



MINISTRY OF EDUCATION



NATIONAL EXAMINATION
AND SCHOOL INSPECTION
AUTHORITY



RTB | RWANDA
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BUGESERA DISTRICT

MARKING GUIDE

**TSS 2nd TERM DISTRICT COMPREHENSIVE ASSESSMENT
SCHOOL YEAR: 2024-2025**

SECTOR: CONSTRUCTION AND BUILDING SERVICES

TRADE: BUILDING CONSTRUCTION

...../100
MARKS

RQF LEVEL: LEVEL 3

MODULE CODE AND TITLE: BDCPS301PLASTERING OF STRUCTURE ELEMENTS

DURATION: 3hours

DATE:/...../2025

INSTRUCTIONS TO CANDIDATE:

- ✓ This exam has three sections.
- ✓ Maximum marks...../....100 Marks
- ✓ Attempt all Questions in A
- ✓ Choose only two questions in section B.
- ✓ Choose only one question in section C.
- ✓ Use pencil to draw any sketch mandatory
- ✓ Draw a line after answer the question

SECTION A Attempt all Questions

(55marks)

**TSS 2nd TERM DISTRICT COMPREHENSIVE ASSESSMENT
SCHOOL YEAR: 2024-2025**

Q1. Complete the following sentences with appropriate word(s). **(5marks)**

- a.is used to spread mortar on the surface.
- b. Tape measure is used
- c.is used to transport materials on site.
- d. To effectively level the plaster screeds vertically, it is recommended to use.....
- e. Mortar is a mixture of.....

ANSWER: Here are the completed sentences: for each 1marks

- a. **Trowel** is used to spread mortar on the surface.
- b. Tape measure is used **to measure lengths and dimensions**.
- c. **Wheelbarrow** is used to transport materials on site.
- d. To effectively level the plaster screeds vertically, it is recommended to use **a spirit level**.
- e. Mortar is a mixture of **sand, water, and cement (or lime)**.

Reference L.O.1. Select tools, equipment and materials on indicative content

1.1.Appropriate tools are selected according to the work to be performed.

Q2. Distinguish between the two (2) methods of batching mortar ingredient for plastering purposes.

ANSWER: for each 2marks

(4mark

The two common methods of batching mortar ingredients for plastering purposes are **volume batching** and **weight batching**. Here's how they differ:

1. Volume Batching

- **Definition:** In this method, the ingredients are measured by volume, typically using a container like a bucket, drum, or other standardized volume units.
- **Process:** The required proportions of sand, cement, and water are mixed based on their volume ratio (for example, 1:3 cement to sand).

2. Weight Batching

- **Definition:** In this method, the ingredients are measured by weight, usually with the help of a scale or balance.
- **Process:** The materials (cement, sand, water) are measured in exact weights, ensuring a more accurate and consistent mix.

In summary, **volume batching** is simpler and quicker, while **weight batching** ensures more accuracy and consistency in the mix.

Reference L.O.3. 3. Prepare mortar on indicative content 3.2. Mixing batches are prepared correctly with reference to the mixing ratio.

Q3. Differentiate good plastering from bad plastering based on their characteristics. Provide at least four points for each. **(4marks)**

ANSWER: Here's a comparison of **good plastering** and **bad plastering** based on their characteristics:

Good Plastering Characteristics:

1. **Smooth and Even Finish:** The surface is smooth, even, and free from lumps or uneven spots, ensuring a clean, uniform appearance. **0.5marks**
2. **Proper Adhesion:** The plaster adheres well to the surface, with no signs of peeling or cracking, indicating a strong bond between the plaster and the substrate. **0.5marks**
3. **Durability:** Good plastering lasts longer and does not crack easily over time, even under environmental stresses like temperature fluctuations or humidity. **0.5marks**
4. **Correct Thickness:** The plaster is applied at the correct thickness, providing sufficient coverage without being too thick or too thin. This ensures strength and effectiveness. **0.5marks**

Bad Plastering Characteristics:

1. **Uneven Surface:** The surface has visible imperfections such as bumps, lumps, or dips, resulting in an unprofessional and unattractive appearance. **0.5marks**
2. **Poor Adhesion:** The plaster peels, cracks, or falls off the wall due to poor bonding between the plaster and the substrate. **0.5marks**
3. **Cracking and Shrinkage:** Bad plastering often results in cracks or shrinkage within a short period due to improper mixing, application, or curing. **0.5marks**
4. **Incorrect Thickness:** The plaster may be too thin in some areas or too thick in others, causing weak spots that may break down over time. **0.5marks**

In summary, **good plastering** is smooth, durable, well-adhered, and properly thick, while **bad plastering** suffers from unevenness, poor adhesion, cracks, and improper thickness.

