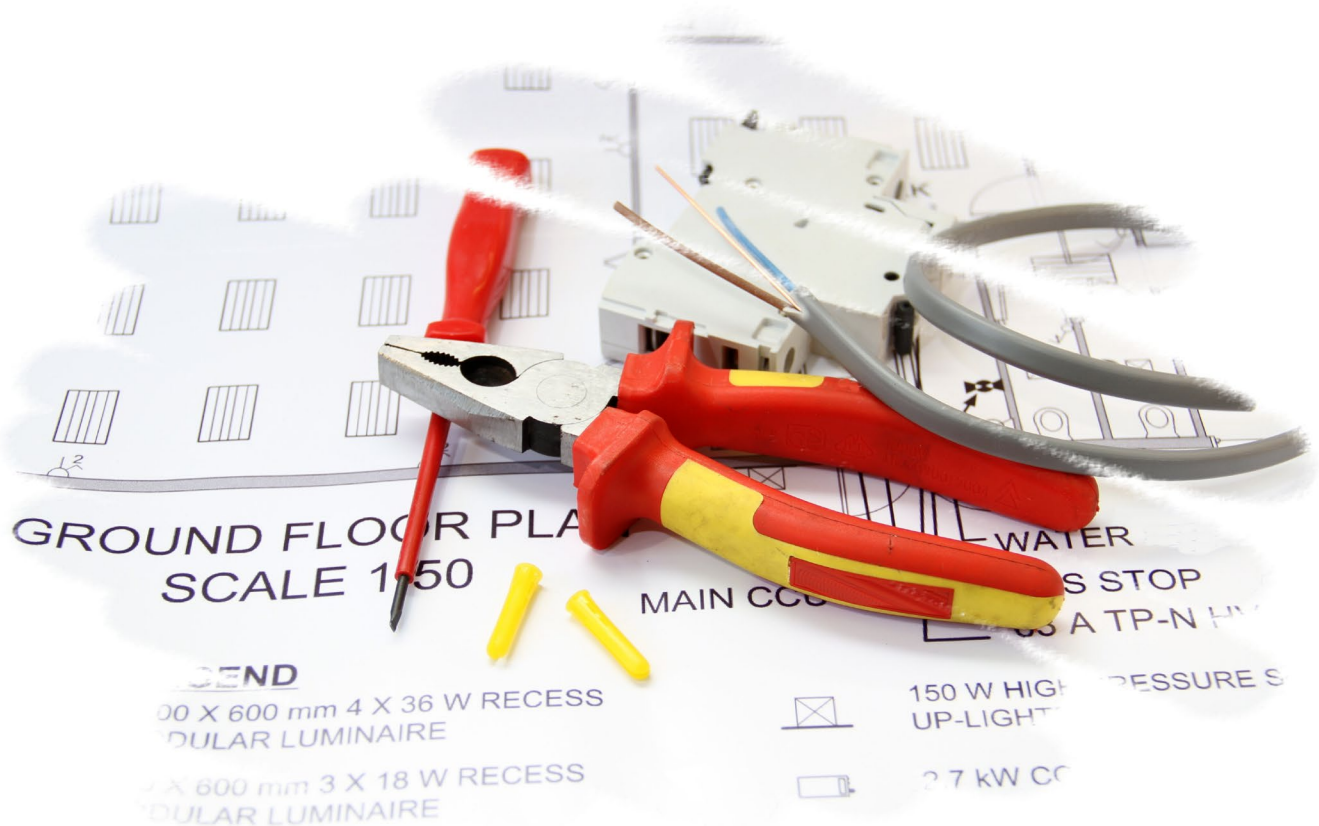


2396-402 Level 4 Principles, Design, Erection and Verification of Electrical Installations.

Chief Examiner's report – June 2021



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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 2021 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 2021 question paper was found to be in accordance with the scheme requirements.

The examination entry for this series was approximately **164**.

This examination contained no errors and was judged to be of the correct level covering the required parts of the test specification.

Questions in this series covered a wide range of subjects across the assessment criteria of BS 7671. A good knowledge of BS 7671, and an understanding of its requirements and where they are applicable, would have been an advantage to many candidates.

