

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

Chief Examiner's report – **June 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 **June 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 **June 2017** question paper was found to be in accordance with the scheme requirements.

The examination entry for this series was approximately **182**.

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

It is **essential** that candidates read a **full** question before attempting as many candidates answered some parts of questions before they were asked to. This led to early spaces becoming cramped and candidates answering later questions by stating 'see question earlier'.

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. Some candidates undersized the conductors as they did not determine the design current correctly. Some marks were still awarded, in this situation, for procedure.

Surprisingly, a number of candidates did **not** show **all** of their calculations when justifying the cable current capacity but instead simply sized for voltage drop. 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'.

Candidates must also be very careful when applying temperature factors to calculations for maximum earth fault loop impedance values. Candidates are encouraged to apply factors during the design process then directly use the data within BS 7671 for comparison. In this situation, the application of further factoring as Appendix 14 is not required, as temperature is already compensated for. Care must also be taken when using data within the IET On-site Guide, as these values are also adjusted for temperature. As a result, some candidates made temperature compensations twice. Candidates are encouraged to use data within BS 7671 for design procedures.

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 on certain circuits produced a variation in answers but very few candidates were able to explain this with many simply quoting where it is required.

Many candidates were able to determine a circuits short circuit capabilities showing a vast improvement over previous series' containing similar questions.

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

The majority of responses to one question, relating to protection against fire and thermal effects, were simply quotations from BS 7671 with little regard to the risks associated with installed equipment in escape routes.

Knowledge of BS 7671 (Selection and Erection)

A question relating to isolation and switching was generally very well answered. Some candidates however seem unable to provide examples of such devices for isolation and switching using practical situations. This led to many scoring half the marks on offer as the question clearly requested examples. Many candidates seem to confuse the requirements for isolation with those for switching for mechanical maintenance.

Few candidates were able to make a correct and accurate design and selection of protective conductors using information within the question. Many answered giving generic ranges of suitable conductors ignoring key detail.

Verification

A majority of candidates were unable to explain the correct method of verifying separation despite having Guidance Note 3 as permitted material. Many focused on insulation resistance of SELV circuits instead.

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.

Appendices

Candidates seemed to use information contained in the appendices well when answering questions relating to circuit design.

3 National pass rate

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

Exam series	Distinction (%)	Merit (%)	Pass (%)	Fail rate (%)
June 2017	9	18	26	47

Past examination series

Exam series	Distinction (%)	Merit (%)	Pass (%)	Fail rate (%)
March 2017	8	26	33	33
December 2016	3	12	25	60
June 2016	10	20	39	31

4 Forthcoming Exam Dates are:

- December 2017
- March 2018

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