

ANSWER KEY & MODEL SOLUTION / उत्तर कुंजी

Class: 9th | Subject: Plumbing (NSQF) / प्लंबिंग

Academic Session: 2026-27

Max Marks: 60

Time Allowed: 2.30 Hours

Code: NSQF-PLB-9

Medium: English & Hindi

Total Questions: 30

SECTION - A / खण्ड-अ : LONG ANSWER TYPE QUESTIONS (3 × 5 = 15 MARKS)

Q.1. What is Plumbing? Explain any five major duties and responsibilities of an Assistant Plumber General.

5 Marks

Answer / Key Solution:

Plumbing Definition: Plumbing is the system of pipes, tanks, fittings, and control devices installed in a building for distributing potable drinking water and removing waterborne wastes safely.

(प्लंबिंग की परिभाषा: प्लंबिंग किसी इमारत में पीने के साफ पानी की आपूर्ति करने तथा अपशिष्ट जल को सुरक्षित रूप से बाहर निकालने के लिए लगाए गए पाइपों, टंकियों और फिटिंग की प्रणाली है।)

Five Major Duties & Responsibilities:

- **Installation:** Installing and assembling basic pipe fittings, fixtures, and sanitaryware as per drawings.
- **Maintenance & Repair:** Inspecting pipe lines, fixing water leakage, replacing worn-out washers, seals, and valves.
- **Material & Tool Preparation:** Selecting appropriate tools (wrenches, threaders, cutters) and checking quality of pipes and fittings at work site.
- **Cutting & Joining:** Cutting, threading, bending, and solvent welding of PVC, CPVC, and GI pipes.
- **Safety Compliance:** Adhering to site safety standards, wearing proper PPE, and maintaining clean work environment.

--- OR / अथवा ---

Q.1 (OR). Describe five important safety rules and Personal Protective Equipment (PPE) that a plumber should use at a work site.

Answer / Key Solution:

- **Safety Helmet (Hard Hat):** Protects head against falling objects and accidental impacts on construction sites.
- **Safety Goggles / Glasses:** Protects eyes from flying dust particles, metal chips, and chemical solvent splashes during pipe cutting.
- **Hand Gloves:** Protects hands from sharp metal edges, pipe threads, hot materials, and hazardous solvents/glue.
- **Safety Shoes (Steel-Toe Boots):** Protects feet from heavy falling items and prevents slipping on wet or oily floors.
- **Ear Protection & Dust Mask:** Protects hearing during power drilling/grinding and shields lungs from inhaling concrete/chemical dust.

Q.2. What are Pipe Fittings? Name and explain the function and use of any five common pipe fittings.

5 Marks

Answer / Key Solution:

Pipe Fittings Definition: Components used in plumbing to join straight pipe sections, alter flow direction, change pipe sizes, or seal pipe ends.

- **Elbow (एल्बो):** Used to change the direction of liquid flow, typically at an angle of 90° or 45°.
- **Tee (टी):** A T-shaped fitting with three openings used to split or combine fluid flow in two directions.
- **Reducer (रिड्यूसर):** Used to connect pipes of different diameters, reducing or enlarging flow channel size.
- **Socket / Coupling (सॉकेट):** Connects two straight pipes of the same diameter in a linear alignment.
- **Plug / Cap (प्लग/कैप):** Used to seal or close the open end of a pipeline permanently or during pressure testing.

--- OR / अथवा ---

Q.2 (OR). Name three common types of pipes used in plumbing (PVC, CPVC, GI). State two main properties and uses of each type.

Answer / Key Solution:

- **PVC (Polyvinyl Chloride):** Lightweight, smooth internal surface, non-corrosive. *Uses:* Cold water supply, drainage, rainwater lines.
- **CPVC (Chlorinated Polyvinyl Chloride):** High temperature resistance (up to 93°C), high mechanical strength, chemical resistant. *Uses:* Hot and cold potable water distribution.
- **GI (Galvanized Iron):** Heavy duty structural strength, zinc-coated against rusting, impact resistant. *Uses:* Outer exposed piping, high-pressure water supply networks.

Q.3. What is a Portable Drill Machine? Explain main steps and safety measures to safely operate it.

5 Marks

Answer / Key Solution:

Definition: A handheld power tool used for drilling holes in various structural materials like concrete, brick, wood, and metal for fixing pipe clamps and hangers.

Main Operational Steps & Safety Measures:

- Inspect drill cord, body insulation, and ensure power source voltage matches machine requirements.
- Insert the correct drill bit into the chuck and tighten securely using the chuck key.
- Mark hole location accurately and hold the drill firmly with both hands perpendicular to the surface.
- Wear safety goggles and dust mask before switching ON power; do not apply excessive force while drilling.
- Disconnect power supply before changing drill bits or cleaning dust from chuck.