Reference L.O.4. Apply plastering coats on indicative content 4.1. Type of plaster are properly identified according to the standards and work requirements.

Q4. Fill in the given figure with the correct word(s)

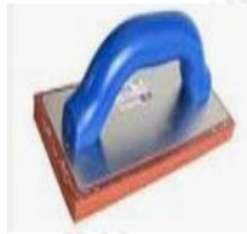
(4marks)



a)



b)



c).....



d).....

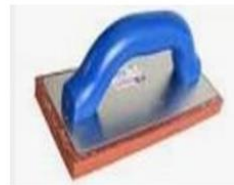
ANSWER for each 1marks



a) Corner shaper



b) Scraper



c) Sponge float



d)Mortar hawk

Reference L.O.1. Select tools, equipment and materials on indicative content
1.1.Appropriate tools are selected according to the work to be performed.

05.

a) What factors influence the selection of proper ingredients for plaster? (3marks)

ANSWER: for each 1marks

The selection of proper ingredients for plastering depends on several factors to ensure the desired quality and durability of the plaster. Here are the key factors that influence the selection:

1. Type of Surface (Substrate)

- The nature of the surface (brick, concrete, stone, etc.) plays a crucial role in the choice of ingredients. Different surfaces require specific types of mortar or plaster to ensure good adhesion and longevity.

2. Environmental Conditions

- **Humidity and Temperature:** In areas with high humidity or temperature variations, the plaster needs to be more resistant to moisture and thermal changes. This affects the choice of binding agents like cement or lime.
- **Exposure to Weather:** External plastering exposed to the elements (rain, wind, etc.)

requires more durable ingredients such as weather-resistant cement, while internal plaster may be less demanding.

3. Purpose of the Plastering

- The intended function of the plaster (e.g., decorative, waterproofing, insulation) influences the selection. For example:
 - **Waterproofing:** Special additives or water-resistant ingredients (like hydrated lime or gypsum) are used.
 - **Decorative Finishes:** Fine sand and high-quality binders may be chosen for a smooth, aesthetic finish.
 - **Insulation:** Ingredients that provide thermal or sound insulation, like expanded perlite or lightweight aggregates, may be used.

4. Strength and Durability Requirements

- The plaster mix needs to have adequate strength to withstand stresses and wear over time. For higher strength, cement-based plaster with the right mix ratio of sand and cement is often preferred. Lime-based plasters, while softer, are more flexible and can be used for less exposed areas.

5. Workability

- Plaster must be easy to mix, apply, and spread. The workability depends on the right proportions of sand, water, and binder. Fine sand with a proper amount of water ensures smooth and manageable plaster for application.

6. Cost and Availability of Materials

- The cost and local availability of materials can influence the selection. For instance, while cement is strong and durable, it may be more expensive than lime, which is easier to source in certain regions.

7. Sustainability and Environmental Impact

- The environmental impact of the plaster ingredients is becoming more of a concern. Materials such as lime or natural gypsum are more environmentally friendly compared to cement-based plasters, which have higher carbon footprints due to the manufacturing process.

8. Curing Time

- The time required for curing can affect the choice of ingredients. Plasters with faster setting times may be required for quick projects, while others may need a slower curing process for better bonding and durability.

9. Aesthetic and Finish Quality

- The finish of the plaster, such as its texture and appearance, can influence the selection.

Fine, polished finishes require finer aggregates and precise mixing, while rough finishes may be achieved with coarser materials.

Reference L.O.3. Prepare mortar on indicative content 3.3. Precise ingredients are quantified according to the mixing ratio.

