

8202-035 and 535 L3 March 2018 Mark Scheme

8202-35 Level 3 Advanced Technical Diploma in Plumbing (450)

Q	Acceptable answer(s)	Guidance	Max marks
1	<p>Tap is fitted with a spring loading mechanism (1 mark) which shuts itself off, eliminating the tap being left on (1 mark) and therefore</p> <p>(only accept one benefit); helps reduce the water bill/costs (1 mark) OR vandal proof – avoid breaks and cracks (1 mark).</p> <p>Less chance of scalding due to water cutting off.</p>	Only one mark for stating benefit(s).	3
2	<p>The pipework could be inadequately support therefore should be sufficiently clipped to avoid water hammer.(1 mark)</p> <p>A shock arrestor/ expansion vessel should be installed,(1 mark) this uses a cushion of air to cushion any shockwave safely without damaging any pipework or fittings (1 mark)</p> <p>Install pressure reducing valve</p>	Any other suitable answer.	3
3	<p>1 mark for each;</p> <ol style="list-style-type: none"> 1. Wholesome 2. Aesthetic quality impaired 3. Slight 4. Significant 5. Serious. 	N/A	5
4a)	50 °C and 30 seconds (1 mark)	(1 mark awarded only if both values are noted)	1
4b)	<p>Answer may include;</p> <p>(max 1 mark for either of the below)</p> <p>By installing a secondary circulation (1 mark) OR a pumped circuit in the hot water system</p>	Or any other reasoning.	2

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	<p>(1 mark)</p> <p>(max 1 mark for either of the below [must be correctly connected with one of the above])</p> <ul style="list-style-type: none"> - which will minimise dead legs (1) mark for either answer - should be insulated along its entirety to protect it from heat loss (1). <p>Bronze pump, top ¼ of cylinder with Essex flange</p>		
5	<p>Suitable material will help support the quick flow of the water through the pipe (1 mark) to a safe termination point to avoid damage to the property and people (1 mark) and it stops the pipework deforming or failing under high temperatures.(1 marks)</p> <p>Material that is expected to last a long time, to stop the contents from freezing</p>	N/A	3
6	<p>Downward discharge up to a maximum of 100 mm above a finished floor level/ car park (1 mark) surrounded by a wire cage to prevent scalding. (1 mark).</p> <p>Tapped gully, below the gully grate but above the water level stopping anyone from being scalded</p>	Any other suitable answer.	2
7a)	<p>Max 3 marks;</p> <p>Solar (1 mark)</p> <p>Electrical appliances (1 mark)</p> <p>Body heat (1 mark)</p> <p>Additional rooms/property with central heating (1 mark)</p> <p>Heat from cylinders, heat from cooking appliances</p>	N/A	3
7b)	<p>Building fabric (1 mark), is the heat loss through the construction materials due to the temperature difference across each component within a building (windows, roofs, floors etc.), (1 marks)</p> <p>Ventilation (1 mark) is the loss of heat due to air changes via air ingress through cracks around windows and mechanical ventilation (1 marks)</p>	N/A	4
8a)	<p>Wet room/ walk in shower (1 mark)</p>	N/A	1
8b)	<p>One mark each (max 2 marks),</p> <p>Perfect for a small bathroom as the bath and shower tray replacement (1 mark)</p>	Or any other suitable	2

	<p>Easy to clean/ hygiene (1 mark) Less likely to leak as the whole floor is waterproofed (1 mark) Good access for disabled (1 mark) Similar price to shower tray and enclosure (1 mark) Suitable for underfloor heating (1 mark) Spacious layout can facilitate more designs due to free floor area (1 mark) Less maintenance (1 mark)</p> <p>Quicker to install and no need to mop up spillages</p>		
9	<p>Any suitable answers (max 2 marks for each point below);</p> <ul style="list-style-type: none"> - Reduces the amount of pipe required (1 mark) as pipework does not have to penetrate through the roof (1 mark) - Reduces the possibility of ingress of water into the property (1 mark) as there is no pipework passing through the property (1 mark) - No foul smells inside the property (1 mark) as the valve is designed to allow air to only flow into the soil stack (1 mark) - During design aspects, there is more flexibility, as pipework can be installed internally or externally as the air admittance valve eliminates the need for the soil stack to be terminated 1 m away from openable windows. <p>Saves money as it can reduce the amount of pipework used</p>	N/A	2
10	The installation of the system type can go ahead without the need for planning permission. (1 mark)	N/A	1
11a)	Part A (1 mark)	N/A	1
11b)	<p>The increased weight/ load that is put on the structure from the full panels and snow (1 mark)</p> <p>OR</p> <p>the increased stress to the structure of the roof from wind uplift (1 mark) [only 1 mark awarded for either of the above]</p> <p>may affect the integrity of the roof ending in the collapse/ failure of the roof.(1 mark)</p>	N/A	2

