1145-530 Level 3 Engineering – Theory Exam

March 2024

Examiner Report

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Introduction

This document has been prepared by the Chief Examiner, it is designed to be used as a feedback tool for centres to use in order to enhance teaching and preparation for assessment. It is advised that this document be referred to when preparing to teach and then again when candidates are preparing to sit examinations for City & Guilds Technical qualifications.

This report provides general commentary on candidate performance and 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 the **March 2024** examination series. It will explain aspects which caused difficulty and potentially why the difficulties arose, whether it was caused by a lack of knowledge, incorrect examination technique or responses that failed to demonstrate the required depth of understanding.

The document provides commentary on the following assessment;

1145-530 – Level 3 Engineering – Theory Exam

Theory Exam – March 2024
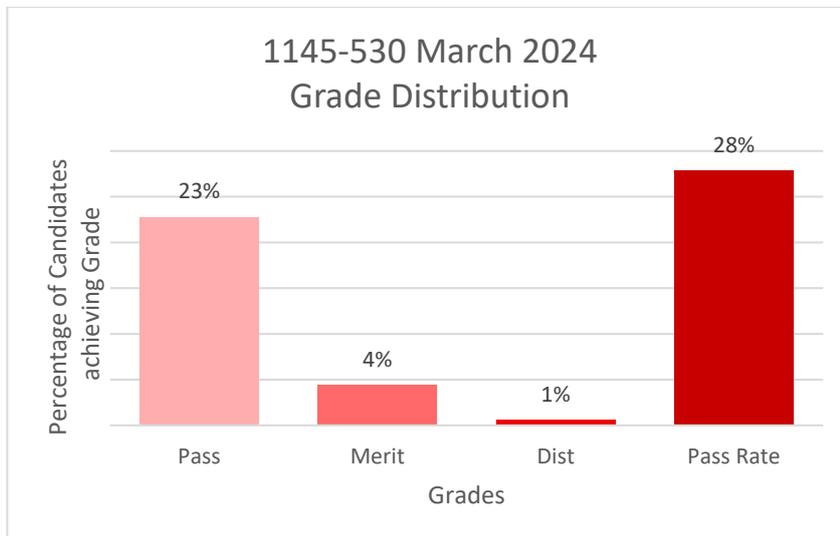
Grade boundaries and distribution

Assessment: **1145-530**
Series: **March 2024**

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

Total marks available	100
Pass mark	39
Merit mark	54
Distinction mark	69

The graph below shows the approximate distribution of grades and pass rates for this assessment:

Chief Examiner Commentary

General Comments on Candidate Performance
Assessment component: 1145-530
Series 1 (March 2024)

The paper as a whole met the requirements of the specification, were of a similar level to the previous papers and covered a good range of topics in the specification. There was a generally poor response to this paper by candidates. In particular, candidates did not appear to have knowledge of some topics within the specification and where questions asked for explanations, candidates frequently responded with statements and did not show their depth of understanding.

When focusing on Engineering Materials (Unit 301), candidates displayed a good understanding of material properties, such as brittleness and toughness, particularly regarding quenching and tempering processes. Some candidates excelled in defining and explaining mechanical properties, although this was not consistent across all. It was noted that there was a significant gap in the ability to recall and define basic concepts like fusibility and specific heat capacity, which suggests a need for stronger foundational knowledge. The application of knowledge to explain processes, such as why tempering improves toughness, was lacking, indicating a need for more depth in understanding material science principles. Questions relating to composite materials and superconductors were particularly poorly answered, with candidates often resorting to general knowledge rather than specific details required by the questions.

When looking at Manufacturing Methods in Engineering (Unit 304), some candidates were able to correctly describe and discuss the advantages and disadvantages of different manufacturing processes, such as JIT (Just-In-Time) production. A weakness in practical application questions was noted, such as those involving CNC machines and go-no-go gauges. These were poorly answered, suggesting a lack of practical exposure or understanding.

In regard to Engineering Design (Unit 305), some aspects of design needs were understood well by a portion of the cohort. It was noted that candidates struggled with understanding and correctly using specific design tools such as comparison matrices. Particularly question 8 was generally answered poorly with repetitive answers demonstrating a weaker area of knowledge surrounding the activities involved throughout product design.

With reference to Engineering Mathematics and Statistics (Unit 306), calculation of safety factors and interpretation of data from electrical outputs were done correctly by a good proportion of candidates, suggesting strong numerical and analytical skills in these areas. However, there was a significant issue with candidates using exact values for estimations, which shows a misunderstanding of the concept of estimation. A high proportion of candidates did not attempt some of the more complex calculation questions, possibly indicating a lack of knowledge in tackling challenging problems. Differentiation was particularly weak and, thus, showed a considerable lack of knowledge on this crucial area of the specification.

Responses to extended response questions (ERQs) were generally well answered when it came to discussing social and economic implications, demonstrating the cohort's ability to engage with complex, multifaceted issues. However, there was a noted inconsistency in the depth and quality of responses, suggesting variability in preparation and understanding among the candidates.

Centres are reminded of the City & Guilds Technicals 'Exam Guides' available here:
[Technicals in Engineering qualifications and training courses | City & Guilds (cityandguilds.com)](http://cityandguilds.com)