- b) Explain clearly the term “screeds” in plastering. (2marks)

ANSWER:

Plaster Screeds:

These are applied to vertical surfaces or walls to provide a flat and smooth surface for finishing. The screed is typically applied as a preparatory layer before the final plaster finish is added. /2marks

Reference L.O.4. Apply plastering coats on indicative content 4.2. Sufficient layers of screeds are strategically applied on the wall at regular intervals.

- Q6.** Answer by true or false to the following statement. (5marks)

- a. Lime can be used to plaster the exposed works subjected to humidity.
- b. Sea water is not recommended to be used in plastering works because it contains salts.
- c. Deteriorated cement is used to plaster internal surfaces of walls.
- d. Cement is an excellent material recommended for plastering works mainly in exposed places and areas subjected to water or humidity.
- e. The strength and durability of plaster is only governed by cement used. Any sand can be used to prepare the plaster

ANSWER: for each 1marks

Here are the answers to the statements:

- a. **False**
- b. **True**
- c. **False**
- d. **True**
- e. **False**

Reference L.O.1. Select tools, equipment and materials on indicative content 1.3. Adequate materials are selected according to the standard.

Q7.

- a. Enumerate at least three (3) qualities of good fine aggregates used in plastering works?
(3marks)

ANSWER: for each 1marks

Here are three key qualities of **good fine aggregates** used in plastering works:

1. Cleanliness

- Fine aggregates should be free from impurities such as dirt, clay, organic matter, or salts. Impurities can affect the bonding strength between the plaster and the substrate, leading to weak adhesion and potential issues like discoloration or poor curing.

2. Well-graded (Uniform Particle Size Distribution)

- The fine aggregates should have a uniform particle size distribution. Well-graded aggregates have a mix of different particle sizes that fill gaps, leading to better workability and a stronger plaster mix. This helps the plaster form a smoother finish and improves its strength.

3. Smooth and Rounded Texture

- Fine aggregates with a smooth or slightly rounded texture are preferred over sharp, angular ones. Rounded particles improve the workability of the plaster mix and make it easier to spread. They also help in achieving a smooth, uniform finish on the surface.

Reference L.O.1. Select tools, equipment and materials on indicative content

1.3.Adequate materials are selected according to the standard.

- b. Define the following term:

(2marks)

- i. Dots:
- ii. Grinning

ANSWER:

Dots refer to small, raised areas or lumps of plaster applied to a wall or surface during the plastering process. **/1marks**

Grinning is a term used in plastering to describe a situation where the underlying surface (such as brick or block work) shows through the plaster layer, creating an uneven, rough appearance

/1marks

Reference L.O.4.Apply plastering coats on indicative content 4.1.Type of plaster is properly identified according to the standards and work requirements.

Q8. Choose the letter corresponding to the correct answer in each statement: **(5marks)**

1.What is the primary purpose of applying screeds on a wall at regular intervals?

- a. To add decorative patterns to the wall
- b. To make the wall waterproof
- c. To provide a level and uniform surface for plastering
- d. To reduce the need for curing

2.What problem can occur if screeds are not applied correctly?

- a. The plaster may become wavy and uneven
- b. The plaster will dry too quickly
- c. The wall will become structurally weak
- d. The plaster will become waterproof

3.What is the ideal consistency of the mortar used for screeds?

- a. Dry and crumbly
- b. Very watery
- c. Sticky like glue
- d. Thick but workable

4.Why is it important to let screeds set before applying plaster?

- a. To prevent the screeds from mixing with the plaster
- b. To ensure the screeds serve as a firm guide for leveling
- c. To make the plaster dry faster
- d. To avoid cracks in the wall

5. How does the spacing of screeds affect the plastering process?

- a. Wider spacing leads to a smoother finish
- b. Closer spacing ensures better leveling and uniformity
- c. Spacing does not affect the plastering process
- d. Irregular spacing improves wall strength

Here are the correct answers: for each 1marks

- 1. **c** – To provide a level and uniform surface for plastering
- 2. **a** – The plaster may become wavy and uneven
- 3. **d** – Thick but workable
- 4. **b** – To ensure the screeds serve as a firm guide for leveling
- 5. **b** – Closer spacing ensures better leveling and uniformity

Reference L.O.4.Apply plastering coats on indicative content 4.2.Sufficient layers of screeds are strategically applied on the wall at regular intervals.

