



GCE AS EXAMINERS' REPORTS

**ELECTRONICS
AS**

SUMMER 2023

Introduction

Our Principal examiners' reports offer valuable feedback on the recent assessment series. They are written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and detail how candidates have performed.

This report offers an overall summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It goes on to look in detail at each question/section of each component, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.ⁱ

The information found in this report can provide invaluable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	Eduqas offers an extensive annual programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.eduqas.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 6 months after the examination.	www.wjecservices.co.uk or on the Eduqas subject page
Grade boundary information	<p>Grade boundaries are the minimum number of marks needed to achieve each grade.</p> <p>For unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and unit level.</p> <p>For linear specifications, a single grade is awarded for the overall subject, rather than for each component/unit that contributes towards the overall grade. Grade boundaries are published on results day.</p>	<p>For unitised specifications click here:</p> <p>Results and Grade Boundaries (eduqas.co.uk)</p>

Exam Results Analysis	WJEC Eduqas provides information to examination centres via the WJEC secure website. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	www.wjecservices.co.uk
Classroom Resources	Access our extensive range of FREE classroom resources, including blended learning materials, exam walk-throughs and knowledge organisers to support teaching and learning.	https://resources.eduqas.co.uk/
Bank of Professional Learning materials	Access our bank of Professional Learning materials from previous events from our secure website and additional pre-recorded materials available in the public domain.	www.wjecservices.co.uk or on the Eduqas subject page.
Become an examiner with Eduqas.	We are always looking to recruit new examiners or moderators. These opportunities can provide you with invaluable insight into the assessment process, enhance your skill set, increase your understanding of your subject and inform your teaching.	Exam Marking jobs Examiner & Moderator Vacancies From Eduqas

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Subject Officer's Executive Summary

The component 1 examination paper and component 2 NEA assessment overall performance was in line with previous years, with similar mean marks to the 2019 series. The standard deviation of marks for component 1 examination was very similar to the 2019 series, although for the component 2 NEA assessment the standard deviation increased slightly compared to 2019 indicating the spread of marks across the range has increased.

Component 1 examination paper's overall facility factor showed similar difficulty to previous years although the individual question spread was slightly narrower. However, it should be noted that these statistics are produced on a relatively small entry for the qualification.

Areas for improvement	Classroom resources	Brief description of resource
Quality of response (QER) question approach	Electronics eBook resources Past papers and mark schemes	Chapters cover the content of the specification with worked examples, exercises and practical investigations for each topic. Past papers and mark schemes contain many examples of QER questions and model answers.
Familiarity with standard sub-systems and being able to conduct appropriate calculations. E.g. D-type latches, relays, capacitor charging circuits, rectifiers.	Electronics eBook resources Knowledge organisers	Chapters cover the content of the specification with worked examples, exercises and practical investigations for each topic. A good revision starting point.
NEA - Recording and analysis results for both sub-systems and the complete system designs.	Electronics as specification 2019 and 2020 CPD material	Overview of the NEA and marking criteria. 2019 and 2020 CPD material on the secure website contains commentary from previous series and examples of work.
NEA - Analogue tasks should contain both an analogue input and an analogue output and normally require the use of an oscilloscope.	Electronics as specification 2019 and 2020 CPD material	Overview of the NEA and marking criteria. 2019 and 2020 CPD material on the secure website contains commentary from previous series and examples of work.

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COMPONENT 1: PRINCIPLES OF ELECTRONICS

Overview of the Component

The examination paper covered most sections of the specification and gave candidates plenty of opportunities to recall and apply their knowledge. Both the QER questions used what should have been familiar systems, to test the candidate's ability to select the relevant information and present it in a logical and structured way, using a combination of text, calculations and diagrams. Despite this the QER questions had the lowest facility factors and the most omissions or poor responses. This is a similar pattern to past examination series.

Statistically the paper had a similar level of demand and accessibility to previous years. The overall facility factor showed similar difficulty to previous years although the individual question spread is slightly narrower. Candidates' marks ranged from 9 to 116.

Comments on individual questions/sections

- Q.1 Boolean algebra is well understood by most candidates. In part (c) the majority of candidates were able to reach the third marking point, successfully using De Morgan's theorem. Most errors occurred when simplifying the answer, particularly removing the brackets.
- Q.2 No areas to highlight.
- Q.3 Using exponentials with multipliers challenged the mathematically less confident candidates, particularly in (a)(ii). In (a)(iii) a surprising number could not recall and use the correct equation. In (b)(i) answers had to state that to debounce the switch was to prevent multiple counts from a single press of the switch to gain the mark. Not many correct charging capacitor graphs were provided in part (b)(ii) with candidates only gaining the mark for the output's rising edge.
- Q.4 Part (b)(i) proved difficult for most candidates, particularly as the D-type latch outputs were sinking not sourcing the currents. The latching of the LEDs when switch S1 was opened was not well understood.
- Q.5 In part (a) most candidates showed the graph gently curving to saturation instead of an abrupt change at this point. This had a knock-on effect in part (b)(ii). The favoured method for answering (b)(i) was substitution into the transconductance equation. The problem was many candidates chose a data point on or after saturation which made their answers incorrect. The simplest way of answering the last part was substituting values into $R=V/I$. However, many candidates used the given power equation containing r_{DSon} first, meaning they had to calculate the power, re-arrange the equation and substitute values correctly. This gave a much greater chance of a mathematical error.

