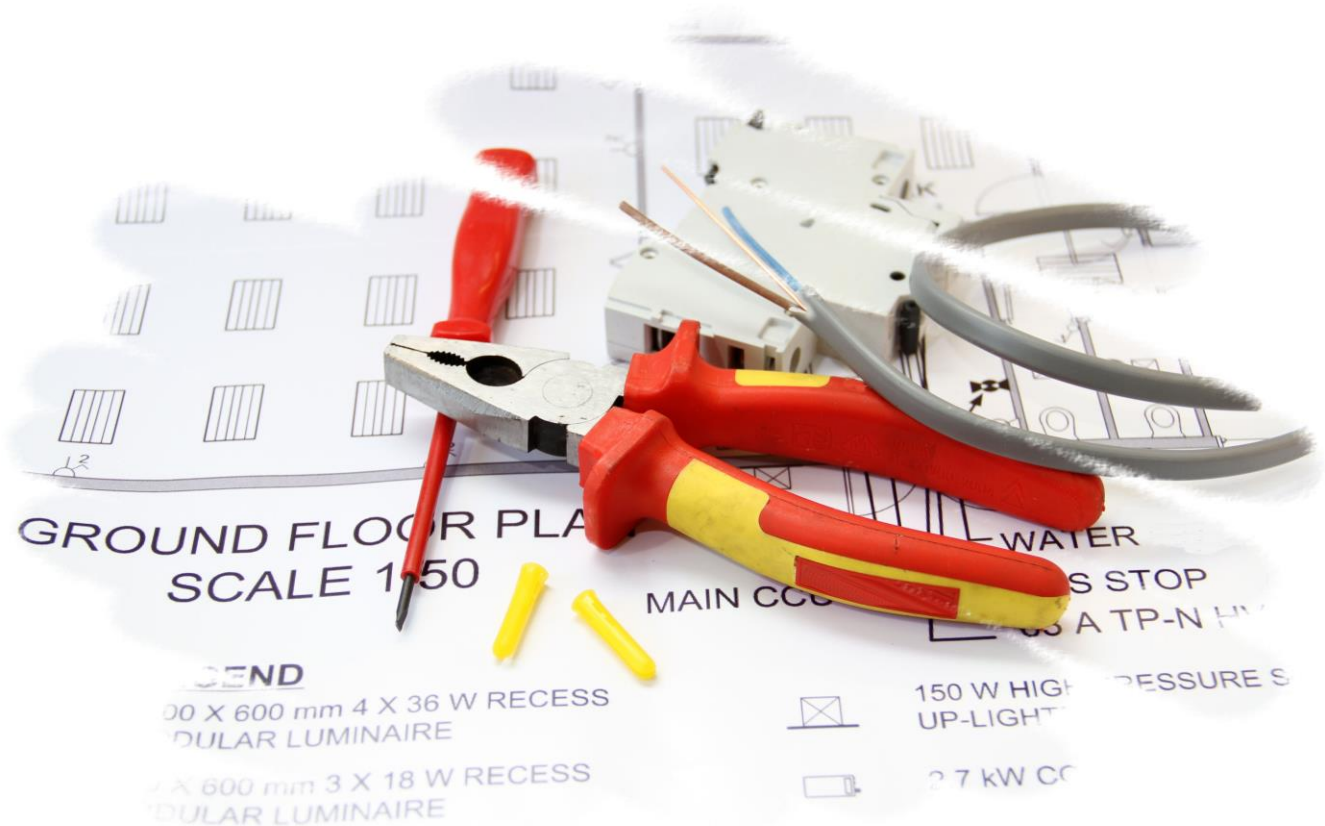


2396-402 Level 4 Principles, Design, Erection and Verification of Electrical Installations.

Chief Examiner's report – March 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 March 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 March 2021 question paper was found to be in accordance with the scheme requirements.

The examination entry for this series was approximately 81.

It is unfortunate that the examination contained two errors which were;

- Section A scenario for questions 1 and 2 listed a protective device as a BS 88-3 system E device and should have stated BS 88-2 system E device.
- Question 6 gave a scenario relating to a new socket-outlet added to a ring-final circuit as a spur, but question b) required the calculation of impedance to the fused connection unit rather than socket-outlet.

It is fully understood that these errors may lead to some confusion by candidates and time wasted looking for characteristics relating to a non-existent device. As a result, these errors were taken fully into consideration during marking.

