THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

FORM TWO NATIONAL ASSESSMENT

074 WOODWORK AND PAINTING ENGINEERING

Time: 2:30 Hours **ANSWERS** **Year: 2023**

Instructions

1. This paper consists of Section **A, B** and **C** with a total of **ten (10)** questions
2. Answer **al**l questions.
3. Section **A** and **C** carry **fifteen (15)** marks each and section **B** carries **seventy (70)** marks
4. Cellular phones and unauthorized materials are not allowed in the assessment room
5. Write your **Assessment Number** at the top right-hand corner of every page.

FOR ASSESSOR'S USE ONLY

QUESTION NUMBER	SCORE	ASSESSOR'S INITIALS
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

SECTION A (15 Marks)

Answer all questions in this section.

1. Choose the correct answer from the given alternatives by writing its letter in the box provided:

(i) Select the proper type of paint to be used as a floor finish material:

A. Oil paint

B. Water paint

C. Epoxy paint

D. Bituminous paint

Epoxy paint is durable and resistant to wear, making it ideal for floor finishes.

Answer: C

(ii) The equipment used to check if the wallpaper runs horizontally after hanging is called?

A. Plumb bob

B. Ruler

C. Square

D. Spirit level

A spirit level ensures wallpaper is hung horizontally by checking level alignment.

Answer: D

(iii) Which one of the following is the unsafe action during operating the spindle machine?

A. Tightening the spindle nut

B. Checking that all attachments and guards are firmly secured

C. Feeding the work into the cutter in the opposite direction to the cutter rotation

D. Feeding the work into the cutter in the same direction to the cutter rotation

Feeding work in the same direction as cutter rotation can cause kickback, making it unsafe.

Answer: D

(iv) You are given a task to paint a school, which category of painting would you use?

A. Water paint and Oil paint

B. Oil paint and Aluminium paint

C. Oil paint and Bituminous paint

D. Oil paint and Silicate paint

Water paint (for interior walls) and oil paint (for durability on trim) are suitable for school painting.

Answer: A

(v) Which set of colour would be appropriate for painting the building with the natural colour?

A. Blue and green

B. Black and white

C. Red and white

D. Yellow and purple

Blue and green resemble natural elements like sky and foliage, suitable for a natural aesthetic.

Answer: A

(vi) The official finishing material that is used on the surface of the wood to enhance the beauty of the grain markings is called

A. polish

B. sealer

C. shellac

D. stain

Stain penetrates wood to enhance grain markings while adding color.

Answer: D

(vii) Which substance would you add to the water aniline dyes to fix the colour into a proper design making batik?

A. Turpentine

B. Sprit

C. Vinegar

D. Water

Vinegar (acetic acid) fixes aniline dyes in batik by setting the color.

Answer: C

(viii) Which one is the most useful binder used for temporary painting works?

A. Turk oil

B. Nut oil

C. Poppy oil

D. Linseed oil

Linseed oil is a versatile binder for temporary painting, drying to a flexible film.

Answer: D

(ix) Form two students were painting a surface of classroom using a roller. What will happen if they apply too much pressure to the roller?

A. It will stick to the surface

B. It will slide along the surface

C. It will roll over a surface

D. It will form roller marks

Excessive pressure on a roller causes uneven application, leaving roller marks.

Answer: D

(x) A woodwork teacher assigned a form two student to order medium abrasive material at the nearest hardware for varnish finish work. Recommend the most probable range of mesh size which is suitable to be ordered.

A. 50-80

B. 20-30

C. 38-40

D. 100-150

Medium abrasive for varnish finishing (smoothing wood) typically ranges from 100-150 grit.

Answer: D

2. Match function of the component of water-based paint in List A described with their corresponding responses in List B by writing the letter of the correct response below the corresponding item number in the table provided.

List A

(i) Makes up the colour of a coating and helps the film former to protect the substrate

(ii) Converts the liquid coating to a solid dry film, binds the pigment particles together and helps the coating to adhere to the surface

(iii) Allows certain coatings to be applied with ease and gives greater adhesive properties to undercoats

(iv) Added to the paint in order to make it more fluid and bring it to a workable consistency

(v) Added to prevent the coat from freezing and control mould growth and pigment stability

List B

A. Acrylic

B. Binder

C. Drier

D. Extender

E. Pigment

F. Sealer

G. Stain

H. Thinner

List A	List B
(i)	E
(ii)	B
(iii)	F
(iv)	H
(v)	D

SECTION B (70 Marks)

Answer all questions from this section.

3. (a) What is your first six favorite types of paint?

(i) Emulsion paint

(ii) Oil paint

(iii) Epoxy paint

(iv) Enamel paint

(v) Acrylic paint

(vi) Silicate paint

(b) Identify the type of paint which has the following characteristics:

(i) Available in powder form

(ii) Should not be applied during humid and damp weather

(iii) Applied on surfaces which are exposed to acidic gases and steam

(iv) Possess high covering capacity

(v) Possess excellent alkali resistance

(vi) Consisting of oil and a strong drier

Cement paint matches these characteristics: powder form, sensitive to humidity, resistant to acids and alkalis, high coverage, and often includes oil and driers.