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<p>12</p>	<p>1 mark for each (max 4 marks);</p> <ul style="list-style-type: none"> - installing a bidet - bath larger than 230 litres - material change of use - installing fittings in new buildings and dwellings extension and alterations of water systems in nondomestic properties - pumping/drawing more than 12 litres per min from main - reverse osmosis - rpz or other valve protecting against fluid cats 4/5 - a garden water system unless hand held, services outside 750-1350 - pond or pool auto replenish more than 10,000 litres. <p>Flushing large quantities of water down the drain containing disinfectants</p>	<p>N/A</p>	<p>4</p>
<p>13</p>	<p>1 mark for each, max 2 marks;</p> <ul style="list-style-type: none"> - Control thermostat - High temperature energy cut out - Temperature pressure relief valve 	<p>N/A</p>	<p>2</p>
<p>14</p>	<p>1 mark for each (max 3 marks);</p> <ul style="list-style-type: none"> - Lower running temperatures as it is installed in the building fabric or structure which heats the room more evenly and efficiently. - Even heat distribution due to the patented layout types - Less likely to leak as it is one continuous installation - Lower maintenance as there are less joints/ components and visible pipeworks to be subject to mechanical damage - Works well with renewables due to the low operating temperature. <p>Quicker to install, no cold spots, more space in rooms with no radiators on walls, safe temperature for elderly persons, allows zoning, no dust behind radiators for people with allergies.</p>	<p>N/A</p>	<p>3</p>
<p>15</p>	<p>The main discharge stack is ventilated (1 mark), this acts as a safe guard against positive and negative air pressure fluctuations reducing any occurrences of trap seal loss. (1 mark)</p>	<p>N/A</p>	<p>2</p>
<p>16</p>	<p>Two approaches:</p>	<p>N/A</p>	<p>3</p>

	<p>Approach 1; 1 mark for recalling Pythagoras's theorem $a^2+b^2=c^2$ (1 mark)</p> <p>1 mark for using formula to calculate edge $5^2 = 25$ $3^2=9$ $25+9=34$ $34\sqrt{5}=5.83095$</p> <p>1 mark for correct calculation of area $5.8 \times 10 = 58m^2$</p> <p>Approach 2; 1 mark for recalling BS EN 12056-3:2000 calculation $L (W + \frac{H}{2})$ 1 mark for placing numbers in the formula correctly; $10 (5 + \frac{3}{2})$ 1 mark for correct answer $= 65m^2$</p>		
<p>17</p>	<p>The trees will mature and may become an issue with shading, (1 mark) this would have an impact on the efficiency of the system (1 mark)</p> <p>Branches could fall and damage collectors</p>	<p>N/A</p>	<p>2</p>
<p>18</p>	<p>Intention: The aim of this question is to allow candidates an opportunity to demonstrate knowledge and understanding of the factors that need to be considered when commissioning common systems for plumbing, heating and drainage. The candidate has the opportunity to demonstrate their level of understanding of the process and how it is carried out ensuring health and safety and best practices.</p> <p>Factors to include/ indicative content; Visual inspection this includes a check of the system confirming it meets industry standards, open ends or capped off, joints are tight, pipework is supported, components are correctly installed, isolation valves are turned off,</p> <p>Checking for soundness, how the various systems are tested for soundness, wet systems have an initial system fill slowly to avoid airlocks and time allowed for stabilisation, test procedure for rigid/ plastic pipework,</p>	<p>N/A</p>	<p>9</p>

<p>disinfection procedure, flushing the system. Drainage systems air test procedure</p> <p>performance checks, flow rates and outlet pressures, design temperatures, trap seal loss,</p> <p>hand over documentation, completion of commissioning records and information provided</p> <p>demonstration to the customer show customer around the system, demonstrate the operating principles and controls, explain how the system works, what to do in case of an emergency, inform of the need for regular service and maintenance. Handover manufacturer’s instructions.</p> <p>Band 1 (1-3 marks) Largely descriptive response. Shows a limited understanding of commissioning process and limited understanding of factors common across system types. Limited or no knowledge of technical component terminology. Lacks clarity and structure.</p> <p>Band 2 (4-6 marks) More detailed response describes commissioning factors and explains consequences and links to other areas. Shows a good understanding of all aspects of the commissioning process and how these are common across all areas. Good knowledge of technical component terminology and shows clarity and structure in arguments.</p> <p>Band 3 (7-9 marks) Specific detail, examples to show evaluation of the commissioning process. Shows an excellent understanding of the commissioning process and thorough understanding of common factors across all areas. Extensive knowledge of technical component terminology and shows clarity and structure in. Awareness of the importance of the correct commissioning procedure regardless of the system type will characterise candidates at the top of this level.</p>		
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