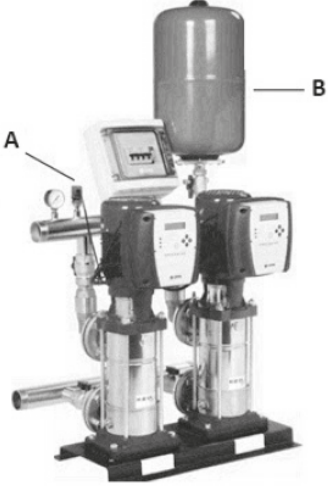


## 8202 Level 3 Advanced Technical Diploma in Plumbing (450)

### 8202-035 and 535 L3 June 2018 Mark Scheme

June 2018


1	State the term used for each of the following fluid categories.		
	a) Category 3. b) Category 4. c) Category 5.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	3- Slight health hazard 4- Significant health hazard 5- Serious health hazard	Accepted slight hazard, significant hazard and serious hazard.	3
2	Explain the function of a Float switch in a break cistern.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	Float switch enables the float to raise or drop due to the varying water levels in the cistern (1 mark),  1 mark from below (max 1 mark); which triggers remote equipment/micro switch (1 mark). Or which stops the pump from running when the water level is too low (1 mark)	Marks also given to responses along the following lines: Then float switch rises or falls with the water level.  Allowing the pump to stop	2
3	Differentiate between how mechanical and non-mechanical protect against back flow.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	Mechanical has a physical barrier to protect against backflow prevention <b>(1 mark)</b> Non- mechanical relies on an air gap to protect against back flow prevention <b>(1 mark)</b>	Accepted: a type mechanical device as correct answer.  Do not accept: The question states to prevent backflow, therefore any answer not containing the words “to protect against back flow prevention” I have taken as correct.	2

4	<p>Figure 1 shows an integral controlled cold water booster pump. Identify the components labelled A and B.</p>  <p style="text-align: center;">Figure 1</p>		
	<p><b>Acceptable answer(s)</b></p>	<p><b>Guidance</b></p>	<p><b>mks</b></p>
	<p>A. Transducer B. Accumulator/ Expansion vessel</p>	<p>1 mark each</p>	<p>2</p>
5	<p>State where the secondary return pipework should enter the cylinder for correct secondary circulation.</p>		
	<p><b>Acceptable answer(s)</b></p>	<p><b>Guidance</b></p>	<p><b>mks</b></p>
	<p>Top ¼ of the cylinder</p>	<p>Also accept ¾ from the bottom of the cylinder</p>	<p>1</p>
6	<p>Under the Water Act 2003, what <b>two</b> documents regulate how plumbers must install, commission and maintain water supplies within domestic buildings?</p>		
	<p><b>Acceptable answer(s)</b></p>	<p><b>Guidance</b></p>	<p><b>mks</b></p>
	<p>1. The Water Supply (Water Fittings) Regulations 1999. 2. The Private Water Supply Regulations 2009.</p>	<p>N/A</p>	<p>2</p>
7	<p>State <b>two</b> components in an unvented hot water system that enable water to be discharged to a safe termination.</p>		
	<p><b>Acceptable answer(s)</b></p>	<p><b>Guidance</b></p>	<p><b>mks</b></p>
	<p>Expansion relief valve Temperature relief valve Tundish</p>	<p>Any two of the following; <b>(1 mark each, max 2 marks)</b>  Do not accept pipework answers.</p>	<p>2</p>

