

MARKING SCHEME & SOLUTION KEY (उत्तर कुंजी)

MODEL QUESTION PAPER (2026-2027) - CLASS X

SUBJECT: PLUMBING (NSQF)

CODE: SECONDARY

MAX MARKS: 60

GENERAL INSTRUCTIONS FOR EVALUATORS / मूल्यांककों के लिए दिशानिर्देश:

- **Stepwise Marking:** Award marks step-by-step according to the division indicated in the scheme.
- **Equivalent Answers:** Full credit should be given for alternative, technically correct terminology or explanations expressed in candidate's own words.
- **Diagrams:** Neat sketches where relevant should be given due weightage even if not explicitly demanded.

SECTION - A: LONG ANSWER TYPE QUESTIONS (15 MARKS)

Q1. Plumbing Fixture Definition, Common Names & Working of Washbasin and Water Closet (WC)

5 MARKS

Answer Summary / मुख्य बिंदु:

Plumbing Fixture: A plumbing fixture is a receptacle or device connected to a water supply system and discharge system to receive and discharge water, liquids, or water-borne wastes in a building.

Four Common Household Fixtures: Washbasin, Water Closet (WC), Bathtub, Kitchen Sink.

- **Washbasin:** A bowl-shaped fixture equipped with taps (faucets) and a drain outlet, used primarily for washing hands, face, and personal hygiene. Wastewater flows out through a P-trap connected underneath.
- **Water Closet (WC):** A sanitary fitting designed to collect and dispose of human body excreta using a flushing mechanism (water stream) into the soil pipe system while preventing sewer gases from entering through an integrated water seal trap.

OR

Q1 (OR). Flushing Cistern: Definition, Working Steps & Sanitation Importance

5 MARKS

Answer Summary / मुख्य बिंदु:

Flushing Cistern: A tank or vessel installed above or behind a WC bowl that stores a specified volume of water to flush out human waste cleanly into the drainage pipe.

Working Mechanism (Steps):

1. **Storage & Filling:** Water enters the tank through an inlet valve; a float valve automatically cuts off the water supply once full.
2. **Operation:** Pressing the flush handle/push button lifts the siphon valve or flush valve mechanism.
3. **Discharge:** High-velocity water flows rapidly through the flush pipe into the WC bowl, creating a scouring/siphon action that clears the bowl.
4. **Reset:** The valve closes, and the float drops to restart refilling the tank.

Importance in Sanitation: Maintains hygienic conditions, prevents odor, removes infectious bacteria, and ensures efficient, touch-free waste transportation.

Q2. Water Pump Definition, Centrifugal/Jet Pump Installation & Uses

5 MARKS

Answer Summary / मुख्य बिंदु:

Water Pump: A mechanical device used to move water from a lower pressure/elevation level to a higher pressure/elevation level using mechanical energy.

Installation Procedure (Centrifugal Pump):

- 1. **Foundation:** Mount firmly on a solid, level concrete base using anchor bolts to absorb vibration.
- 2. **Piping Connection:** Connect suction pipe (with foot valve at bottom) and delivery pipe with tight, leak-proof joints.
- 3. **Priming:** Fill the pump casing and suction line completely with water to remove trapped air before starting.
- 4. **Electrical Wiring:** Connect securely to an appropriate power source with proper earthing.

Uses: Supplying water to overhead tanks in residential buildings, agricultural irrigation, and boosting pipeline pressure.

OR

Q2 (OR). Precautions & Maintenance Procedures for Residential Pumps

5 MARKS

Answer Summary / मुख्य बिंदु:

Installation & Safety Precautions:

- 1. Never run the pump dry (without water) to avoid mechanical seal damage.
- 2. Ensure proper electrical grounding/earthing and waterproof wire joints.
- 3. Install non-return valves (NRV) to prevent water hammer and backflow.
- 4. Place pump in a dry, ventilated shelter protected from direct rain/sunlight.