--- OR / अथवा ---

Q.3 (OR). What are Valves in plumbing? Explain the function and practical use of (i) Gate Valve, and (ii) Float Valve (Ball Valve).

Answer / Key Solution:

Valves Definition: Mechanical devices installed in piping systems to regulate, direct, or control the flow and pressure of fluids by opening, closing, or partially obstructing passages.

- **(i) Gate Valve (गेट वॉल्व):** Linear motion valve using a sliding wedge gate. Function: Provides full flow or complete shut-off with minimal friction loss. *Practical Use:* Installed at main supply inlets and overhead tank outlets.
- **(ii) Float Valve / Ball Valve (फ्लोट वॉल्व):** Lever-operated valve controlled by a hollow floating ball. Function: Automatically shuts off water flow when water reaches pre-set high level. *Practical Use:* Installed in overhead water tanks and toilet flush cisterns.

SECTION - B / खण्ड-ब : SHORT ANSWER TYPE QUESTIONS (6 × 3 = 18 MARKS)

Q.4. Differentiate between Hand Tools and Power Tools used in plumbing with two examples of each.

3 Marks

- **Hand Tools:** Operated manually by human physical force without external electric/pneumatic power. *Examples:* Pipe Wrench, Hacksaw, Spirit Level.
- **Power Tools:** Driven by electric current, battery, or compressed air for faster and heavy-duty operation. *Examples:* Portable Electric Drill, Pipe Threading Machine, Angle Grinder.

--- OR / अथवा ---

Q.4 (OR). Name any three holding tools and state their main functions in holding pipes.

- **Bench Vice:** Fixed to workbench; securely clamps straight pipes and metallic stock during cutting/threading.
- **Pipe Vice:** V-shaped jaw holding tool designed specifically to grip round pipes firmly without slipping or crushing.
- **Pipe Wrench:** Adjustable hand tool with serrated teeth jaws used to hold, turn, and tighten threaded pipes and fittings.

Q.5. Why are CPVC pipes preferred over normal PVC pipes for hot water supply? State three reasons.

3 Marks

- **High Temperature Resistance:** CPVC withstands hot water temperatures up to 93°C (200°F) without softening or deforming, whereas normal PVC deforms above 60°C.
- **Thermal Expansion & Insulation:** Low coefficient of thermal expansion and lower thermal conductivity compared to metallic and normal PVC pipes.
- **Chemical Stability:** Does not breakdown, leach chemicals, or degrade under prolonged exposure to hot chlorinated water.

--- OR / अथवा ---

Q.5 (OR). Write three key points to check during the unpacking and visual inspection of plumbing materials at site.

- **Physical Damage Inspection:** Check for cracks, dents, deformation, or surface fractures on pipes, fittings, and valves.
- **Specification Verification:** Verify pipe pressure ratings, wall thickness, material grade (e.g., Schedule 40/80), and nominal diameters against delivery challan.
- **Completeness & Cleanliness:** Ensure threads are undamaged, caps/seals are intact, and internal channels are free from dirt, oil, or debris.

Q.6. Perform the following simple unit conversions: (a) 2 metres into cm, (b) 1 foot into inches, (c) 1 metre into mm.

3 Marks

- **(a) 2 Metres to Centimetres:** $2 \times 100 = 200 \text{ cm}$
- **(b) 1 Foot to Inches:** $1 \times 12 = 12 \text{ inches}$
- **(c) 1 Metre to Millimetres:** $1 \times 1000 = 1000 \text{ mm}$

Q.7. Explain the purpose and function of a Spirit Level and a Measuring Tape in plumbing installation.

3 Marks

- **Spirit Level (स्प्रिट लेवल):** Instrument with bubble tubes used to check horizontal levelness and vertical alignment (plumb) of pipelines, drainage slope, and sanitary fixtures.
- **Measuring Tape (मेजरिंग टेप):** Flexible marked metal/fiberglass ribbon used to measure accurate linear distances, pipe cutting lengths, and centerline layouts on site.

Q.8. What are Pipe Hangers and Clamps? Why are they used while fixing pipes on walls or ceilings?

3 Marks

Answer: Metallic or plastic supporting brackets used to hold, anchor, and secure running pipelines against structural walls, beams, or overhead ceilings.

Reasons for Use:

- Prevents sagging and vibration of long pipe runs filled with water weight.
- Maintains proper alignment and required fall/gradient in drainage lines.
- Protects pipe joints from structural strain and accidental displacement.