8	Explain how the 3 tier temperature control safety features of an unvented hot water system protects the consumer.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	<p>Control thermostat controls the contents of the cylinder to 60-65°C <b>(1 mark)</b> to limit bacterial growth which can lead to legionella disease/ to safely store water for use <b>(1 mark)</b>.</p> <p>Manual resettable/ Overheat thermostat cuts power to the heat source if the temperature exceeds 85-89 °C <b>(1 mark)</b> to act as a 2<sup>nd</sup> fail safe device should the cylinder thermostat fail <b>(1 mark)</b>.</p> <p>Temperature/ Pressure relief valve discharges when the temperature exceeds 95 °C <b>(1 mark)</b> to act as a 3<sup>rd</sup> fail safe device should the overheat thermostat fail <b>(1 mark)</b>.</p>	N/A	6
9a	<p>Explain why the pump is positioned after the vent and feed pipework as shown in Figure 2.</p> <div style="text-align: center;"> </div> <p>Figure 2</p>		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	To ensure pump is installed within the neutral zone <b>(1 mark)</b> to prevent the system pumping over or pulling air into the system <b>(1 mark)</b>	N/A	2
9b	Explain why it is important to maintain a <b>maximum</b> dimension of 150 mm between the vent and feed.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	<p>Maximum dimension of 150 mm ensures equal suction on both connections <b>(1 mark)</b>,</p> <p>OR</p> <p>So the pump can't be positioned between the vent and feed <b>(1 mark)</b></p> <p>therefore it eliminates the risk of aeration being introduced <b>(1 mark)</b> which can cause/ lead to corrosion <b>(1 mark)</b></p>	N/A	3

10	Define the term Boiler Interlock.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	Boiler interlock is the interconnection of all controls on the system <b>(1 mark)</b> which prevents the boiler firing when it's not required <b>(1 mark)</b>	N/A	2
11	State <b>two</b> advantages of underfloor heating.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	<ul style="list-style-type: none"> <li>- comfortable even temperature</li> <li>- flexibility of installation</li> <li>- virtually no maintenance</li> <li>- low running costs</li> <li>- links well with micro-renewables</li> </ul> Any other suitable.	(1 mark each, max 2 marks)  Any other suitable	2
12	State the regulation that sets the provisions for the ventilation of a building.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	Approved Document F of the Building Regulations <b>(1 mark)</b>	N/A  Accepted: Part F or Document F. typical terms used for the document.	1

13	<p>Complete Table 1 by stating the <b>maximum</b> distances, in metres, from the soil stack to the appliance when installing the diameter waste pipework shown.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Waste pipe diameter (mm)</th> <th style="text-align: center;">Maximum distance (m)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">32</td> <td style="text-align: center;">_____</td> </tr> <tr> <td style="text-align: center;">40</td> <td style="text-align: center;">_____</td> </tr> <tr> <td style="text-align: center;">50</td> <td style="text-align: center;">_____</td> </tr> </tbody> </table> <p style="text-align: center;">Table 1</p>			Waste pipe diameter (mm)	Maximum distance (m)	32	_____	40	_____	50	_____
Waste pipe diameter (mm)	Maximum distance (m)										
32	_____										
40	_____										
50	_____										
<b>Acceptable answer(s)</b>		<b>Guidance</b>	<b>mks</b>								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Waste pipe diameter (mm)</th> <th style="text-align: center;">Maximum distance (m)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">32</td> <td style="text-align: center;">1.7</td> </tr> <tr> <td style="text-align: center;">40</td> <td style="text-align: center;">3.0</td> </tr> <tr> <td style="text-align: center;">50</td> <td style="text-align: center;">4.0</td> </tr> </tbody> </table>		Waste pipe diameter (mm)	Maximum distance (m)	32	1.7	40	3.0	50	4.0	N/A	3
Waste pipe diameter (mm)	Maximum distance (m)										
32	1.7										
40	3.0										
50	4.0										
14	<p>Explain the installation requirements on the outlet pipe of a WC macerator.</p>										
<b>Acceptable answer(s)</b>		<b>Guidance</b>	<b>mks</b>								
<p>Long radius and 45 degree bends are used <b>(1 mark)</b>  - to minimise blockages <b>(1 mark)</b></p> <p>Flexible connections on the inlets and outlets <b>(1 mark)</b>  - to minimise noise <b>(1 mark)</b></p> <p>Discharge pipework rises vertically within 300 mm of the unit <b>(1 mark)</b>  - to reduce frictional loss and resistance <b>(1 mark)</b></p>		<p>Allowed marks for the following:  Fall 1:100  Plastic pipe solvent weld only.  An AAV can be fitted in some circumstances.</p>	6								
15	<p>Compare the operating principles of air source heating and ground source heating.</p>										
<b>Acceptable answer(s)</b>		<b>Guidance</b>	<b>mks</b>								
<p>A Heat pump takes the available heat from the ground (1 mark) and increases it by putting it under pressure to use to heat the home and hot water <b>(1 mark)</b> (Or similar wording)  An Air source heat pump takes heat from the air (1 mark) as it's drawn through the unit <b>(1 mark)</b></p>		N/A	4								

