

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

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

Version: June 2017

Exam date: 22/06/2017

Exam time: 09:00 – 11:00

Base mark: 60

1	
Under Regulation 5 of the Water Supply (Water fittings) Regulation, consent is required from the water undertaker for the installation of new fittings in buildings and dwellings. Describe one installation that requires consent.	(1 mark) AO1
LO (unit title): 331 Cold water system planning and design	Test spec: 8202-331.01.01
<p>Answers may include;</p> <p>1 mark for any of the below;</p> <ul style="list-style-type: none"> • Bath over 230 litres • A pump drawing more than 12 litres per minute connected to a supply pipe • A unit which incorporates reverse osmosis • Installation of RPZ valve 	

2	
Provide a description on the requirements to notify the installation of a water fitting.	(3 marks) AO2
LO (unit title): 331 Cold water system planning and design	Test spec: 8202-331.01.02
<p>Notifiable fitting is to be installed in connection with (1 mark for any from the below, maximum of 1 mark):</p> <p>i) The erection of a building or structure</p> <p>ii) The extension or alteration of a fitting on any premises other than a house</p> <p>iii) The material change of use of any premises</p> <p>The installer or his representative to give notice before starting the work (1 mark)</p> <p>The work should not start until consent is given. If no reply is given, consent may be deemed if 10 days have passed (1 mark)</p>	

3	
To enable adequate service and maintenance, state three locations where service valves should be fitted.	(3 marks) AO1
LO (unit title): 331 Cold water system planning and design	Test spec: 8202-331.02.04
<p>Answers may include;</p> <ul style="list-style-type: none"> • On every cold feed or distribution pipe from a cold water storage system. (1 mark) • On every hot distributing pipe where it is not possible to fit a valve on the cold feed pipe. (1 mark) • Immediately before any float operated valve. (1 mark) 	

4	
Provide a description of the procedure to follow when carrying out commissioning of a cold water system to a domestic property.	(5 marks) AO1
LO (unit title): 331 Cold water system planning and design	Test spec: 8202-331.06.06
<p>Visual inspection of installation to ensure all pipework is secure with no open ends (1 mark) Flush the system to remove debris at the furthest outlet (1 mark) carry out soundness testing in line with water regulations (1 mark) performance test in line with water regulations (1 mark) carry out final checks of installation and handover to customer detailing any special instructions (1 mark).</p>	

5	
On commissioning a system, provide two possible circumstances when a disinfection procedure may need to be repeated.	(2 marks) AO2
LO (unit title): 331 Cold water system planning and design	Test spec: 8202-331.06.06
<p>Circumstances may include; (or any other suitable answer) max 2 marks</p> <ul style="list-style-type: none"> • Where bacterial analysis is unsatisfactory. (1 mark) • Where residual chlorine is less than 30mg/l after saturation period. (1 mark) • Zoned systems in stages (1 mark) • If the process has to be done due to leak located on system (1 mark) 	

6	
Information and guidance on unvented hot water systems can be found in which regulatory document?	A01 (1 mark)
LO (unit title): 332 Hot water system planning and design	Test spec: 8202-332.02.02
Answer; Building Regulations part G	

7	
Water is heated by a boiler with an efficiency of 93%. The water is stored at 65 °C and is supplied to the cylinder at 5 °C (Specific Heat Capacity of water = 4.19). Using the formula below calculate the heat input in kW required to heat 120 ltrs of stored water to temperature in two hours.	A01 (2 marks)
$\frac{\text{S.H.C.} \times \text{Litres of water} \times \text{Temp. difference } (\Delta t) \times \text{Boiler efficiency}}{\text{Time in seconds} \times 100} = \text{kW}$	
LO (unit title): 332 Hot water system planning and design	Test spec: 8202-332.01.02
Answer; Working out shown (1 mark); [4.19 x 120 x 60 x 93] / [7200 x 100] Correct answer (1 mark); 3.89 kw	

8

a) Explain the operation of components labelled 1, 2, 3, 4 and 5 in Figure 1.