It seems to be a growing trend that candidates can calculate to a set procedure, but if that procedure requires adaption because of the need to use different data, this throws candidates. Candidates should be taught how to use different items of data and how they fit together rather than following one set procedure.

Cable Design Calculations

Most candidate were able to deal with most of the calculations and data linked to the sizing of the circuit live conductors. There are still a number of candidates who go through the procedure and forget to stipulate the actual cable size selected, leading to the loss of marks.

Few candidates were able to correctly determine voltage drop for this circuit having power factor. Few candidates gave full consideration for load power factor as detailed in Appendix 4 of BS 7671 with many calculating voltage drop using impedance values and some using reactive values. Whilst the use of impedance values was not incorrect in this scenario, it does lead to higher values of voltage drop.

Whilst many candidates demonstrated the procedure for calculating circuit earth fault loop impedances, far less could correctly determine the **minimum** cross-sectional area (csa) of protective conductor suitable to provide ADS. Candidates need to be able to demonstrate that they understand the relationship between data and, as a designer, know the minimum suitable csa. They may ultimately select a larger csa for other reasons, but they do so in the knowledge it exceeds the **minimum** permissible. In situations where large csa protective conductors are used, having the capability to determine the minimum permissible csa through simple calculation has huge economic benefits.

Knowledge of BS 7671 (Design)

Most candidates demonstrated a reasonable knowledge of design using BS 7671. Area of weakness shown included the following:

- Not showing an understanding of the requirements for ring-final circuits, or in some cases, not reading the question correctly and stating a minimum cable csa rather than a current capacity.
- Calculating values of R_1+R_2 when calculating short circuit impedances and therefore not including the neutral.
- A large number of candidates chose not to attempt the question relating to short circuit protection.

Knowledge of BS 7671 (Selection and Erection)

Generally, candidates answered well to most questions relating to selection and erection as Part 5 of BS 7671. Areas of weakness shown included the following:

- Missing key rating factors that need to be applied to buried cables.
- Providing key explanations where BS 7671 requires supports for cables and systems liable to premature collapse in the event of a fire.
- Key detail for the requirements for firefighters' switches.
- Requirements where a metallic assembly/enclosure is used as a protective conductor.
- The risks associated with through wiring.

Verification

Most responses to the question relating to verification of RCBOs were brief and lacking in full detail. A question which requires an explanation must contain key relevant information demonstrating understanding rather than brief, high level statements which carry little meaning.

It was however encouraging to see that most understood the meanings of the short circuit capacity ratings for circuit breakers.

Whilst many could successfully calculate a maximum residual current rating for an RCD using given electrode data, few would actually acknowledge the existence of Table 53.1 of BS 7671 and instead used Table 41.5 which gives a lower than acceptable value.

Special Locations and Appendices

Whilst most candidates responded to the question relating to the energy efficiency of an electrical installation, some responses were brief and lacking key detail. Some responses did address the losses in the wiring system, or some described how systems may be arranged to reduce power loss, or the unnecessary use of power. Many responses described the use energy efficient equipment.

Most candidates answered well when assessing the risks associated with marinas.

National pass rate

The national pass rate for the 2396-402 June 2021 examination is as follows:

Exam series	Distinction (%)	Merit (%)	Pass (%)	Fail rate (%)
June 2021	4.7	16.1	30.2	48.9

Past examination series

Exam series	Distinction (%)	Merit (%)	Pass (%)	Fail rate (%)
March 2021	1.6	13.3	41.6	43.3
December 2020	3.0	6.8	17.5	72.5
September 2020	0.0	4.4	37.8	57.8
March 2020	3.4	9.4	17.1	70.1
December 2019	7.6	13.5	28.1	50.8

4 Forthcoming Exam Dates are: Thursday 2nd December 2021

5 Note regarding 18th Edition of IET Wiring Regulations 2022

Amendment 2 of BS 7671 is expected to be published in March 2022. All examinations will reflect the current edition of BS 7671 until June 2022 where amendment 2 may be reflected in examination. Projects may reflect either version of BS 7671 until September 2022 where all project work must reflect changes relating to BS 7671:2018(2022)

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