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.

Centres should encourage potential candidates to have recently achieved City & Guilds 2382: Requirements for Electrical Installations, before enrolling onto this course or include a similar course of study as an addition to this course.

Cable Design Calculations

It was very clear that many candidates do not take on board all the information in the scenario for this distribution circuit. It was made very clear that a final lighting circuit had a stipulated voltage drop that gave clear limitations on this distribution circuit yet very few candidates took notice of this and allowed for it in their circuit calculations. This error would lead to the final lighting circuit exceeding voltage drop requirements especially when many candidates went for the maximum power voltage drop in their circuit.

In addition, some candidates were unable to decide on the most onerous method of installation that this circuit should be designed to.

Generally, many candidates were able to successfully calculate total earth fault loop impedances but slightly fewer were able to determine suitability for thermal constraints. Candidates are encouraged to check which factors must be applied with regard to operating temperature and not to apply those which only apply to measured resistance values.

Few candidates were able to understand both temperature constraints linked to the use of 90 °C insulated cables.

Knowledge of BS 7671 (Design)

Candidates need to understand that although the voltage and frequency of an installation may be measured, it rarely gives the **nominal** voltage and frequency so this must be obtained by enquiry. Whilst it is fully appreciated that these are generally well known in the UK, they cannot be measured. It was very surprising how many candidates lost marks on what supply characteristics may be measured and those that require enquiry.

Considerations for maximum demand provided many vague responses even though this is a fundamental aspect of design and candidates must be aware of the factors that influence the application of diversity.

Few candidates were able to explain why overload protection can be applied at varying parts of a circuit nor where they able to explain how a circuit cable is protected if overload protection is not placed at the origin of a circuit.

One question related to through wiring within luminaires. Many candidates gave answers which related only to cables that then leave the fitting and or for another un-associated circuit. These candidates did not show understanding of the heat damage that can occur to any cables passing through fittings regardless of their final termination point.

Surge protection devices are now commonplace within many electrical installations, yet few candidates were familiar with the operating principles of the different configurations. Whilst many were able to correctly identify the positioning of the different types of SPD, many did not show an understanding of the arrangements. Manufacturers supply detailed guides on the installation and use of surge protection devices that could prove useful to candidates.

The question relating to the calculation of short circuit current in a ring final circuit did have an error where the scenario gave a new socket-outlet connected as a spur from a ring-final circuit, but part of the question required candidates to determine the short circuit protection at the fused connection unit. It was evident that this may have caused confusion with candidates and this error has been taken into consideration. Many candidates did not seem to notice the error and carried out the calculation correctly based on the circuit criteria given.

Knowledge of BS 7671 (Selection and Erection)

Generally, candidates answered well to questions relating to selection and erection as Part 5 of BS 7671.

Verification

Some candidates were very vague in their responses to a question relating to insulation resistance testing with key detail missing from responses. Where a single question attracts twenty marks, responses do require key detail relating to the given scenario rather than vague responses linked to general insulation testing.

Special Locations and Appendices

Whilst most candidates responded to the question relating to the energy efficiency of an electrical installation, most responses were linked to current using equipment such as low power lighting. Few responses addressed the losses in the wiring system or how systems may be arranged to reduce power loss or the unnecessary use of power.

Most candidates answered well when assessing the risks associated with exhibitions, shows and stands.

3 National pass rate

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

Exam series	Distinction (%)	Merit (%)	Pass (%)	Fail rate (%)
March 2021	1.6	13.3	41.6	43.3

Past examination series

Exam series	Distinction (%)	Merit (%)	Pass (%)	Fail rate (%)
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 10th June 2021

5 Note regarding 18th Edition of IET Wiring Regulations

Please note that all 2020 series will only accept answers versioned to the 18th Edition of the IET Wiring Regulations (BS 7671:2018). Candidates are encouraged to ensure they have received a copy of the corrigendum to BS 7671:2018 published by IET and available at <https://electrical.theiet.org/bs-7671/updates/> Future assessments may require candidates to have amendment 1 of BS 7671 (2020) which can also be downloaded from the IET website above, including its corrigendum. Should any question come under the scope of amendment 1, it will be marked to amendment one and its corrigendum only. It is anticipated that amendment 2 of BS 7671 will be published around the time of the March 2022 examination but this examination will not incorporate questions relating to it. The June 2022 examination may incorporate questions relating to amendment 2.

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