Q9. Match the following properties of good sand with their descriptions: **(5marks)**

Column A (Properties of Good Sand)	Column B (Descriptions)
1.Hardness	A. Free from clay, silt, and organic matter
2. Grain Shape	B. Should be strong and resistant to crushing
3. Cleanliness	C. Angular and rough grains provide better bonding
4. Grading	D. Helps in reducing voids and improving compaction.
5. Fineness Modulus	E. Well-graded sand improves strength and durability

**Here's the correct matching of the properties of good sand with their descriptions:
For each 1marks**

1. Hardness - B. Should be strong and resistant to crushing
2. Grain Shape - C. Angular and rough grains provide better bonding
3. Cleanliness - A. Free from clay, silt, and organic matter
4. Grading - E. Well-graded sand improves strength and durability
5. Fineness Modulus - D. Helps in reducing voids and improving compaction

Reference L.O.1. Select tools, equipment and materials on indicative content

1.3.Adequate materials are selected according to the standard.

Q10. What are the key factors to consider when ensuring that surfaces are suitable for plastering, given that any four (4) surfaces should be reasonably dry and protected from the weather?" **(4marks)**

ANSWER: All surfaces should be reasonably dry and protected from the weather. Backgrounds need to be suitable with regards to: **for each 1marks**

- **Its strength** – can it take the weight of the plaster
- **Suction** – how quickly will it pull the moisture out of the plaster as it sets

- **Bonding properties** – does it have a texture for a key
- **Shrinkage** – will it continue to shrink underneath a layer of plaster
- **Thermal movement characteristic** – will it expand or contract causing the plaster to crack
- **Water and soluble salt content** – are the levels likely to cause problems to the key or finish

Reference L.O.4. Apply plastering coats on indicative content 4.3. Plastering mortar is systematically applied according to the type of plaster.

Q11. State any five (5) benefits of using super plasticizer admixtures in mortar mixes during plastering work. **(5marks)**

ANSWER: Here are five key benefits of using **super plasticizer admixtures** in mortar mixes during plastering work: **for each 1marks**

1. Improved Workability

- Super plasticizers increase the fluidity and workability of the mortar without the need to add extra water. This makes the plaster easier to apply, spread, and level, improving the efficiency and quality of the plastering work.

2. Enhanced Bond Strength

- The use of super plasticizers helps in improving the bond between the plaster and the substrate. It allows for better adhesion of the mortar to the surface, reducing the likelihood of peeling or cracking.

3. Reduced Water Demand

- Super plasticizers reduce the water content required in the mortar mix, which leads to a stronger final product. By lowering the water-cement ratio, the compressive strength and durability of the plaster are enhanced.

4. Increased Durability

- Mortar with super plasticizers tends to have better resistance to cracking and shrinkage due to its improved workability and reduced water content. This results in a more durable plaster that can withstand environmental stresses.

5. Faster Setting Time

- Super plasticizers can help speed up the setting time of the mortar, allowing the plaster to set more quickly. This can improve project timelines, as the plastered surface is ready for further work or finishing sooner.

Reference L.O.3. Prepare mortar on indicative content 3.3. Precise ingredients are quantified according to the mixing ratio.

Q12.

a. How is the water-cement ratio expressed?

(2marks)

ANSWER:

The water-cement ratio is expressed as the ratio of the mass of water to the mass of cement in a concrete mix. It is usually written as:

Water-Cement Ratio (w/c) = Mass of Water / Mass of Cement

b. What is adhesion?

(2marks)

Adhesion is the attraction or bonding between different materials or surfaces

Reference L.O.3. Prepare mortar on indicative content3.3. Precise ingredients are quantified according to the mixing ratio.

SECTION B: Choose only two questions

(30marks)

Q13. Suppose that the cement you have used on plaster shows signs of weakness, such as cracking and poor adhesion, despite passing field tests.

a. Analyse the cause of failure in plaster.

(10marks)

b. Identify measures you would take to prevent the failure so that it will not happen again.
(5marks)

ANSWER:

a.Analysis of the Cause of Failure in Plaster: The failure in plaster showing signs of cracking and poor adhesion, despite passing field tests, can be attributed to several possible factors:

1. Improper Water-Cement Ratio:

- If the water-cement ratio is too high, it can result in a weak plaster mix. Excess water leads to a porous structure, which causes reduced strength, poor adhesion, and cracks over time.

