thermal efficiency.
iii. durability – The door should be strong enough to withstand wear and tear over time.
iv. soundproofing – It should reduce noise transmission between spaces.

5. Give four manufactured boards used in woodworking in the building industry.

i. plywood – Made of thin layers of wood glued together, providing strength and stability.
ii. medium density fiberboard (MDF) – A dense, smooth-surfaced board used in furniture and interior fittings.
iii. particle board – Composed of wood chips and adhesive, used for affordable furniture production.
iv. blockboard – Constructed with wooden strips sandwiched between layers of veneer, used in doors and partitions.

6. (a) What is an architrave?

An architrave is a decorative molding that surrounds a door or window frame, covering the joint between the frame and the wall. It enhances aesthetics and provides a finished appearance.

(b) Explain the chief function of finished material.

Finished material serves to protect, enhance durability, and improve the appearance of wooden surfaces. It prevents moisture absorption, reduces wear, and provides resistance against insects and fungi.

7. State four basic requirements of a scaffold.

i. stability – A scaffold must be securely built to prevent collapse.
ii. safety – It should have guardrails and toe boards to protect workers from falling.
iii. load-bearing capacity – The scaffold must support workers and materials without failure.
iv. accessibility – It should allow easy movement of workers and tools during construction.

8. (a) Define the term "mullion".

A mullion is a vertical or horizontal structural member that divides adjacent sections of a window, door, or screen. It provides support and improves the strength of the structure.

(b) List down the vertical components used in supporting trenches in loose soils.

i. timber sheeting – Vertical boards used to prevent soil collapse.
ii. wailings – Horizontal supports that hold the trench lining in place.
iii. struts – Diagonal braces that add extra support to the trench structure.

9. (a) What kind of joints are most suitable for the construction of table drawers?

i. dovetail joint – Known for its strength and resistance to pulling forces, commonly used in drawer construction.
ii. finger joint – Provides durability and smooth alignment in wooden joints.
iii. rebate joint – A simple yet strong joint for connecting drawer sections securely.

(b) Indicate the common area where a franked joint is commonly applied.

A franked joint is commonly used in wooden door frames and furniture joints where two wooden pieces need to be securely locked together.

10. Define the term "timber partition".

A timber partition is a non-load-bearing internal wall made of timber studs and panels, used to divide interior spaces in buildings.

11. Name four types of arches.

i. semicircular arch – A half-circle-shaped arch commonly found in Roman and classical architecture.
ii. segmental arch – An arch with a shallow curve, often used in doorways and bridges.
iii. pointed arch – A Gothic-style arch with two curved sides meeting at a sharp point.
iv. elliptical arch – A flattened arch with an elongated curve, used in decorative architectural designs.

12. Mention three types of adhesives used in bonding of laminated plastic.

i. contact adhesive – A fast-drying adhesive used for laminating plastic surfaces.
ii. epoxy resin – A strong, waterproof adhesive suitable for high-strength bonding.
iii. polyvinyl acetate (PVA) – A commonly used adhesive for bonding wood and laminated surfaces in furniture making.

13. (a) What does the term preservative mean?

A preservative is a chemical or natural substance applied to wood to protect it from decay, insect attack, and moisture damage. It extends the lifespan of wood by preventing fungal growth and degradation caused by environmental factors.

(b) List three qualities of preservatives.

i. durability – A good preservative should offer long-lasting protection against biological and environmental threats.
ii. non-toxicity – It should be safe for human use and not release harmful fumes or chemicals into the environment.
iii. water resistance – The preservative should create a barrier that prevents moisture absorption, reducing the risk of rotting and fungal growth.

(c) Mention four advantages of water-soluble preservatives.

i. easy application – Water-soluble preservatives can be applied by brushing, spraying, or dipping, making them user-friendly.
ii. deep penetration – These preservatives are absorbed effectively into the wood fibers, providing long-term protection.
iii. environmentally friendly – Since they are water-based, they have lower levels of volatile organic compounds (VOCs), making them safer for the environment.
iv. cost-effective – They are generally cheaper than oil-based preservatives and do not require specialized equipment for application.

(d) List four methods used to apply preservatives.

i. brushing – Applying the preservative manually using a brush, ensuring even distribution over the wood surface.
ii. spraying – Using a spray gun to cover large areas quickly with a uniform coat of preservative.
iii. dipping – Submerging wood pieces in a preservative solution to allow thorough absorption.
iv. pressure treatment – Forcing the preservative into the wood fibers using high pressure, ensuring deep penetration and long-term protection.

14. (a) Draw a neat and well-labeled sketch for a sectional view of a formwork showing details of beam casing.

The sectional view of a beam casing should include components such as the bottom form (soffit), side forms, props for support, and tie bars to hold the structure together during concrete pouring.

(b) (i) What type of nail is used for fencing?

A fencing staple, also known as a U-nail, is commonly used for fencing. It is a U-shaped nail with two pointed ends that secure wire mesh or fencing materials to wooden posts.

(ii) Name the vertical members on stud timber partition.

i. studs – These are vertical wooden or metal members that provide structural support in a partition wall.
ii. noggings – Horizontal pieces placed between studs to add strength and rigidity.
iii. sole plate – The horizontal base member on which studs are fixed.

(iii) State three operations that can be performed on a radial arm saw machine.

i. cross-cutting – The radial arm saw is commonly used for making precise crosscuts on wooden boards.
ii. ripping – It can be used to cut along the grain of the wood, similar to a table saw.
iii. bevel and miter cuts – The saw arm can be adjusted to cut angles, making it useful for bevel and miter joints.

(c) Give the definition of the following terms:

(i) Lagging – Lagging refers to the outer covering or insulation applied to pipes, walls, or other surfaces to reduce heat loss, prevent moisture penetration, or provide protection.

(ii) Ribs – In construction and engineering, ribs are structural reinforcements designed to increase the strength and stability of a material. They are commonly found in beams, floors, and formworks to improve load distribution.

15. (a) Categorize three types of arches as applied in carpentry and joinery.

i. segmental arch – An arch with a curve that is less than a semicircle, commonly used in window and door openings.
ii. semicircular arch – A full half-circle arch often seen in classical architecture and bridges.
iii. pointed arch – A Gothic-style arch with two curved sides meeting at a sharp point, used for decorative and structural purposes.

(b) With the aid of sketches, define and describe fully the types of flush doors.

Flush doors are modern doors with a smooth, flat surface without visible joints or paneling. They are classified into:

i. solid core flush door – Constructed with a solid core of timber or compressed board, providing durability and soundproofing.
ii. hollow core flush door – Made with a lightweight core featuring internal supports, commonly used for interior applications.
iii. laminated flush door – Covered with a laminate or veneer surface for enhanced aesthetics and protection against moisture and scratches.