



**Qualification: 8202 Level 3 Advanced Technical Diploma in Plumbing (450)**

**Exam name: 8202-035 Level 3 Plumbing - Theory exam**

**Version: April 2017**

**Exam date: 27/04/2017**

**Exam time: 09:00 – 11:00**

**Base mark: 60**

<b>1</b>	
The water industry act 1991 governs the water regulation in this country. Describe the main requirements of Section 74.	(2 mark)
Answer; To make sure the water is not contaminated, and its quality and suitability for purpose is not prejudiced.  Or any suitable description for the below (max 2 marks); <ul style="list-style-type: none"><li>• To prevent waste</li><li>• To prevent undue consumption</li><li>• To prevent misuse of water supplied by the undertaker</li><li>• To make sure that water fittings installed and used are suitable for its purpose</li><li>• To prevent erroneous measurement</li></ul>	

2

State the recommended components for the **two** items marked 1 and 2 in Figure 1 and explain why they are suitable for their location. (4 marks)

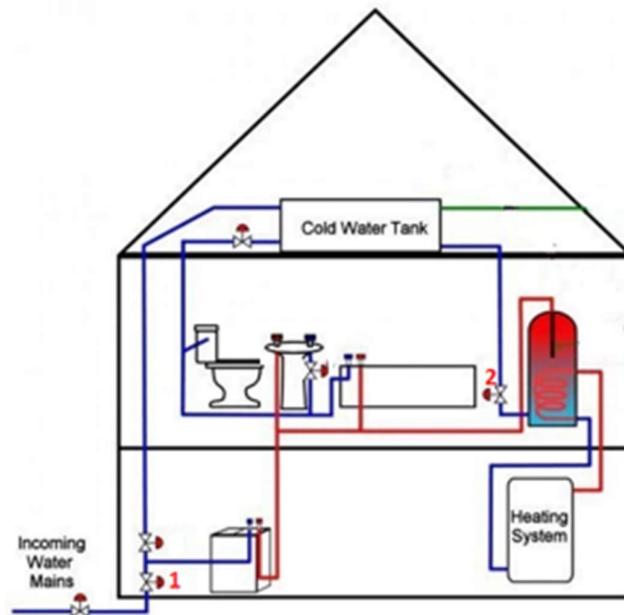


Figure 1

Answer;

Position 1 – Stop valve; suitable for controlling mains pressure water supply into a property  
Position 2 – Wheel operated valve; suitable for controlling low pressure internal water supplies with minimal flow restriction.

**3**

Complete the table below identifying the types of backflow prevention and the fluid risk category associated with it.

(3 marks)

Answer;

1 mark for each correct row.

Backflow Device	Mechanically operated Y/N	Non-Mechanically Operated Y/N	Application fluid category for back siphonage
AUK1	Y		5
AD	Y		5
BA		Y	5

**4**

a) What would be the **two most** suitable sources of information when diagnosing faults for the following two scenarios?

i) Malfunctioning water softener displaying a fault code.

ii) Client reports intermittent loud noise from pipework in a domestic property.

(1 mark)

(1 mark)

b) Upon further investigation, the issue reported in 4a) ii) is only occurring when the WC has been flushed. With this further information explain **three** faults that could be the cause.

(3 marks)

Answers;

i) Manufacturer's instructions

ii) Liaise with customer

b)

Pipework is insufficiently clipped allowing for pipework movement

Pipework under floorboards is insufficiently lagged allowing pipework vibration

Defective ball valve/ ball valve washer allowing vibration through the diaphragm

5

a) Identify the component in Figure 2 and determine the length of the discharge pipework (D2) from the table below.

(2 marks)

- Valve outlet – G1/2
- Pipe length – 10 m
- Five elbows.

Valve outlet size	Minimum size of discharge pipe D1*	Minimum size of discharge pipe D2* from tundish	Maximum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend
G½	15mm	22mm	Up to 9m	0.8m
		28mm	Up to 18m	1.0m
		35mm	Up to 27m	1.4m
G¾	22mm	28mm	Up to 9m	1.0m
		35mm	Up to 18m	1.4m
		42mm	Up to 27m	1.7m
G1	28mm	35mm	Up to 9m	1.4m
		42mm	Up to 18m	1.7m
		54mm	Up to 27m	2.3m

