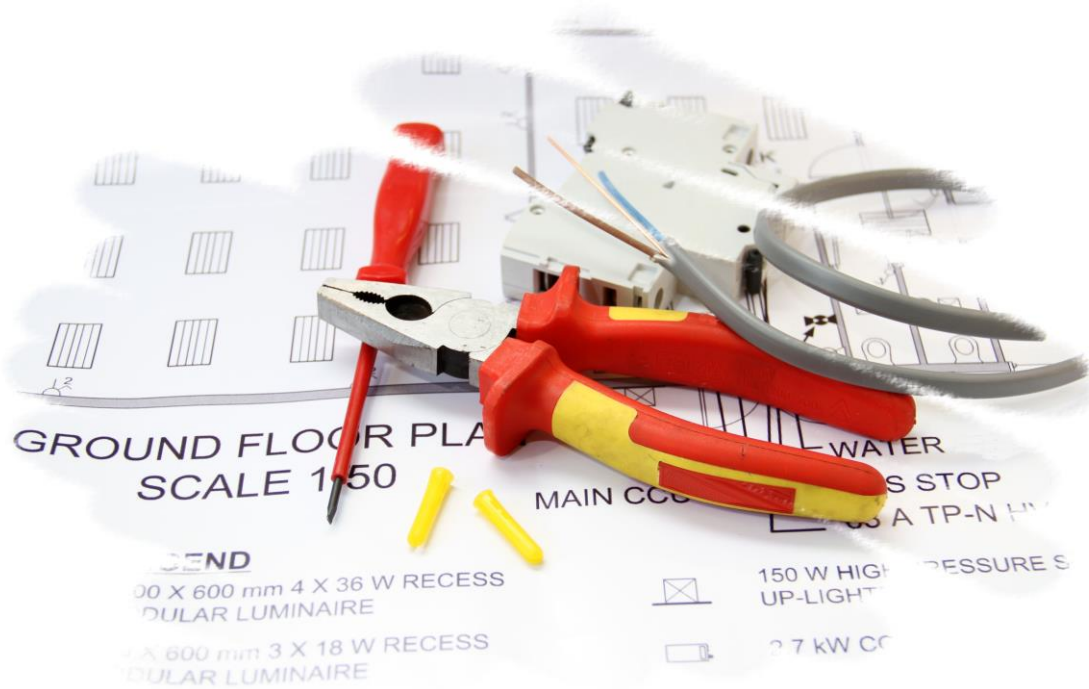


2396-402 Level 4 Principles, Design, Erection and Verification of Electrical Installations.

Chief Examiner's report – September 2020



About City & Guilds

City & Guilds is the UK's leading provider of vocational qualifications, offering over 500 awards across a wide range of industries, and progressing from entry level to the highest levels of professional achievement. With over 8500 centres in 100 countries, City & Guilds is recognised by employers worldwide for providing qualifications that offer proof of the skills they need to get the job done.

City & Guilds Group

The City & Guilds Group includes City & Guilds, ILM (the Institute of Leadership & Management, which provides management qualifications, learning materials and membership services), City & Guilds NPTC (which offers land-based qualifications and membership services), City & Guilds HAB (the Hospitality Awarding Body), and City & Guilds Centre for Skills Development. City & Guilds also manages the Engineering Council Examinations on behalf of the Engineering Council.

Equal opportunities

City & Guilds fully supports the principle of equal opportunities and we are committed to satisfying this principle in all our activities and published material. A copy of our equal opportunities policy statement is available on our website.

Copyright

The content of this document is, unless otherwise indicated, © The City and Guilds of London Institute and may not be copied, reproduced or distributed without prior written consent.

However, approved City & Guilds centres and candidates studying for City & Guilds qualifications may photocopy this document free of charge and/or include a PDF version of it on centre intranets on the following conditions:

centre staff may copy the material only for the purpose of teaching candidates working towards a City & Guilds qualification, or for internal administration purposes

candidates may copy the material only for their own use when working towards a City & Guilds qualification

The Standard Copying Conditions (which can be found on our website) also apply.

Please note: National Occupational Standards are not © The City and Guilds of London Institute. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Publications

City & Guilds publications are available from our website or from our Publications Sales department, using the contact details shown below.

Every effort has been made to ensure that the information contained in this publication is true and correct at the time of going to press. However, City & Guilds' products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time. City & Guilds cannot accept liability for loss or damage arising from the use of information in this publication.

City & Guilds

1 Giltspur Street

London EC1A 9DD

T +44 (0)844 543 0000

F +44 (0)20 7294 2413

www.cityandguilds.com

centresupport@cityandguilds.com

Contents

1	Introduction	2
2	Feedback on candidate performance	3
	General feedback	3
	Cable Design Calculations	4
	Knowledge of BS 7671 (Design)	4
	Knowledge of BS 7671 (Selection and Erection)	5
	Verification	5
	Special Locations	5
3	National pass rate	6
	Past examination series	6
4	Forthcoming Exam Dates are:	6
5	Note regarding 18 th Edition of IET Wiring Regulations	6

1 Introduction

The purpose of this document is to provide centres with feedback on the performance of candidates in the September 2020 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 September 2020 series was timetabled as an alternative to the June 2020 examination. The June 2020 series was cancelled due to the COVID-19 restrictions introduced in late March 2020 by H.M. Government.