2. Inadequate Curing:

- Plaster requires proper curing to develop strength. Insufficient curing, such as not keeping the plaster moist for an adequate period, can lead to cracks and weak adhesion.

3. Poor Quality of Cement:

- The cement used may have been of low quality or improperly stored (e.g., exposed to moisture or stored for too long), which affects its performance and results in weak plaster. Even if it passes field tests, it may not perform well under stress.

4. Excessive Thickness of Plaster:

- If the plaster is applied too thickly, it may dry unevenly, leading to cracking. Thicker layers are more prone to shrinkage, which results in surface cracks and loss of adhesion.

5. Improper Surface Preparation:

- The surface to which the plaster is applied must be clean, rough, and properly prepared. A smooth or dirty surface prevents the plaster from bonding well, causing poor adhesion and cracking.

6. Environmental Factors:

- Environmental conditions like high temperatures, strong winds, or rapid drying can cause the plaster to set too quickly, leading to cracks. In cold weather, plaster can take longer to set, which also affects the final result.

7. Improper Mixing:

- If the plaster mix is not uniform or not adequately mixed, some areas may have excess water or cement, leading to weak spots in the plaster. This can result in cracking and weak adhesion over time.

8. Incorrect Type of Plaster Mix:

- Using the wrong type or grade of plaster mix for a specific application can also lead to problems. For example, if the plaster is intended for external use but an interior plaster mix is used, it may not be durable enough.

b. Measures to Prevent the Failure in Plaster:

To prevent plaster failure and ensure durability, the following measures should be taken:

1. Control the Water-Cement Ratio:

- Maintain the correct water-cement ratio according to the type of plaster being applied. The correct ratio ensures adequate strength and durability. Avoid using excess water, as it reduces the bond strength.

2. Proper Curing:

- Ensure proper curing of the plaster for at least 7-14 days. Keep the plaster moist during the curing period to prevent cracking and to promote hydration and bonding of the cement particles.

3. Use High-Quality Cement:

- Ensure that the cement used is of good quality, properly stored, and not expired. Cement should be kept in dry conditions to prevent absorption of moisture from the environment.

4. Apply the Correct Thickness:

- Apply plaster in thin, even layers to prevent cracking due to shrinkage. If the plaster is too thick, the inner layers may dry too slowly and cause cracking at the surface.

5. Prepare the Surface Properly:

- Ensure that the surface to which the plaster is applied is clean, rough, and free of dust, oils, or other contaminants. Roughen smooth surfaces to improve the adhesion of the plaster.

6. Monitor Environmental Conditions:

- Apply plaster under favorable weather conditions. Avoid applying plaster in very hot appropriate curing techniques to avoid slow drying.

7. Proper Mixing of Materials:

- Ensure the plaster ingredients (cement, sand, and water) are mixed properly. The mix should be uniform to avoid weak spots and inconsistencies in the plaster. Use a mechanical mixer if necessary to achieve consistent results.

8. Use the Right Type of Plaster Mix:

- Choose the correct mix depending on the application (internal vs. external plastering). Different environments require different plaster compositions to ensure

long-term performance and durability.

9. Reinforcement of Plaster:

- Consider adding reinforcement materials like fiber mesh or wire mesh in the plaster for enhanced tensile strength. This will help minimize cracking under stress.

10. Quality Control and Testing:

- Even though the cement passed field tests, it's crucial to perform more thorough quality control tests, such as compressive strength tests or bond tests, to ensure that the materials are truly suitable for the project.

Reference L.O.4. Apply plastering coats on indicative content 4.4. Finishing is adequately done in accordance with plaster types.

Q14. It is necessary to carry out field test of the cement sample before usage on the sites to know if the cement is good or bad one.

- a. Describe different kind of tests that you would carry out on the field to help you decide on the quality of the cement. **(10marks)**

ANSWER:

It is necessary to carry out field test of the cement sample before usage on the sites to know if the cement is good or bad one.