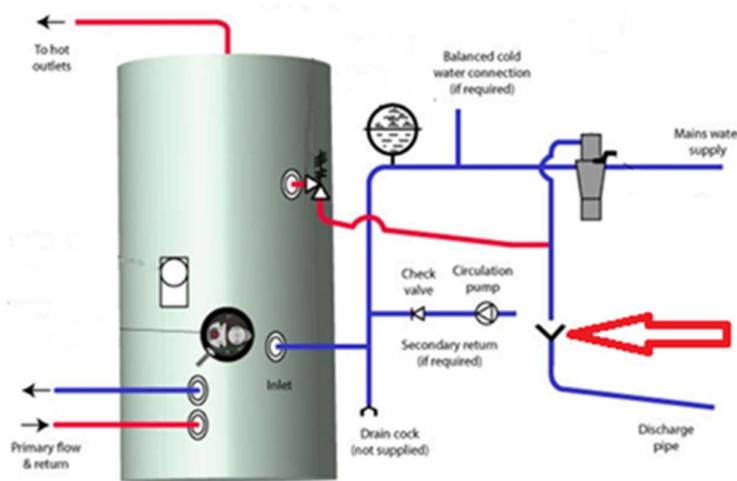


Figure 2

b) Explain the considerations when installing D2 pipework.

(4 marks)

Answer;

a) Tundish

Length of discharge – 28 mm

b) Pipe size calculated to at least one pipe size diameter larger than the D1 to prevent backflow through the tundish and ease of flow through discharge pipework. (1 mark)

Water should be discharged to a suitable location so that it is visible and prevents scolding. (1 mark)

No bends with the first 300 mm to prevent backflow. (1 mark)

Correct pipework material to prevent distortion of discharge pipework. (1 mark)

6

Which building regulation would **best** provide guidance on unvented hot water?

(1 mark)

Answer;  
Building Regulations part G

7

Explain the operating principles and functions of the zone valves in Figure 3.

(3 marks)

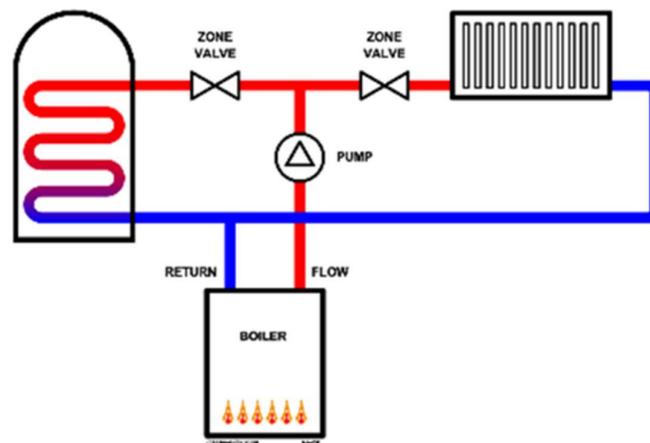


Figure 3

Answer;  
Zone valves allow for independent running of hot water/heating or allows for both to run simultaneously

8

Identify the type of heating installation from the wiring diagram in Figure 4 and explain **two** advantages of this system type.

(3 marks)

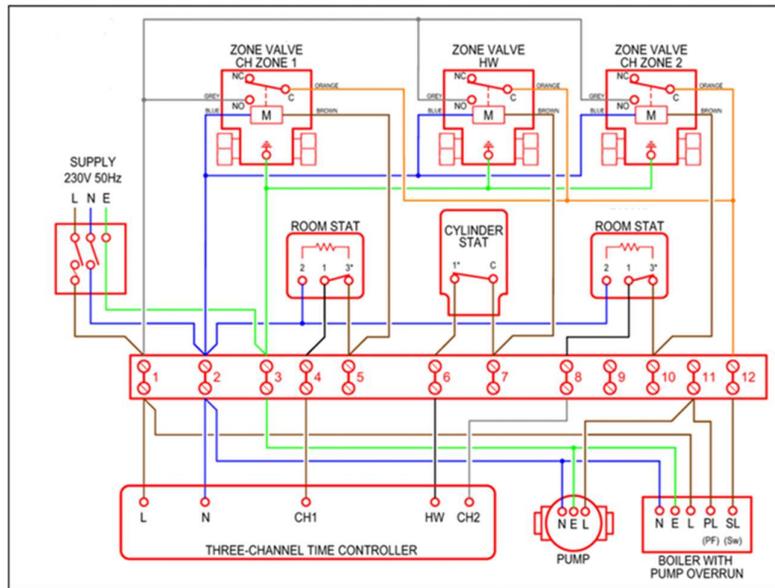


Figure 4

Answers;

S-Plan plus (**1 mark**) allows independent control of heating zones resulting in fuel efficiency (**1 mark**). The system design allows additional zones to be added at a later date with minimal disruption (**1 mark**)

Or any other suitable answer giving an explanation of the benefit.

9

Explain why a polarity test is carried out and how a failed test is indicated.