The September 2020 question paper was found to be in accordance with the scheme requirements.

The examination entry for this series was approximately 42.

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

Candidates must take care to read a question carefully and follow the verb in the question. Where a question begins with **Explain** or **Describe**, simply quoting text from BS 7671 will not attract marks. Candidates must ensure they interpret the requirements to suit any given **scenario** within the question.

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 'how/where' they are applied.

Several questions required candidates to give a **specific number of responses**. A small but significant number of candidates give more answers than asked for, and whilst this isn't penalised, it could be a waste of the candidate's time. Only the first number of responses asked for will be considered for marking.

Centres should be encouraged to teach candidates the reasons why certain regulations exist, change or are introduced to BS 7671. Understanding why regulations change gives far better insight into why these regulations are essential, and the risks associated. Centres may wish to use resources such as 'Wiring Matters' produced by IET as well as the IET website where articles can be found giving background to some of the topics which are often raised within this assessment. These include risks such as those associated with PME arrangements, or those associated with special locations.

Within this assessment, it was very disappointing that some of the most basic of questions were answered with very simplistic responses such as factors impacting on the correct size of protective conductor.

BS 7671 clearly states that design of an installation must be undertaken by a skilled person and BS 7671 also defines a skilled person as someone who can understand the **risks** that electricity can create.

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

Whilst the majority of candidates did correctly determine the correct, minimum csa of live conductors for current carrying capacity and voltage drop, many seemed unable to present their calculations or stages logically, including justifications of why a particular size or value is considered suitable.

Whilst many candidates were able to calculate the earth fault loop impedance for the given circuit, many were unable to use that value to effectively justify the suitability of the selected protective conductor. It is to be noted that some candidates are incorrectly applying factors within resistance calculations that only relate to measured values during the verification process and not applicable to design. Candidates are encouraged to read the IET guidance within Guidance Note 3 or the On-site Guide, both of which clarifies this point.

One question asked for the actual disconnection time under earth fault conditions of a circuits overcurrent protective device. A surprising number of candidates incorrectly attempted to determine this by use of the adiabatic formula given in Chapter 43 of BS 7671. Centres are encouraged to ensure candidates know how to determine the actual disconnection time, and this is required to correctly undertake thermal constraint calculations.

Whilst some candidates did justify their answers, many were still simply providing calculated values with no justification or reason as to whether these values were compliant or not.

Knowledge of BS 7671 (Design)

Few candidates were able to fully explain considerations when applying diversity with some simply quoting basic circuit guidance as given in the IET On-site Guide with many choosing not to attempt the question.

Very few candidates were able to demonstrate a suitable understanding of the risks with PME arrangements and measured used to reduce these risks. Of those that attempted this item, most responses were brief and non-specific.

It is clear that many do not fully read questions correctly as many responded to a question, which clearly stated the presence of a metallic service pipe, with answers specifying and relating to plastic pipes.

Many candidates were able to determine circuit earth fault loop impedance for a given scenario but it was surprising that few were able to select a suitable maximum residual current rating for an RCD to provide fault protection. Most of the responses seen simply quoted the requirements for Additional Protection. Candidates must understand the clear difference between fault protection and additional protection.

Knowledge of BS 7671 (Selection and Erection)

Very few candidates were able to provide any understanding of the factors that effect the sizing of protective conductors or common example of their purpose. With these conductors being so common, with the vast majority of installations reliant on their presence and suitability, it is concerning that few can demonstrate any understanding of them.

Few candidates were able to demonstrate a full understanding of the requirements for standby generators with many responses brief and lacking in technical detail.

Verification

Generally, most candidates were able to answer some basic questions on earth fault loop impedance testing but surprisingly few were able to explain the verification process when dealing with values obtained from BS 7671.

Also lacking in technical detail were responses to an item relating to the information required by an inspector before undertaking an initial verification. Candidates should carefully read a question and look at the marks on offer so when an item asks for a detailed explanation and carries fourteen marks, a short, bullet point list will not suffice as an answer.

One question required candidates to give two ways to determine the total earth fault loop impedance of a circuit. Many candidates clearly misread the question and answered with regard to the value of Z_e . It is paramount for all candidates to read the questions carefully and answer what is being asked.

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.

On average, most candidates answered these questions to a reasonably good standard in relation to an caravans and caravan park installations. It should however be noted that many candidates begin their responses well detailing some of the risks, such as potential ingress of water or impact damage, but end up reciting requirements. The intention of the questions is to address why the requirements are there, not what each requirement states.

3 National pass rate

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

Exam series	Distinction (%)	Merit (%)	Pass (%)	Fail rate (%)
September 2020	0.0	4.4	37.8	57.8

Past examination series

Exam series	Distinction (%)	Merit (%)	Pass (%)	Fail rate (%)
March 2020	3.4	9.4	17.1	70.1
June 2019	0.0	4.6	30.3	65.2
December 2019	7.6	13.5	28.1	50.1

4. Forthcoming Exam Dates are: Thursday 3rd December 2020

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.

Published by City & Guilds
1 Giltspur Street
London
EC1A 9DD
T +44 (0)844 543 0000
F +44 (0)20 7294 2413
www.cityandguilds.com

City & Guilds is a registered charity
established to promote education and training

