8202-535 JUNE 2017
Level 3 Advanced Technical Diploma in Plumbing (450)
Level 3 Plumbing – Theory Exam

If provided, stick your candidate barcode label here.

Candidate name (first, last)
First
Last
Candidate enrolment number
Date of birth (DDMMYYYY) Gender (M/F)
Assessment date (DDMMYYYY) Centre number Candidate signature and declaration*

• If any additional answer sheets are used, enter the additional number of pages in this box.
• Please ensure that you staple additional answer sheets to the back of this answer booklet, clearly labelling them with your full name, enrolment number, centre number and qualification number in BLOCK CAPITALS.
• All candidates need to use a black/blue pen. Do not use a pencil or gel pen.
• If provided with source documents, these documents will not be returned to City & Guilds, and will be shredded. Do not write on the source documents.

* I declare that I had no prior knowledge of the questions in this assessment and that I will not divulge to any person any information about the questions.

You should have the following for this examination
• non-programmable scientific calculator
• a pen with blue or black ink

General instructions
This question paper is the property of City and Guilds of London and should be returned after the examination.
• The maximum marks for each section is shown in brackets.
• Answer all questions.
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)

2. Provide a description on the requirements to notify the installation of a water fitting. (3 marks)

3. To enable adequate service and maintenance, state three locations where service valves should be fitted. (3 marks)

4. Provide a description of the procedure to follow when carrying out commissioning of a cold water system to a domestic property. (5 marks)
5 On commissioning a system, provide **two** possible circumstances when a disinfection procedure may need to be repeated. (2 marks)

6 Information and guidance on unvented hot water systems can be found in which regulatory document? (1 mark)

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. (2 marks)

\[
\text{S.H.C. x Litres of water x Temp. difference (}\Delta t\text{) x Boiler efficiency}{\text{Time in seconds x 100}} = \text{kW}
\]
8 a) Explain the operation of components labelled 1, 2, 3, 4 and 5 in Figure 1. (5 marks)

![Modern Unvented System Control Layout](image)

**Figure 1**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control thermostat and eco</td>
</tr>
<tr>
<td>2</td>
<td>Emerson and eco</td>
</tr>
<tr>
<td>3</td>
<td>T and P valve</td>
</tr>
<tr>
<td>4</td>
<td>Pressure vessel</td>
</tr>
<tr>
<td>5</td>
<td>Composite valve</td>
</tr>
</tbody>
</table>

**Table 1**
Question 8 a) continued

b) Explain the reason for the correct termination of D2 discharge pipework. (2 marks)

9 State the reason for a polarity check. (1 mark)
10 Explain the benefits of using an S Plus plan system as shown in Figure 2. (4 marks)
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. (7 marks)

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)
13 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. Complete the table and statement below.

The stack base should use two 45° bends or a bend with a radius of ________ or more.

<table>
<thead>
<tr>
<th>Application</th>
<th>Minimum height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single dwelling up to three storeys</td>
<td>_______________</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>

14 Describe the operating principles of **two** heat producing micro renewable technologies. (4 marks)

15 a) Define a risk assessment and a method statement. (2 marks)

b) Explain how to **minimise** risks when carrying out jointing techniques. (2 marks)
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)

   b) Explain how you would ensure the project remains on schedule. (2 marks)

17 Discuss factors that would influence the selection of hot water and heating systems. (9 marks)