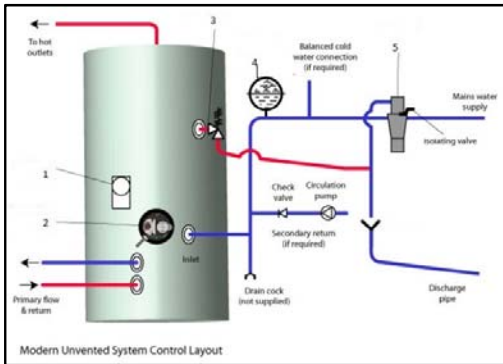


Figure 1

1	Control thermostat and eco
2	Immersion and eco
3	T and P valve
4	Pressure vessel
5	Composite valve

Table 1

AO2
(5 marks)

b) Explain the reason for the correct termination of D2 discharge pipework.

AO2
(2 marks)

LO (unit title): 332 Hot water system planning and design

Test spec: 8202-332.01.03

Answers;

A;

Control thermostat and eco (1 mark)

Thermostat operates by sensing the temperature of a system and electronically switching on and off components.

Immersion and eco (1 mark)

Immersion heaters are electric heating elements that are found in water cylinders to heat water and contain a thermal lockout that must be reset manually.

T and P Valve (1 mark)

Device that opens to release a fluid before pressure or temperature reaches dangerous levels.

Pressure Vessel (1 mark)

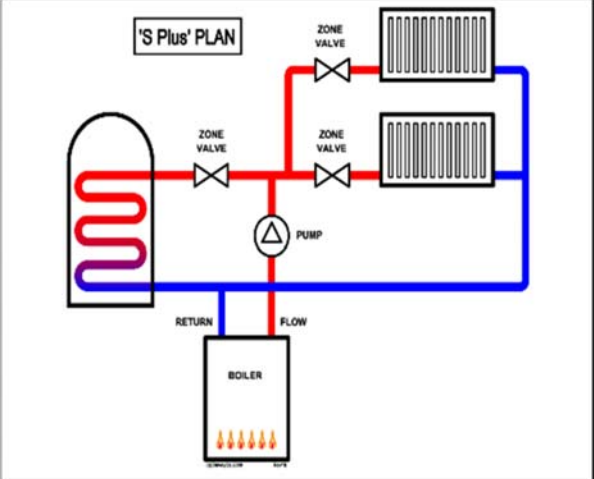
This is used to deal with the expansion of the water in the system as it is heated. As water gets warmer it expands.

Composite Valve (1 mark)

This is placed on the incoming cold water main to allow isolation and permit the control of pressure it will enable backflow prevention and contain a line strainer.

B; The D2 must terminate correctly to ensure no persons can come into contact with the discharging water **(1 mark)** that can be at a temperature of 95 °C **(1 mark)**.

9	
State the reason for a polarity check.	(1 mark) AO1
LO (unit title): 333 Central Heating System Planning and Design	Test spec: 8202-333.04.04
Answer; To ensure the live and neutral connections are wired correctly and there is no cross polarity.	

10	
Explain the benefits of using an S Plus plan system as shown in Figure 2.	(4 marks) AO2
 <p style="text-align: center;">Figure 2</p>	
LO (unit title): 333 Central Heating System Planning and Design	Test spec: 8202-333.01.01, 01.02, 03.01
<p>Marks should be distributed as follows; maximum of 4 marks from any above</p> <ul style="list-style-type: none"> - 1 mark for providing the benefit - 1 mark for explaining how/what makes it a benefit <p>Each bullet point should be worth a max of 2 marks</p> <ul style="list-style-type: none"> • Allows independent control of zones (1 mark) and therefore reduce running cost (1 mark). • Use of additional zoning valves (1 mark) allows the system to only provide heating to the areas required (1 mark) and therefore increasing comfort levels and reducing costs (1 mark) • System allows for multiple zones to be added (1 mark) this allows for future alterations or extensions to be added to the system for example independent control of a heating circuit to a conservatory or new extension (1 mark). • Underfloor heating and kick space heating can be added as additional zones whereby each zone is controlled by its own thermostat (as well as TRVs (1 mark)) this provides 	