16	What action should be taken to rectify a 40 mm waste pipe that has exceeded a 3 m run?		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	Upsize the pipe diameter Add anti-vacuum trap Ventilate the branch	N/A	1
17	Identify the <b>two</b> renewable systems that conserve water usage.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	Rain Water Harvesting ( <b>1 mark</b> ) Grey Water Harvesting ( <b>1 mark</b> )	N/A	2
18	State how a standing (static) pressure test on a cold main would be carried out?		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	Attach a pressure gauge to an open end of the cold main pipework (1 mark) then open the valves to the gauge, the reading should be taken when no appliances are in operation (1 mark)	N/A	2
19	Explain how the internal components of a double-check valve protects wholesome water from contamination.		
			
	<b>Figure 3</b>		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	It uses a spring loaded one-way valve ( <b>1 mark</b> ) so movement of water is only in one direction ( <b>1 mark</b> )	N/A	2

20

What type of installation is shown in Figure 4?

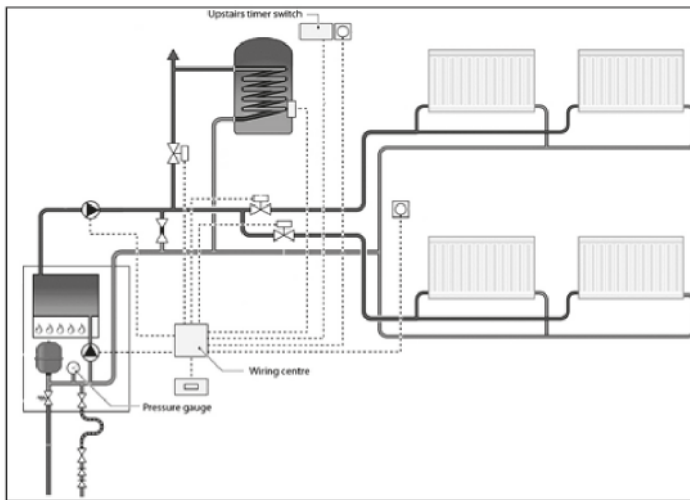


Figure 4

**Acceptable answer(s)****Guidance****mks**

S Plan plus

N/A

1

21	Discuss the advantages and disadvantages of installing a micro renewable system.		
	<b>Acceptable answer(s)</b>	<b>Guidance</b>	<b>mks</b>
	<p><b>Band 1 (1-3)</b></p> <p>Limited scope of advantages and disadvantages identified, mostly inaccurate. No links made with micro-renewable systems. Limited knowledge of system operation requirements demonstrated. Response showed lack of knowledge as most points made were either incorrect or not relevant to the question and had no justification.</p> <p><b>Band (4-6)</b>  <b>Thoroughness of response</b>  Some points highlighted for advantages and disadvantages of micro renewable systems with some inaccuracies. Some conclusions made on few points, and few links made between them showing understanding of the systems. Some clear causes and effects provided for the advantages/ disadvantages. Some good attempts at concluding the points raised with very few inaccuracies.</p> <p><b>Band 3 (7-9)</b></p> <p>Detailed response with clear understanding shown of all advantages and disadvantages of micro renewable systems. Links made between all points and demonstrated causes and effects of each. Accurate conclusions made with full justifications for desired customer's needs.</p>	<p>Factors to include/ indicative content:</p> <ul style="list-style-type: none"> <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 micro renewable system.</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> <li>• Customer's needs and requirements</li> </ul>	9