4. Recommend four types of blade that can be used in the workshop and give brief description on how to use each of them.

(i) Rip saw blade:

Description: Coarse teeth for cutting along the wood grain.

Use: Secure wood, align blade with marked line, and saw with steady strokes along grain.

(ii) Crosscut saw blade:

Description: Fine teeth for cutting across the grain.

Use: Mark cut line, hold wood firmly, and saw across grain with even pressure.

(iii) Chisel blade:

Description: Sharp, flat edge for carving or shaping wood.

Use: Position chisel on marked area, tap with mallet to remove wood gradually.

(iv) Plane blade:

Description: Sharp blade in a plane for smoothing wood surfaces.

Use: Adjust blade depth, push plane along wood surface to shave thin layers.

5. By using a well-labeled sketch, elaborate the way you would arrange the machines to comply with the safety regulations of the company.

Description:

Workshop layout with:

Spindle machine: Centrally placed with 1m clearance around for safe operation.

Sanding machine: Near wall, away from walkways, with dust extraction.

Saw bench: Positioned with guardrails and emergency stop button.

Workbenches: Along walls with tool storage.

Fire extinguisher: Near exit.

Clear walkways: Marked for safe movement.

Ventilation: Windows/fans for fume extraction.

6. Explain two functions of each of the given painting material ingredients:

(a) Pigment

(i) Provides color to the paint.

(ii) Enhances opacity to cover surfaces.

(b) Binder

(i) Binds pigment particles together.

(ii) Ensures adhesion to the surface.

(c) Solvent

(i) Thins paint for easier application.

(ii) Evaporates to aid drying.

(d) Additives

(i) Prevents mould growth in paint.

(ii) Improves flow and leveling.

7. Recommend six safety precautions to be observed when operating woodworking machines.

(i) Wear safety goggles to protect eyes from debris.

(ii) Use ear protection to reduce noise exposure.

(iii) Ensure machine guards are in place.

(iv) Check tools for defects before use.

(v) Keep hands away from moving parts.

(vi) Maintain a clutter-free workspace.

8. Mahenge secondary school plans to change the colour of staff furniture. During implementation, the quality assurance officer found sprayed paint film is dried to a rough gritty finish.

(a) What could be the three causes of this problem?

(i) Contaminated paint with dust or debris.

(ii) Improper surface preparation (e.g., not sanded).

(iii) Spray gun too far or incorrect pressure.

(b) Recommend four control measures to avoid the problem before painting work is completed.

(i) Filter paint to remove contaminants.

(ii) Sand and clean surfaces thoroughly.

(iii) Adjust spray gun distance and pressure.

(iv) Paint in a dust-free environment.

9. You have won a tender of painting a certain building owned by the government school having 18 m length, 5 m width, 7 m height with door and windows opening 2 m^2 and 7.5 m^2 respectively.

(i) What type of painting materials would you apply for skirting, internal wall finishes, and ceiling board finishes?

Skirting: Oil paint (durable, glossy finish).

Internal wall finishes: Emulsion paint (breathable, washable).

Ceiling board finishes: Emulsion paint (matte, covers imperfections).

(ii) Determine cost of materials to be used if 5 litres of painting materials which is sold at 8000/= Tshs per litre can be used to paint 35 m^2 of surface area.

Step 1: Calculate total surface area

External walls: $2(18 \times 7) + 2(5 \times 7) = 252 + 70 = 322\ m^2$

Openings: 2 m^2 (door) + 7.5 m^2 (windows) = 9.5 m^2

Area to paint: $322 - 9.5 = 312.5\ m^2$

Step 2: Calculate paint required

5 litres cover 35 m^2

Litres needed: $(312.5 \div 35) \times 5 \approx 44.64$ litres

Round up: 45 litres

Step 3: Calculate cost

Cost per litre: 8000 Tshs

Total cost: $45 \times 8000 = 360{,}000$ Tshs

Answer: 360,000 Tshs

SECTION C (15 Marks)

Answer all questions from this section.

10. (a) Why varnishes are used on the surface of woodwork for the final coat as finishing material? Give four reasons.

(i) Enhances wood grain beauty.

(ii) Protects wood from moisture and UV damage.

(iii) Provides a durable, scratch-resistant surface.

(iv) Adds a glossy or matte aesthetic finish.

(b) How can you identify a good varnish? Give four points.

(i) Clear and consistent color, free of cloudiness.

(ii) Smooth application without bubbling.

(iii) Quick drying with a hard finish.

(iv) High resistance to water and chemicals.

(c) Identify three types of materials under each ingredient of varnish.

(i) Resins:

Polyurethane

Alkyd

Phenolic

(ii) Solvents:

Mineral spirits

Turpentine

Xylene

(iii) Driers:

Cobalt

Manganese

Zirconium