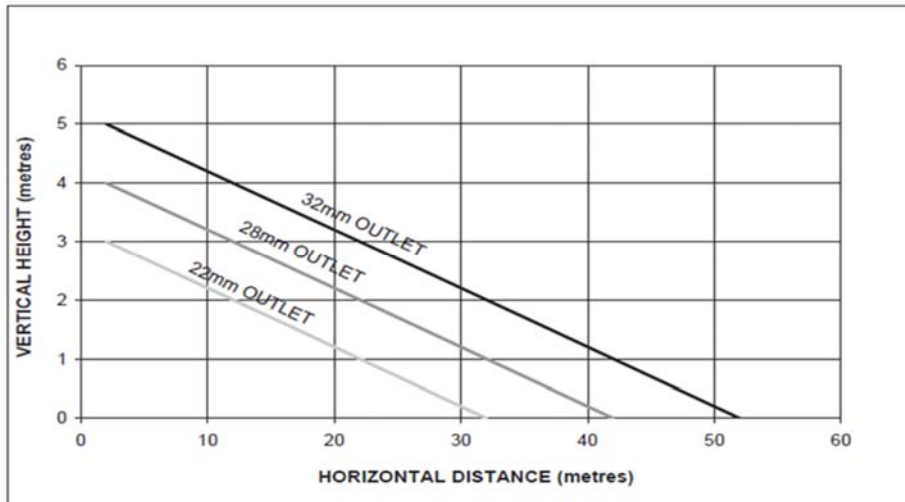
the benefit of increased control of heating systems creating greater comfort levels and increased efficiency **(1 Mark)**

- Stored hot water systems with independent control through the use of zoning arrangements **(1 mark)** operated through a temperature and timer arrangement independently from the heating systems allowing for reduced cost, increased heat up times and improved system efficiency **(1 mark)**.

11

Explain the installation process of a macerator pump to a new en-suite installation with a vertical lift of 4.5 m using a suitable outlet size from the chart provided.

A02
(7 marks)



LO (unit title): 334 Sanitation system planning and design

Test spec: 8202-334.01.01

Answer;

The learner must describe a standard macerator installation covering the main points below;

- Suitable outlet size – 32 mm **(1 mark)**
- Vertical lift 4.5m **(1 mark)**
- Non-return valve to prevent waste water cycling back into the unit **(1 mark)**
- Anti-vibration mat and connections to help reduce noise **(1 mark)**
- Continuous fall on pipework to maintain continuous flow of waste water after pump **(1 mark)**
- Non-switched fused spur fitted to enable isolation of appliance **(1 mark)**
- Detailed commissioning process as per manufactures specifications **(1 mark)**

12	
A customer complains of bad smells from a cloak room containing a wc and whb connected to a stub stack. Describe one possible fault.	(1 mark) AO1
LO (unit title): 334 Sanitation system planning and design	Test spec: 8202-334.03.01
Answer;	
Any suitable trap seal loss or air admittance devise issues explained (1 mark)	

13											
<p>To eliminate positive pressure, the minimum distance from the base of the stack to the lowest branch connection varies depending on the height of the stack.</p> <p>Complete the table and statement below.</p> <p>The stack base should use two 45° bends or a bend with a radius of [Insert text box] or more.</p> <table border="1" data-bbox="420 984 1078 1306"> <thead> <tr> <th>Application</th> <th>Minimum height</th> </tr> </thead> <tbody> <tr> <td>Single dwelling up to three storeys</td> <td>[Insert text box]</td> </tr> <tr> <td>Up to five storeys</td> <td>740 mm</td> </tr> <tr> <td>More than five storeys</td> <td>One storey</td> </tr> <tr> <td>More than 20 storeys</td> <td>Two storeys</td> </tr> </tbody> </table>	Application	Minimum height	Single dwelling up to three storeys	[Insert text box]	Up to five storeys	740 mm	More than five storeys	One storey	More than 20 storeys	Two storeys	AO1 (2 marks)
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LO (unit title): 334 Sanitation system planning and design	Test spec: 8202-334.04.01										
Answers;											
<ul style="list-style-type: none"> - 450 mm (1 mark) - 200 mm (1 mark) 											

