8202-30 Level 3 Advanced Technical Certificate in Electrical Installation

2024

Qualification Report

Contents

Introduction

This document has been prepared by the Chief Examiner and Principal Moderator; it is designed to be used as a feedback tool for centres in order to enhance teaching and preparation for assessment. It is advised that this document is referred to when planning delivery and when preparing candidates for City & Guilds Technical assessments.

This report provides general commentary on candidate performance in both the synoptic assignment and theory exam. It highlights common themes in relation to the technical aspects explored within the assessment, giving areas of strengths and weakness demonstrated by the cohort of candidates who sat assessments in the 2024 academic year. It will explain aspects which caused difficulty and potentially why the difficulties arose.

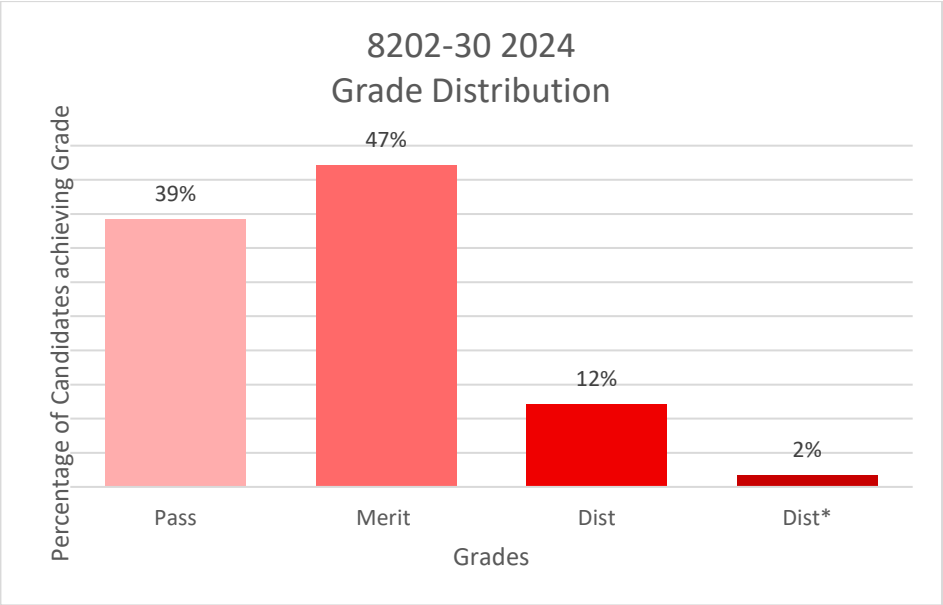
The document provides commentary on the following assessments:

- 8202-531 – Level 3 Advanced Technical Diploma in Electrical Installation (Theory exam)
    - April 2024
    - June 2024

- 8202-032 – Level 3 Advanced Technical Diploma in Electrical Installation (Synoptic Assignment)

Qualification Grade Distribution

The approximate grade distribution for this qualification is shown below:



Please note City & Guilds will only report qualification grades for candidates who have achieved all of the required assessment components, including Employer Involvement, optional units and any other centre assessed components as indicated within the Qualification Handbook. The grade distribution shown above could include performance from previous years.

Theory Exam

8202-531 – Electrical Installation

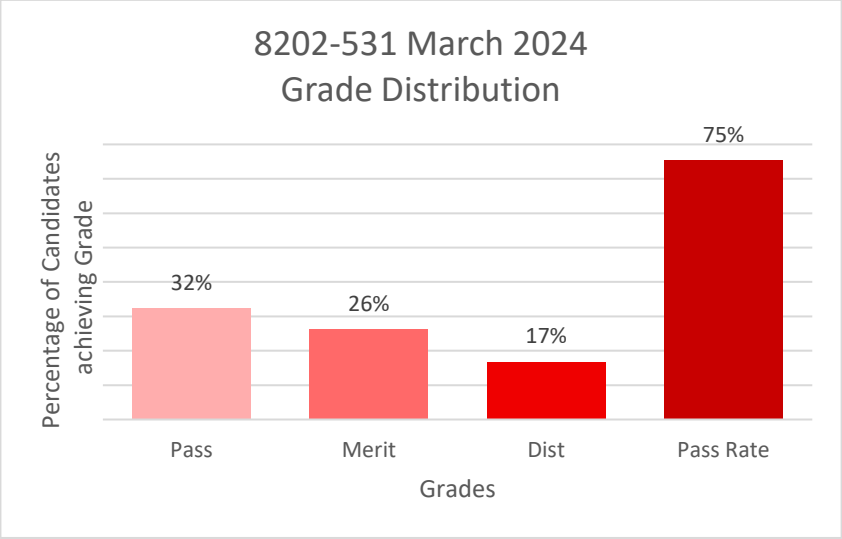
Grade Boundaries

Assessment: **8202-531**
Series: **March 2024 (Spring)**

Below identifies the final grade boundaries for this assessment, as agreed by the awarding panel:

Total marks available	75
Pass mark	28
Merit mark	39
Distinction mark	50

The graph below shows the approximate distributions of grades and pass rate for this assessment:

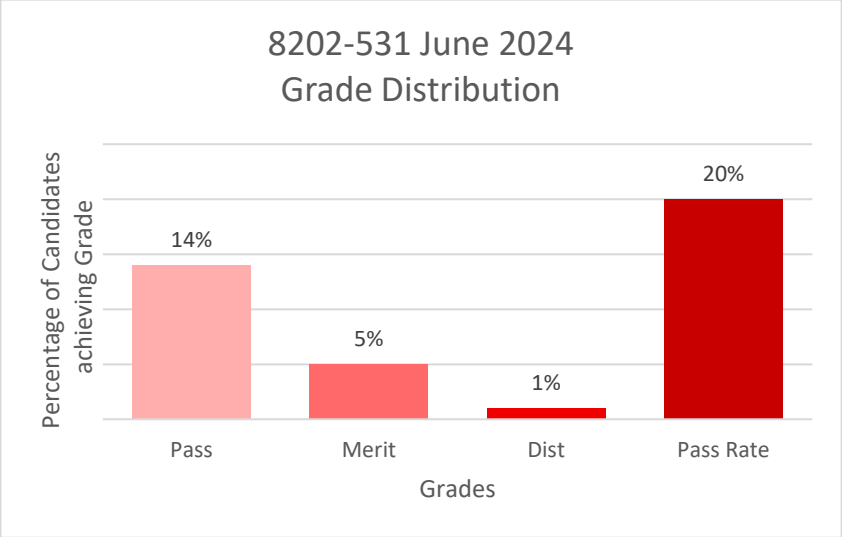


Assessment: **8202-531**
Series: **June 2024 (Summer)**

Below identifies the final grade boundaries for this assessment, as agreed by the awarding panel:

Total marks available	75
Pass mark	22
Merit mark	33
Distinction mark	44

The graph below shows the approximate distributions of grades and pass rate for this assessment:



Chief Examiner Commentary

8202-531 – Level 3 Electrical Installation – Theory Exam

Series 1 – March 2024

This spring series was considered as being comparable to previous examinations and explored a good range across the specification.

Most candidates responded reasonably well to questions requiring information recall, such as stating distribution voltages, matching earthing arrangements to the external loop impedance value and researching and stating different types of earth electrodes.

Recall of formula was also a strength for many candidates, with a large number scoring at least 50% of the marks for maths-based questions such as determining AC circuit values, and phase/line current or voltages in star systems. Whilst many candidates were able to calculate AC inductive and capacitive values up to the circuit current value, most found calculating component voltages a challenge. Calculating Lux values using the inverse square law was a significant strength across the cohort for this series.

A significant number of candidates were unable to recall the alpha-numeric codes used to identify three-phase line conductors together with their colours, with many stating the three single-phase colours and conductors such as L, N and E together with brown, blue and green/yellow respectively. Alternatively, many would give hybrid responses giving the three-phase codes and single-phase colours.

Basic principles such as the operating principles of a wind turbine also proved a challenge to many candidates with few attracting full marks. Whilst many could identify that wind caused blades to rotate, many were under the impression a motor then took over and continued to make them rotate, or that the turbine was simply connected to a motor.

Understanding of electrical devices and components was a particular area of weakness across most candidates, with very few candidates being able to demonstrate an understanding of the operating principles of a circuit breaker, in terms of the magnetic and thermal tripping mechanisms, but most were able to identify that a short circuit would cause the device to trip. Another area where candidates did not maximise marks was for recalling three types of faults, with many stating overload as a fault when it is in fact a circuit condition. Also, a large proportion of candidates stated overcurrent as a fault and although a fault would cause overcurrent, it is too generic as a term as it describes faults and conditions which is why it is the heading for Chapter 43 of BS 7671. Few candidates explored faults unrelated to excessive current such as arc faults.