(2 marks)

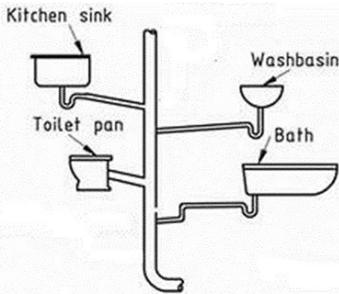
Answer;

To check the live and neutral connections are wire correctly and the installation is safe (**1 mark**) failed test would indicate the live and neutral were crossed resulting in an unsafe installation. (**1 mark**)

10

a) Complete the table below giving the type of drainage system and the recommended pipe sizes for the items indicated in the table.

(3 marks)



System type	
Bath waste size	
WC pan waste size	

b) A customer requests an additional remote WC to the property. On further inspection it is confirmed that it cannot be connected to the existing soil stack. Explain an alternative method of waste removal which would be suitable for the customer's needs.

(2 marks)

Answers;

a)

System type	Stack system
Bath waste size	40/42 mm
WC pan waste size	100/110 mm

b) Any suitable answer; (max 2 marks)

Macerator pump installed allowing for the WC to be located anywhere in the property (**2 marks**)

Stub-Stack system can be connected to the below ground drainage allowing for removal of waste material on a ground floor installation (**2 marks**)

11

A customer complains of bad smells from a washbasin in a rarely used en-suite. Describe one possible fault and explain why the bad smell occurs.

(2 marks)

Answer;

Trap seal loss in traps including waterless seals. (1 mark)

Trap seal loss results in contaminated air allowed to flow back through the sanitation pipework and into the property. (1 mark)

<b>12</b>	
Explain why Visual, Soundness and Performance tests are always undertaken during a commissioning procedure on an above ground drainage system.	(3 marks)
<p>Answer; Explanation of each;</p> <p>Visual inspection of the pipework installation looking for open ends/damage missing support brackets, repairs required <b>(1 mark)</b>  Soundness testing to ensure air tightness of the pipework system <b>(1 mark)</b>  Performance test of the pipework to ensure that trap seals are retained after appliances are used <b>(1 mark)</b></p>	

<b>13</b>	
Explain <b>one</b> advantage and <b>one</b> disadvantage of <b>two</b> different micro renewable technologies	(4 marks)
<p>Answers; Any two suitably correct answers detailing advantages and disadvantages;</p> <ul style="list-style-type: none"> <li>- Solar panels</li> <li>- Ground source heat pump</li> <li>- Air source heat pump</li> <li>- Rainwater harvest</li> <li>- Biomass</li> </ul>	

<b>14</b>	
Describe four different job roles and the responsibilities that will be involved in a large plumbing contract on a new housing development.	(4 marks)
<p>Answers;</p> <p>Site agent A site agent works alongside contractors and subcontractors to make sure building contracts are carried out on schedule. The agent is responsible for all on-site activities, including organizing work and making sure key building materials are delivered on schedule.</p> <p>Clerk of works The role is primarily to represent the interests of the client in regard to ensuring that the quality of both materials and workmanship are in accordance with the design information such as specification and drawings</p> <p>Surveyor Typical activities of the role include: advising clients about building/property issues, which can include technical, financial, legal, environmental/sustainability, building regulation and restoration matters ,undertaking building surveys and writing technical reports</p> <p>Foreperson Construction foremen may work in many different settings, and job requirements vary depending on the employer. Supervisory experience as well as an understanding of carpentry, plumbing and/or electrical work could also be helpful.</p>	

<b>15</b>	
Explain <b>two</b> areas to consider when monitoring progress against a work programme	(4 marks)
<p>Answers could include;</p> <p>Cost effectiveness - ensuring all cost are tracked and managed and within budget (<b>2 marks</b>)</p> <p>Progress monitoring against the schedule to ensure timely completion of work programme (<b>2 marks</b>)</p> <p>Quality - ensuring ongoing quality of work product (<b>2 marks</b>).</p> <p>Staff management – impacts on work programme against staffing levels (<b>2 marks</b>)</p>	

<b>16</b>	
Discuss the factors that would influence the selection of a central heating system.	(9 marks)
<p>Answer;</p> <p>Band 1 (1-3 marks) Largely descriptive response. Some attempt at evaluation to move to upper end of level.</p> <p>Band 2 (3-6 marks) More detailed response describes factors and explains consequences. Specific detail and examples access upper end.</p> <p>Band 3 (6-9 marks) Specific detail, examples to show evaluation of factors impact. Awareness of the relative effect of their impact will characterise candidates at the top of this level.</p> <p>Factors include:</p> <ul style="list-style-type: none"> <li>• Customers' needs/requirements</li> <li>• Building lay out and features/plans drawings and specifications</li> <li>• Fuel available</li> <li>• Occupancy and purpose</li> <li>• Availability and suitability of environmental technologies</li> <li>• Appliance and component location</li> <li>• System type</li> <li>• Energy efficiency</li> <li>• Cost</li> <li>• Legislation</li> <li>• Statutory regulations</li> <li>• Manufacturers technical instructions</li> </ul>	