14	
Describe the operating principles of two heat producing micro renewable technologies.	AO1/AO2 (4 marks)
LO (unit title): 335 Environmental technology systems	Test spec: 8202-335.01.01
<p>Answers (or any other suitable answer);</p> <ul style="list-style-type: none"> • Solar thermal flat plate collector (1 mark) uses temperature differentiation between the panel and the cylinder to gain usable heat. (1 mark) • Ground source heat pump (1 mark) uses temperature differentiation between the underground coil and the cylinder to gain usable heat from the refrigeration process. (1 mark) 	

15	
a) Define a risk assessment and a method statement.	(2 marks) AO1
b) Explain how to minimise risks when carrying out jointing techniques.	(2 marks) AO2
LO (unit title): 336 Site procedures and planning	Test spec: 8202-336.02.01 , 02.02
<p>Answers;</p> <p>A;</p> <p>Risk Assessment – likelihood of a risk occurring (1 mark)</p> <p>Method statement – suitable method of carrying out an activity that has taken (1 mark)</p> <p>B; Any 2 marks from below</p> <p>Using correct PPE (1 mark) and heat protective equipment (1 mark). Ensuring area is well lit and well ventilated (1 mark) wearing suitable protective gloves apply flux form joint and apply only sufficient heat to enable joint to be formed (1 mark) and allow to cool to prevent risk of burns (1 mark) store soldering equipment away from the direct working area (1 mark).</p>	

16	
A client has requested an amendment to a small scale plumbing and heating project.	
a) Explain the process of a variation order.	(2 marks) AO1
b) Explain how you would ensure the project remains on schedule.	(2 marks) AO2
LO (unit title): 336 Site procedures and planning	Test spec: 8202-336.03.01 , 03.02

Answer;
 A; Customer requests in writing the amendments required **(1 mark)** these are costed and re-quoted to the customer **(1 mark)**.
 B; Correct time management **(1 mark)** for trades on site timely delivery of materials from supply chain **(1 mark)**.

17	
Discuss factors that would influence the selection of hot water and heating systems.	(9 marks)
LO (unit title): Integration across the units Any valid factors that learner discusses in answer including Location Demand Customer needs Cost Building limitations Types of systems available Renewable energies Building regulations Comparisons of system types	Test spec: 8202-332.01.01, 01.02 8202-332.02.01, 02.02, 02.03, 02.04 8202-333.01.01, 01.02, 01.03, 01.04 8202-333.02.01, 02.02 8202-333.03.01 8202-335.01.01, 01.02 8202-335.02.01, 02.02, 02.03 8202-335.03.01, 03.02 8202-336.01.01, 01.02, 01.03, 01.04 8202-336.02.01, 02.02 8202-336.03.01, 03.02 8202-336.04.01, 04.02, 04.03, 04.04
Answer; Band 1 (1-3 marks) Largely descriptive response. Shows a limited understanding of hot water and heating selection and limited understanding of influencing factors. Limited or no knowledge of technical component terminology. Lacks clarity and structure. Band 2 (4-6 marks) More detailed response describes factors and explains consequences. Shows a good understanding of hot water and heating selection and good understanding of influencing factors. Good knowledge of technical component terminology and shows clarity and structure in arguments. Band 3 (7-9 marks) Specific detail, examples to show evaluation of factors impact. Shows an excellent understanding of hot water and heating selection and thorough understanding of influencing factors. Extensive knowledge of technical component terminology and shows clarity and structure in. Awareness of the relative effect of their selection will characterise candidates at the top of this level. Factors include: <ul style="list-style-type: none"> • Customer’s needs/requirements 	

- Building lay out and features/plans drawings and specifications
- Fuel available
- Occupancy and purpose
- Availability and suitability of environmental technologies
- Appliance and component location
- System type
- Energy efficiency
- Cost
- Legislation
- Statutory regulations
- Manufacturers technical instructions