Some questions seemed to cause confusion such as the item asking for reasons for a continuity test; many candidates were unable to expand their responses beyond a continuous conductor before straying into what protective bonding conductors connect to. Similarly, when asked the purpose of an Electrical Installation Certificate, the majority stated the situations where one would be issued, rather than its purpose.

Questions based on BS 7671 attracted mixed responses with many being able to research detail relating to bathroom locations, although some did seem to confuse bathrooms and swimming pools. Researching the requirements for isolation of a photovoltaic (PV) system was an area of general strength. Understanding linked to external influences and the fundamental principles detailed in BS 7671 did not attract many marks amongst low scoring candidates. Better research of the required materials would have improved marks for these items.

The extended response question (ERQ) attracted much better responses when compared to previous series. Many candidates were able to work through the stages of confirming conductor cross-sectional area for live and protective conductors with some justifications and reasoning.

Many of the high scoring candidates did not maximise marks as they did not relate the circuit to the location and did not identify specific needs such as Additional Protection for the circuit. A proportion of lower scoring candidates did not seem to observe that the question was exploring the need to upgrade a circuit and they simply undertook a set procedure with basic justifications and minimal, if any, analysing. Examples of areas where the majority of candidates could have improved their scores were using calculated maximum voltage drop values to compare to rather than percentages and expanding on why a value is acceptable, rather than it is simply bigger or smaller than another value, therefore acceptable.

Series 2 – June 2024

The performance in the June 2024 paper was lower in comparison to the March 2024 paper. The majority of the cohort were candidates who were resitting, due to not being able to achieve a pass or higher in the Spring. Alongside the weaker cohort, the June 2024 paper was more difficult than the Spring 2024 paper. As a result, grade boundaries were reduced to reflect this.

Areas of strength within this cohort were found in topic areas regarding distribution voltages, matching earth arrangements to the external loop impedance value, and researching and stating different types of electrodes.

Some of the mathematical-based questions demonstrated some candidates could recall formulae and apply calculations. A significant number of candidates achieved at least half of the marks for these maths-based questions that involved determining AC circuit values, and phase/line current or voltages in star systems. Calculating Lux values using the inverse square law was a significant strength across the cohort for this series.

Mixed responses were found for questions based around the use of required materials. Most candidates were able to research areas of BS 7671 when identifying types of installations and the definition of a prosumer. Approximately a quarter of candidates also managed to research the current needed to cause disconnection of three given protective devices. The majority however were unable to score any marks on this item; many candidates found it difficult to look up the correct data to answer the question. A high mark tariff question required candidates to apply the requirements of Chapter 46. The question prompted candidates on the specific areas they needed to consider when responding to the question. Most candidates were able to attract some marks for reciting the requirements of BS 7671 but very few applied the requirements to the scenario failing to demonstrate depth of understanding of the subject matter.

Areas of weakness included candidates not being able to recall details of socket-outlets, items to be inspected in or on a domestic consumer unit, or specific test instruments and the checks to be made on them. One item of recall relating to the basic operating principles of a wind turbine, was particularly challenging, with many candidates believing that a motor is involved in the process.

Candidates were unable to demonstrate an understanding of dangerous stroboscopic effect on machines, the purpose of a capacitor in a capacitor start induction motor and suitability of cable sizes used for fused and un-fused spurs in ring-final circuits.

An unexpected area of weakness was understanding of inspection and testing procedure and practice. This was unexpected as the questions related to the practical elements which overlapped with tasks candidates carried out within the synoptic assignment.

The candidate performance for the ERQ was in line with previous series. Historically, a clear strength of candidates is to apply a design procedure to a distribution circuit even when the question does not require it. In this particular ERQ, this is solely what was required, with no further evaluations needed. Many candidates were able to work through the stages of confirming conductor cross-sectional area for live and protective conductors with some justifications and reasoning. Of the candidates who did provide a full procedure, many went on to calculate the thermal constraints by use of the adiabatic equation. Some were even able to demonstrate the understanding that this is not required as the cpc of the circuit is the same size as the live conductors, and therefore complied with Table 54.7 of BS 7671, negating the need for the equation.

Many of the high scoring candidates did not maximise marks as they did not relate the circuit to the location and did not identify specific needs such as Additional Protection for the circuit. A proportion of lower scoring candidates did not seem to observe that the question was exploring the need to upgrade a circuit and they simply undertook a set procedure with basic justifications and minimal, if any, analysing.

