

# 2396-402 Level 4 Principles, Design, Erection and Verification of Electrical Installations.

Chief Examiner's report – **December 2017**



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# 1 Introduction

The purpose of this document is to provide centres with feedback on the performance of candidates in the **December 2017** examination for 2396-402 Design, Erection and Verification of Electrical Installations.

The Chief Examiners' Report has been reintroduced as a result of feedback from centres, to give them guidance in preparing candidates for the written examination.

## 2 Feedback on candidate performance

### General feedback

The following comments are intended to help students prepare for the examination by having a better understanding of what is expected of them. The feedback within this report would also be valuable to tutors in understanding candidates' difficulties in answering questions and the areas where more guidance is required.

The **December 2017** question paper was found to be in accordance with the scheme requirements.

The examination entry for this series was approximately **188**.

This examination contained no errors and was suitable for the qualification specification and Level.

Candidates who simply quote text from permitted publications, such as BS 7671, will not score well where questions require an explanation or description. Candidates must interpret the requirements to suit, where required, the scenario within the question.

Candidates are encouraged to study the detail within each question and provide responses specific to that detail. Where candidates state a range of requirements, and not those specific to the question, marks will be lost.

Where questions are seeking **why** particular regulations or measures are required, candidates must take care to explain 'why' as opposed to 'what' the requirements are or 'where' they are applied.

### Cable Design Calculations

Candidates on the whole show a good ability in the application of circuit design for both live conductors and cpc. A few candidates oversized the conductors as they did not determine the design current correctly. Some marks were still awarded, in this situation, for procedure.

Once again, a large number of candidates did **not** show **all** of their calculations when justifying the cable **current capacity** but instead simply sized for voltage drop and simply compared design current with tabulated current values. As the process carries marks, these candidates would not have scored the maximum available.

In addition, quite a number of candidates would provide a detailed set of calculations but forget to actually state the conductor size selected.

Candidates generally apply a good understanding of design earth fault loop impedance and the application of the adiabatic equation as Chapter 54 of BS 7671. In contrast to previous series', a large proportion of candidates did conclude that their circuit calculations were acceptable instead of simply showing calculations.

Conclusions to questions are as important as the calculations used to arrive at an answer. A large part of the design process is justification of sizes selected. Candidates are encouraged to conclude their selections by making comparisons to permitted and/or calculated values.

Candidates must be made aware of the two forms of adiabatic equation and where it is suitable to apply each. Incorrect use of the equation requires a candidate to perform more calculations than is required for justification and, if looking at the wrong Chapter in BS 7671, incorrect values of 'k' may be used.

### **Knowledge of BS 7671 (Design)**

A working knowledge of BS 7671 is required by all candidates. Some candidates are able to recite the requirements of BS 7671 but are unable to demonstrate how these requirements are applied by using examples. Candidates at this level must be able to interpret requirements. Quoting regulation numbers only is not a suitable response.

One question requiring candidates to explain **why** Additional Protection is required in particular locations produced a variation in answers but very few candidates were able to explain this with many simply quoting where it is required, or confusing the situation with fault currents.

Many candidates confused earth fault current with short circuit current and used cpc resistance values when determining short circuit values.

The vast majority of candidates answered questions relating to Fundamental Principles and General Characteristics very well.

One question relating to reduced low-voltage produced a variety of answers, many confusing this system with SELV. In addition, many candidates still confuse electrical separation and SELV when considering a bathroom shaver point.

### **Knowledge of BS 7671 (Selection and Erection)**

A question relating to isolation and switching was not particularly well answered as many candidates were unable to state **why** many typical devices are required and instead detailed what the requirements were.

### **Verification**

A majority of candidates were able to demonstrate an understanding of ring-final circuit continuity, but key points were missing from many answers such as the instrument used and its preparation.

### **Special Locations**

As well as having an understanding of the requirements of BS 7671 for Special Installations or Locations, candidates at this level need to demonstrate a knowledge of the risks which lead to these further measures. A good understanding of the risks enables designers to select suitable measures including a better understanding of why certain requirements must be met.

Many candidates answered these questions to a reasonably good standard.

### 3 National pass rate

The national pass rate for the 2396-402 **December 2017** examination is as follows:

<b>Exam series</b>	<b>Distinction (%)</b>	<b>Merit (%)</b>	<b>Pass (%)</b>	<b>Fail rate (%)</b>
<b>December 2017</b>	<b>7</b>	<b>24</b>	<b>29</b>	<b>40</b>

#### **Past examination series**

<b>Exam series</b>	<b>Distinction (%)</b>	<b>Merit (%)</b>	<b>Pass (%)</b>	<b>Fail rate (%)</b>
<b>June 2017</b>	<b>9</b>	<b>18</b>	<b>26</b>	<b>47</b>
<b>March 2017</b>	<b>8</b>	<b>26</b>	<b>33</b>	<b>33</b>
<b>December 2016</b>	<b>3</b>	<b>12</b>	<b>25</b>	<b>60</b>

### 4 Forthcoming Exam Dates are:

- **March 2018**
- **June 2018**

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