Maintenance Procedures: Regularly check and clean foot valves/strainers, inspect gland packing for minor lubrication leakage, lubricate bearings periodically, and check electrical connections for overheating or corrosion.

Q3. Personal Protective Equipment (PPE) Definition, 5 Essential Items & Benefits

5 MARKS

Answer Summary / मुख्य बिंदु:

PPE Definition: Protective clothing, helmets, goggles, or other garments designed to protect the wearer's body from injury or infection at work.

Five Essential PPE Items & Benefits:

- 1. **Safety Helmet (Hard Hat):** Protects head from falling debris, low beams, and electrical shocks.
- 2. **Safety Goggles:** Prevents eyes from airborne dust, pipe shavings, chemical splashes, and metal sparks.
- 3. **Hand Gloves:** Protects hands against cuts, burns, chemical solvents, and toxic wastewater.
- 4. **Safety Boots (Steel-toe Shoes):** Guards feet against heavy falling tools, sharp objects, and wet/slippery floors.
- 5. **Dust Mask / Respirator:** Protects lungs from inhaling toxic sewer gases, cement dust, and dangerous fumes.

OR

Q3 (OR). Pipeline Testing Necessity & Water Pressure / Leakage Test Steps

5 MARKS

Answer Summary / मुख्य बिंदु:

Necessity of Pipeline Testing: Ensures structural integrity, verifies that all joints are leak-free, prevents wall dampness/building damage, and confirms pipe rating withstands working pressure.

Water Pressure / Leakage Test Steps:

- 1. **Sealing:** Plug all open ends and branch outlets of the pipeline firmly using test plugs or caps.
- 2. **Filling:** Fill the entire pipeline slowly with water from the lowest point to vent out all trapped air.
- 3. **Pressurizing:** Apply hydraulic pressure using a hand pump or test pump up to 1.5 times the normal working pressure.
- 4. **Observation:** Hold the pressure for a specified duration (typically 30–60 minutes) and inspect all joints visually for drops on pressure gauge or water leaks.

SECTION - B: SHORT ANSWER TYPE QUESTIONS (18 MARKS)

Q4. Three Pipe Cutting Tools & Hacksaw Function

3 MARKS

Three Pipe Cutting Tools: Hacksaw, Pipe Cutter, Angle Grinder.

Use of Hacksaw: A manual hand tool fitted with a fine-toothed blade used for cutting plastic (PVC/CPVC), GI, and copper pipes accurately to desired lengths.

Q5. Three Differences Between Submersible Pump and Centrifugal Pump

3 MARKS

- 1. **Location:** Submersible pumps are completely submerged underwater inside a borewell/sump; Centrifugal pumps are installed above ground level.
- 2. **Priming Requirement:** Submersible pumps do not require priming as they operate underwater; Centrifugal pumps require initial priming to function.
- 3. **Suction Lift:** Submersible pumps push water upward from great depths; Centrifugal pumps rely on suction and are limited to shallow water depths.

Q6. Cement Mortar Definition, Ratio & Construction Use

3 MARKS

Definition: A homogeneous paste prepared by mixing cement, sand, and water in suitable proportions.

Composition Ratio: Commonly 1:3 or 1:4 (1 part cement to 3 or 4 parts sand) for masonry and plaster work.

Main Use: Binding bricks/stones together in masonry construction and plastering walls for smooth finish.

Q7. Three Household Water Conservation Measures

3 MARKS

- 1. Immediately repair dripping taps, leaky valves, and running flush tanks.
- 2. Install water-saving aerators on faucets and dual-flush cisterns on water closets.
- 3. Reuse greywater from RO purifiers and washing machines for cleaning or gardening.

Q8. Wall Chasing Definition & Two Safety Rules

3 MARKS

Wall Chasing: The process of cutting narrow grooves/recesses in masonry walls to lay concealed plumbing pipes or electrical conduits.

Two Safety Rules:

- 1. Always wear safety goggles and a dust mask while operating wall chaser tools or chiseling.
- 2. Check wall line for hidden electrical wires or existing utility pipes before cutting.