You can carry out these field tests as follows:

- When you put your hand into a bag of cement you will receive a cool feeling.
- The color of ordinary Portland cement is powder greenish-grey.
- When you open a bag of cement, take careful look at the cement powder should not have any visible lumps.
- When you take a pinch of cement and feel it between your fingers, the cement should give a smooth feeling.
- When you take a sample of cement powder and throw it inside a bucket full of water, the cement particles float for sometimes before they sink into the bucket.

Reference L.O.1. Select tools, equipment and materials on indicative content 1.3. Adequate materials are selected according to the standard.

- b. Illustrate any five (5) physical properties of cement **(5marks)**

ANSWER:

1. Fineness
2. Setting time
3. Soundness
4. Crushing strength.
5. Consistency
6. Heat of hydration
7. Bulk density

8. Specific gravity (Relative density)

Reference L.O.1. Select tools, equipment and materials on indicative content

1.3.Adequate materials are selected according to the standard.

Q15. Differentiate between interior and exterior plastering according to the following aspects:
(15marks)

- a. Purpose :
- b. Material used:
- c. Durability requirement:
- d. Moisture resistance:
- e. Maintenance:
- f. Thickness:
- g. Surface Finish:

ANSWER:

Aspect	Interior Plastering	Exterior Plastering
a. Purpose	Enhances aesthetics, smoothens the wall, and provides a base for painting or wallpaper	Protects the structure from weather elements, improves durability, and provides a finished look
b. Material Used	Typically uses gypsum, lime, or cement-based plaster	Uses cement-sand mortar, waterproof additives, and sometimes acrylic-based plasters
c. Durability Requirement	Requires moderate durability as it is not exposed to harsh weather	High durability needed to withstand rain, temperature changes, and UV rays
d. Moisture Resistance	Lower moisture resistance, but can use moisture-resistant plaster in humid areas like kitchens and bathrooms	High moisture resistance to prevent water penetration and damage
e. Maintenance	Easier to repair, may require repainting over time	Requires less frequent maintenance but may need waterproofing treatments or repainting
f. Thickness	Generally, 6mm to 12mm	Usually thicker, around 12mm to 15mm for better protection
g. Surface Finish	Smooth or textured, depending on the decorative finish required	Rougher texture or textured finishes to withstand outdoor conditions and improve grip for paint

Reference L.O.4. Apply plastering coats on indicative content 4.1.Type of plaster are properly identified according to the standards and work requirements.

Q16. a. Explain the following terminology used in plastering of structure of elements.
(10marks)

- a. Blistering:
- b. Crazing:
- c. Keys:
- d. Dado:
- e. Dubbing coat:

ANSWER:

A. Here's an explanation of the plastering terms you've mentioned:

a. Blistering: Blistering refers to the formation of bubbles or raised patches on the surface of the plaster. This usually occurs due to the trapped air or moisture beneath the plaster layer.

b. Crazing: Crazing refers to the formation of fine cracks that appear on the surface of the plaster.

c. Keys: Keys refer to the grooves or roughened surfaces that are intentionally created on the underlying substrate (like a wall) before applying plaster. These keys help improve the bonding between the plaster and the surface, ensuring that the plaster adheres firmly and reduces the likelihood of separation over time. The keying process could involve scratching, roughening, or applying bonding agents to create a stronger bond.

d. Dado: Dado refers to the lower part of a wall, typically from the floor up to about 3 to 4 feet, which is often treated differently than the rest of the wall in terms of plastering.

e. Dubbing Coat: A dubbing coat is a thin layer of plaster applied to a wall before the finishing coats. It is typically used to level out irregularities or fill gaps, ensuring a smooth and even surface for the final layers of plaster.

Reference L.O.4. Apply plastering coats on indicative content 4.3. Plastering mortar is systematically applied according to the type of plaster.

b. Explain briefly how plastering tools and equipment should be effectively handled. **(5marks)**

b. Effectively handling plastering tools and equipment is essential for achieving a high-quality finish and ensuring safety during the plastering process. Here are some guidelines for handling plastering tools and equipment:.