- Q.6 The first QER question yielded the full range of responses with no indication that candidates had particular difficulty understanding the concepts involved. The main reasons for the lower band answers were largely due to missing elements, mistakes in calculations and poorly structured responses.
- Q.7 No areas to highlight.
- Q.8 Very few candidates understood that the role of the transition gate was to produce a momentary logic zero pulse at pin 2, as otherwise the output of the monostable would remain high beyond the time period. In part (b), despite being an important concept using a relay to interface a low voltage DC control circuit with an AC mains circuit this was often very poorly answered. In flow diagrams each box must only contain one instruction. Many candidates included the times with other instructions. The parallelogram boxes should contain instructions to control external devices, in this case turn the heater/ fan ON/OFF not just 'blow hot air' etc.
- Q.9 No areas to highlight.
- Q.10 As with the previous QER there was no evidence of a failure to understand the concepts and many good answers were provided. The better answers included a diagram of a diode bridge circuit and a graphical representation of ripple voltage, together with a coherent description of the current and voltage at the different stages. They also included some quantitative comments. The point most missed was the doubling of the frequency. In general, most candidates did understand that having a parallel resistor increased the current drawn and hence resulted in a greater ripple voltage.

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Component 2: System design and realisation tasks - NEA

Overview of the component

Centres are to be congratulated for their effort in presenting candidates' work for moderation, including the timely online recording of centre marks.

The general performance across the component was good. The quality of the physical circuit layouts produced by candidates was much improved this year.

Tasks

Comments on tasks/questions relating to candidate performance/meeting assessment criteria

A characteristic of a successful report was where candidates made extensive use of screenshots and photographic evidence. Several candidates provided screenshots of simulation results alongside photographs of the corresponding test results on the physical circuit, which displayed voltmeter readings and/or oscilloscope traces. This approach allowed the candidates to easily make comparisons and analysis their results.

Task 1

The range of design briefs produced by candidates were varied and covered a wide range of contexts. Candidates in several centres produced outstanding digital tasks which could easily have provided the basis for an A level extended task. A common weakness was in the recording and analysis of results for both sub-systems and the complete system.

Task 2

The nature of the analogue task lends itself to the investigation of the characteristics of a circuit containing an AC input and output, which would normally require the use of an oscilloscope. The range of design briefs produced was very limited. In a significant minority of centres all candidates attempted almost identical investigations.

Some variation could be achieved within a centre by candidates:

- using different configurations such as inverting/non-inverting/summing op-amps
- using different families of op-amp such as LM741, TL081, CA3140
- varying the task by investigating frequency response, or slew rate, or the effect of both DC and AC signals used with a summing amplifier.

Candidates could also consider investigating the effect of different values of load resistance and smoothing capacitor on the ripple voltage produced in a rectifier circuit.

Task 3

Candidates from several centres provided both imaginative and complex design briefs with excellent solutions that included several sub-routines.

Many candidates failed to provide documentation for simulation tests and were consequently unable make comparisons of the results obtained on the physical circuit.

Task marking

Comments on approaches to internal marking

The assessment of the work was within tolerance in most centres but in a small number of centres adjustments to the marks were required.

Annotation on the scripts and mark schemes greatly aid the moderation process. In particular an indication on the mark scheme of which level descriptors were or were not achieved is very helpful. A small number of centres did not provide any annotation or indication on the mark scheme, making accurate feedback to centres on specific marking points very difficult.

Supporting you

Useful contacts and links

Our friendly subject team are on hand to support you between 8.30am and 5.30pm, Monday to Friday.

Tel: 029 2240 4254

Email: electronics@edugas.co.uk

Qualification webpage: [AS and A Level Electronics | Edugas](#)

See other useful contacts here: [Useful Contacts | Edugas](#)

CPD Training / Professional Learning

Access our popular, free online CPD/PL courses to receive exam feedback and put questions to our subject team, and attend one of our face-to-face events, focused on enhancing teaching and learning, providing practical classroom ideas and developing understanding of marking and assessment.

Please find details for all our courses here: <https://www.edugas.co.uk/home/professional-learning/>

Regional Rep Team

Our regional team covers all areas of England and can provide face-to-face and online advice at a time which is convenient to you.

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We are one of the largest providers of qualifications for schools, academies, sixth form and further education colleges across England, offering valued qualifications to suit a range of abilities. Each and every one of our qualifications is carefully designed to engage students and to equip them for the next stage of their lives.

We support our education communities by providing trusted qualifications and specialist support, to allow our students the opportunity to reach their full potential.



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ⁱ *Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.*