Q9. Three Basic Workplace First Aid Steps for Minor Injury

3 MARKS

- 1. Clean the wound immediately with clean running water or antiseptic liquid.
- 2. Apply light pressure with a clean cloth/gauze to stop minor bleeding.
- 3. Apply an antiseptic cream and cover with a sterile bandage; seek medical attention if necessary.

SECTION - C: VERY SHORT ANSWER TYPE QUESTIONS (12 MARKS)

Q10. Effective Communication Definition & One Key Element

2 MARKS

Effective Communication: The process of exchanging information, thoughts, and ideas clearly between sender and receiver so the message is understood as intended.

One Key Element: Active Listening / Clear Feedback.

Q11. Full Form of SMART in Goal Setting

2 MARKS

S - Specific

M - Measurable

A - Achievable / Attainable

R - Relevant / Realistic

T - Time-bound

Q12. Water Meter Definition & Main Function

2 MARKS

Definition: A measuring device installed in a water supply pipeline.

Main Function: Measures and records the volume of water consumed by a household or commercial facility for billing and management purposes.

Q13. Two Non-Verbal Communication Methods

2 MARKS

- 1. Facial expressions and eye contact.
- 2. Body language, gestures, and hand posture.

Q14. Main Function of Trap in Bathroom Drainage

2 MARKS

Main Function: Holds a constant water seal that prevents foul gases, bad odors, and insects/pests from entering the bathroom from the sewer lines.

Q15. Two Green Skills / Environment-Friendly Practices for Plumbers**2 MARKS**

- 1. Installing low-flow aerators and rainwater harvesting structures.
- 2. Proper recycling and safe disposal of replaced plastic/metal pipe scraps.

SECTION - D: OBJECTIVE TYPE QUESTIONS (15 MARKS)**Answer Key for Questions 16 to 30 (1 Mark Each)**

Q. No.	Correct Option / Answer	Explanation / Remarks
Q.16	(b) Pipe Die / पाइप डाई	A Pipe Die is used to cut external threads, while a Tap cuts internal threads.
Q.17	(a) Ctrl + C	Ctrl + C is the standard shortcut command for copying selected text/items.
Q.18	(b) Solar Energy / सौर ऊर्जा	Solar energy is naturally replenished and inexhaustible compared to fossil fuels.
Q.19	(b) Safety Goggles / सुरक्षा चश्मा	Goggles protect eyes against flying metal shavings, dust, and sparks during cutting.
Q.20	(a) Helmet / हेलमेट	Hard hats/helmets shield head against impact from falling tools or overhead structures.
Q.21	(b) Wet/Organic Waste / गीला कचरा	Green bins are globally designated for compostable, wet organic/kitchen waste.
Q.22	(a) Pipe Vice / पाइप वाइस	A Pipe Vice holds circular pipes firmly in place during threading or cutting.
Q.23	(a) Manage Time & Stress / समय और तनाव प्रबंधन में	Self-management equips students to manage priorities, time, and emotions effectively.
Q.24	(a) Water Extinguisher / जल अग्निशामक	Class A fires (combustible materials like wood/paper) are extinguished using water.
Q.25	(a) Starts a new business / नया व्यवसाय शुरू करता है	An entrepreneur sets up a business venture, innovates, and manages financial risks.
Q.26	Solvent Cement (सॉल्वेंट सीमेंट)	CPVC pipes are joined using chemical solvent cement that cold welds the joints.
Q.27	Communication (कम्युनिकेशन)	ICT stands for Information and Communication Technology.
Q.28	Traps / Water Traps (ट्रैप)	P-Trap and S-Trap are types of water seals used in sanitary plumbing.
Q.29	Dry (सूखा)	Blue dustbins are designated for dry recyclable waste like paper, plastic, and glass.
Q.30	Meter (मीटर)	A device used to measure water flow volume is called a Water Meter.