There was a significant number of candidates who provided vague information in their response and thus attracted very low marks. Some candidates who did attempt the question scored low marks for identifying parts of the design process, but not justifying or evaluating the results of their calculations.

Centres should be reminded that extended response questions are intended for candidates to display a level of understanding and it is important candidates read the question to understand what is required of them, especially when applying and/or justifying their data.

Candidates and centres should also be reminded that there are clear instructions on what publications are permitted for the assessment contained in the permitted materials document which can be downloaded from the 8202 qualification webpage here: Electrotechnical_permitted_reference_materials_v2-4 (cityandguilds.com)

Synoptic Assignment

8202-032 – Electrical Installation

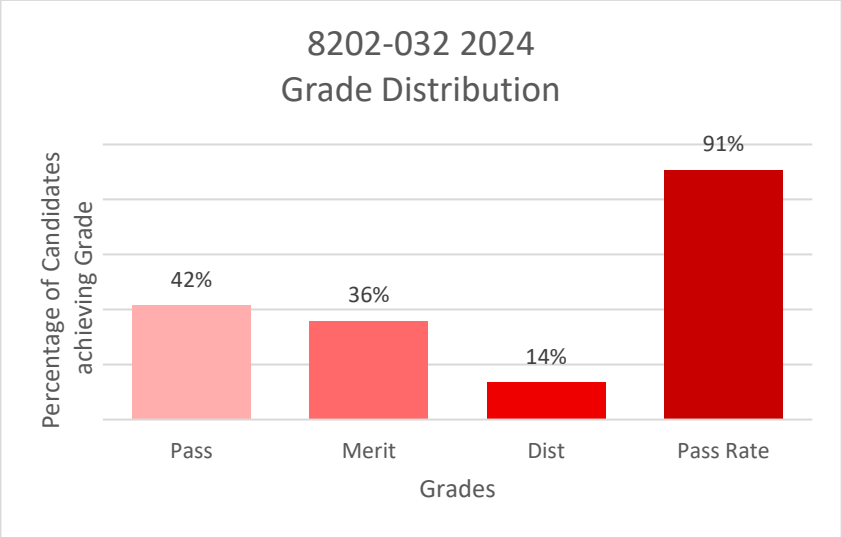
Grade Boundaries

Below identifies the final grade boundaries for this assessment, as agreed by the awarding panel:

Assessment: 8202-032
Series: 2024

Total marks available	60
Pass mark	27
Merit mark	38
Distinction mark	49

The graph below shows the approximate distributions of grades and pass rate for this assessment:



Principal Moderator Commentary

The synoptic assessment for 2024 was seen as very comparable to those taken in 2023 and 2022. The performance of candidates, as a whole, was seen to improve this year and this is mainly due to better familiarity, recording evidence and marking by centres.

There was a slight fall in the number of candidates taking the 2024 series assessment compared to 2023. This may be due to the gradual movement towards T-Levels.

The candidates' performance as a whole was seen as slightly better to last year, and the pass rate increased by approximately 5%. Centre based evidence was not as detailed as in previous series, such as in performance observation (PO) forms and candidate record forms (CRFs), which were slightly less supportive of marks awarded overall.

Candidates performed well across the assessment objectives (AOs) and the following points were noted:

- Design grids were generally well attempted with generally good calculations, supporting the data in the grids. It is clear from the evidence which candidates follow a set procedure with little understanding, to those who show clear links between calculations and acceptable results.

- Methods of displaying emergency lighting were very wide ranging, but this provided good indications of candidates' thought processes.

- The sub-task relating to decommissioning and waste disposal proved to be a good way to measure the research and reporting ability of candidates which can attribute towards AO1 and AO2 very well.

- Take-off sheets sometimes resembled materials lists and at times contained costings, which are not required.

- Inspection and testing forms were generally well populated but still there were some pieces of evidence missing for some candidates. Candidates should be completing a schedule of circuits as well as a schedule of test results when undertaking task 2.

- Fault reports were generally completed well but still candidates used very poor technical terminology referring to 'line conductors' as 'lives' and stating, for example, 'broken wire' instead of 'open circuit'. Additional research may assist candidates with using more technical terminology correctly.

It was still noticeable from some centres that marking by task is still being undertaken. This may be by aggregating marks on a spreadsheet per task or by allocating marks on PO forms. Centre must be reminded that **this must <u>not</u> be the method of marking** as it skews weightings per AO and disadvantages candidates through inaccurate marking; this ultimately can lead to regression of marks.