Tools

In plastering, we use some common tools as used in other construction works such:

1. **Tape measure and folding ruler:** These are used for measuring lengths.
2. **Spirit level and hose pipe level:** Is used for levelling and checking the horizontal plane of masonry works and to stretch the verticality of masonry work piece.
3. **Building line:** This is used for horizontal levelling and setting out of the building.
4. **Claw hammer:** It is used in fixing and pulling out of nails.
5. **Masonry chisels:** Used for background preparation
6. **Steel square:** This is used for controlling right angles when building walls and setting out.
7. **Plumb bob:** Is used for stretching vertically or to control the verticality of constructed structures
8. **Bucket:** Used for carrying water.
9. **Spade / shovel:** Is used for mixing sand, cement, collecting, loading on and off loading the materials.
10. **Gauge box:** Is used for measuring the proportion of materials and to control the ratio by volume
11. **Pan:** Is used for carrying materials usually mortar.
12. **Mortar hawk:** Is used for holding mortar.
13. **Straight edge:** Used to check the flatness of the wall
14. **Brush:** Is used for cleaning and also for painting.
15. **Scraper:** Is used to remove extra mortar from walls, floors, and to scrap the wall ready for painting
16. **Scratching tool:** Is used for making scratches on plaster while plastering.

Apart from those common tools, there are other specific tools which are used in plastering such as:

- 1) **Float:** A float is used for applying and spreading mortar on the surface. It is made of either metal or wood.

1.1. **Metal float** is known as **laying trowel**. It is used for troweling, to get desired smooth finish.

1.2. **Wooden float** is commonly known as **skimming float**. It is used for finishing coat of plaster. Its size is 10cm×30cm to 11cm×33cm.

2) **Floating rule**: Any wooden/metal or steel member with even and straight surface used for checking the level of the plastered surfaces between screeds.

3) **Dry wall Corner shaper (angle tool)**: These are trowel like tools used for making corners either internal or external (quoin)

4) **Fiberglass/steel mesh sieves**: These are used as Sieves depending on needed particle size of sand to be used

Reference L.O.1. Select tools, equipment and materials on indicative content

1.1.Appropriate tools are selected according to the work to be performed.

SECTION C Choose only one question

(15marks)

Q17. A 10m × 3m wall has a 2m × 2.1m door and two windows (each 1.5m × 1.2m). The plaster thickness is 15mm, and the mix ratio is 1:3. Assume a water-cement ratio of 0.5.

a. Find the net plastering area.

5marks

ANSWER:

Part a: Find the Net Plastering Area

To calculate the **net plastering area**, we need to subtract the areas of the door and windows from the total wall area.

Step 1: Calculate the Total Wall Area

The dimensions of the wall are:

Length = 10 m,

Height = 3 m.

So, the total wall area is:

$$\text{Total Wall Area} = \text{Length} \times \text{Height} = 10 \text{ m} \times 3 \text{ m} = 30 \text{ m}^2$$

Step 2: Calculate the Area of the Door

The dimensions of the door are:

Length = 2 m,

Height = 2.1 m.

So, the door area is:

$$\text{Door Area} = 2 \text{ m} \times 2.1 \text{ m} = 4.2 \text{ m}^2$$

Step 3: Calculate the Area of Each Window

The dimensions of each window are:

Length = 1.5 m,

Height = 1.2 m.

So, the area of one window is:

$$\text{Window Area} = 1.5 \text{ m} \times 1.2 \text{ m} = 1.8 \text{ m}^2$$

Since there are two windows:

$$\text{Total Window Area} = 2 \times 1.8 \text{ m}^2 = 3.6 \text{ m}^2$$

Step 4: Calculate the Net Plastering Area

Now, subtract the door and window areas from the total wall area:

$$\text{Net Plastering Area} = \text{Total Wall Area} - \text{Door Area} - \text{Total Window Area}$$

$$\text{Net Plastering Area} = 30 \text{ m}^2 - 4.2 \text{ m}^2 - 3.6 \text{ m}^2 = 22.2 \text{ m}^2$$

So, the net plastering area is 22.2 m^2 .