Q.9. Write short notes on any three common mechanical fasteners: (i) Hex Nut, (ii) Washer, (iii) U-Bolt.

3 Marks

- **(i) Hex Nut (हेक्स नट):** Six-sided threaded internal fastener used with threaded bolts/studs to clamp structural parts tightly.
- **(ii) Washer (वाशर):** Flat metal or rubber ring placed under a nut/bolt head to distribute clamping load evenly and prevent surface damage or leaks.
- **(iii) U-Bolt (यू-बोल्ड):** U-shaped threaded fastener with two legs used specifically to clamp round pipes securely to flat support brackets or walls.

SECTION - C / खण्ड-स : VERY SHORT ANSWER TYPE QUESTIONS (6 × 2 = 12 MARKS)

Q.10. Define Plumbing in simple words.

2 Marks

Answer: Plumbing is the system of pipes, fittings, and appliances installed in a building for supplying clean drinking water and removing wastewater safely.

Q.11. What is the primary use of a Hacksaw in plumbing?

2 Marks

Answer: A Hacksaw is a fine-toothed hand cutting tool used primarily for cutting metal, PVC, CPVC, and plastic pipes to required lengths.

--- OR / अथवा ---

Q.11 (OR). Convert: (a) 3 feet into inches, and (b) 100 centimetres into metres.

Answer:

- (a) 3 Feet = $3 \times 12 = 36$ Inches
- (b) 100 Centimetres = $100 / 100 = 1$ Metre

Q.12. Write the full forms of: (a) PVC, and (b) CPVC.

2 Marks

- **(a) PVC:** Polyvinyl Chloride
- **(b) CPVC:** Chlorinated Polyvinyl Chloride

Q.13. State two main differences between GI (Galvanized Iron) pipe and PVC pipe.

2 Marks

- **Material & Weight:** GI pipe is metallic, heavy, and rigid; PVC pipe is plastic, lightweight, and flexible.
- **Corrosion & Joining:** GI pipes require threading and can corrode over time; PVC pipes are non-corrosive and joined via solvent cement.

Q.14. What is a Plumb Bob and what is its main use?

2 Marks

Answer: A Plumb Bob is a heavy pointed metal weight attached to a string line. Its main use is to check and transfer true vertical alignment (plumbness) of walls and vertical pipe risers.

Q.15. Where is an Overhead Water Tank installed in a building and why?**2 Marks**

Answer: Installed on the highest roof top / terrace of a building. It is placed at high elevation so water can flow down naturally to all lower taps and outlets by force of gravity.

SECTION - D / खण्ड-द : OBJECTIVE TYPE QUESTIONS (15 × 1 = 15 MARKS)

Note: Full 1 mark is awarded for each correct option / answer key. No negative marking.

Q. No.	Question / Text	Correct Answer / Solution	Marks
Q.16	Tool used for cutting metal or PVC pipes	(a) Hacksaw (हैकसॉ)	1 Mark
Q.17	Every residential building needs regular supply of clean...	Water / जल	1 Mark
Q.18	A Vice is used to firmly hold round pipes...	Pipe Vice / वाइस	1 Mark
Q.19	When communicating verbally with clients, use...	(b) Simple and polite words	1 Mark
Q.20	CPVC pipes are widely used for which water supply?	(a) Hot & Cold water	1 Mark
Q.21	1 Metre = _____ Centimetres (cm)	100	1 Mark
Q.22	1 Foot = _____ Inches	12	1 Mark
Q.23	Fitting used to turn water flow direction by 90°	(b) Elbow (एल्बो)	1 Mark
Q.24	Number of open ends in standard 'Tee' fitting	(b) 3	1 Mark
Q.25	'Plumbing' originates from Latin 'Plumbum' meaning...	(c) Lead (सीसा)	1 Mark
Q.26	Safety item protecting plumber's head at site	(a) Safety Helmet (सुरक्षा हेलमेट)	1 Mark
Q.27	Match Column A with Column B	1 - (B) Measuring length 2 - (A) Checking levelness 3 - (D) Turning/holding pipes 4 - (C) Cutting PVC pipes	1 Mark
Q.28	Plumbing Symbol for 90° Elbow or Tee Fitting	90° Elbow Symbol:  or  Tee Symbol:  or 	1 Mark
Q.29	Sunlight and Water are examples of _____ energy	Renewable (नवीकरणीय)	1 Mark
Q.30	Safety gloves protect hands from sharp edges & chemicals	True (सत्य)	1 Mark