- b. Calculate the total cement (in bags), sand (in m^3), and water (in liters) required

(10marks)

ANSWER:

Part b: Calculate the Total Cement, Sand, and Water Required

Given:

- Plaster thickness = 15 mm = 0.015 m
- Mix ratio = 1:3 (Cement: Sand)
- Water-cement ratio = 0.5
- Co-efficiency = 1.33 (for accounting for wastage and variations in mix consistency)

Step 1: Calculate the Volume of Plaster

The volume of plaster required is:

$$\text{Volume of Plaster} = \text{Net Plastering Area} \times \text{Plaster Thickness}$$

$$\text{Volume of Plaster} = 22.2 \text{ m}^2 \times 0.015 \text{ m} = 0.333 \text{ m}^3$$

Step 2: Adjust for Co-efficiency

To account for wastage and variations in the mix consistency, we apply the co-efficiency of 1.33:

$$\text{Adjusted Volume of Plaster} = 0.333 \text{ m}^3 \times 1.33 = 0.443 \text{ m}^3$$

Step 3: Calculate Cement and Sand Volumes

Since the mix ratio is 1:3 (cement: sand), the total parts are $1 + 3 = 4$ parts.

- Cement Volume = $\frac{1}{4} \times \text{Adjusted Volume}$
- Sand Volume = $\frac{3}{4} \times \text{Adjusted Volume}$

So:

$$\text{Cement Volume} = \frac{1}{4} \times 0.443 \text{ m}^3 = 0.11075 \text{ m}^3$$

$$\text{Sand Volume} = \frac{3}{4} \times 0.443 \text{ m}^3 = 0.33225 \text{ m}^3$$

Step 4: Convert Cement Volume to Bags

1 bag of cement = 0.035 m^3 .

So, the number of cement bags required:

$$\text{Cement Bags} = \frac{0.11075 \text{ m}^3}{0.035 \text{ m}^3/\text{bag}} = 3.16 \text{ bags}$$

Thus, **3.16 bags** of cement are required, which can be rounded to **3.2 bags**.

Step 5: Calculate the Water Volume

The water-cement ratio is 0.5, meaning for every 1 part of cement, 0.5 parts of water are needed.

Water required:

$$\text{Water Volume} = 0.5 \times \text{Cement Volume}$$

$$\text{Water Volume} = 0.5 \times 0.11075 \text{ m}^3 = 0.055375 \text{ m}^3$$

Since $1 \text{ m}^3 = 1000 \text{ liters}$:

$$\text{Water Volume in Liters} = 0.055375 \text{ m}^3 \times 1000 = 55.375 \text{ liters}$$

Thus, 55.4 liters of water are required.

Summary of Results

- Net plastering area = 22.2 m^2
- Cement = 3.2 bags
- Sand = 0.33225 m^3 (approximately 0.33 m^3)
- Water = 55.4 liters

Reference L.O3. Prepare mortar on indicative content 3.3. Precise ingredients are quantified according to the mixing ratio.

Q18. Explain the significance of plastering in construction and list thirteen(13) objectives it fulfills. **(15marks)**

ANSWER: plastering is applied to the surfaces of walls and ceilings, providing a smooth, durable finish that enhances the overall quality of construction.

Thirteen Objectives of Plastering

1. To enhance the aesthetic appearance of the structure by providing a smooth, finished surface.
2. To protect surfaces from damage caused by environmental elements such as moisture, dust, and dirt.
3. To improve the durability of the structure by making the walls and ceilings more resilient to physical wear and tear.
4. To insulate the building thermally and acoustically, keeping rooms comfortable

and reducing noise transmission.

5. To provide fire resistance by offering an additional barrier that helps slow down the spread of flames.
6. To smooth out rough surfaces and correct any unevenness or imperfections in the walls and ceilings.
7. To offer water resistance and prevent moisture from penetrating the structure, reducing the risk of mold and dampness.
8. To enhance the structural integrity by reinforcing the surface and making it more robust.
9. To help in waterproofing in specific plaster types, protecting walls from water damage and infiltration.
10. To increase the lifespan of walls and ceilings by providing a protective barrier that reduces wear and tear.
11. To facilitate easy painting or finishing as plaster provides an ideal surface for applying paints, wallpaper, or other finishes.
12. To reduce maintenance costs by preventing cracks, mold growth, and other types of surface damage that may require costly repairs.
13. **To improve energy efficiency** by providing an additional layer of thermal insulation that helps regulate temperature and reduces energy consumption.

Reference L.O.4. Apply plastering coats on indicative content4.4.Finishing is adequately done in accordance with plaster types.