

2025 ASSESSMENT REPORT

EAT315124 ELECTRONICS AND ADVANCED TECHNOLOGIES

General Comments

The 2025 Electronics and Advanced Technologies exam demonstrated that most students could analyse electronics components, simple circuits, and complex circuits. The exam gave a good balance between the different ways that circuit diagrams, block diagrams, information, and text can be used to provide stimulus for demonstrating knowledge.

Strong students were able to use a wide variety of knowledge and skills, including making good use of the information sheet or clues provided to support their analysis. Weaker students tended to miss critical details or information provided and it was evident that they either failed to remember that applicable information was available either in the question stimulus or on the information sheet.

Some questions provided stimulus that may have been contrary to students' experience (e.g. that LED's have a maximum reverse voltage that is low enough that it needs to be considered), highlighting the importance of reading the question and using the information provided.

A very few questions relied on information that may not have been explicitly covered in class (e.g. AAA battery typical voltage, anti-static materials) which differentiated students that spent more time reading and immersing themselves in the very broad field of study that is electronics.

Section A – Criterion 3

General comments

The majority of students received between 16.5 and 32 marks for this section, demonstrating that it was reasonably accessible for students. This section covered the content required by the criterion evenly, and with all questions within the course requirements.

Question 1

Generally not answered well (average 1.5/3).

Very few students understood the purpose of RCDs, or what determined a resistor's power rating.

A significant number of students could not give the correct voltage of 4 AAA cells in series, likely due to this being assumed knowledge, and might not have been covered in class owing to using other power supplies.

Question 2

Generally answered well (average 5/7). Most students lost marks for some incorrect responses to part a).

Question 3

Generally answered very well (average 5.5/6). Most lost marks due to not completely answering the question.

Question 4

Generally not answered that well (average 6/10).

Many students placed the ammeter incorrectly in part a).

Missing connections in part b) was common.

Many students did not realise that the datasheet shows that a max reverse voltage of 5V would lead to failure in part d), (or stating that the current limiting resistor should protect it in this scenario).

Only a few managed to correctly identify the NAND gate in part f).

Question 5

Generally not answered well (average 2.3/4).

Most students were able to wire the motor to work somehow, but very few were able to get both forward and backwards configuration in part a).

Not that many knew the DPDT description in part b).

Most students appropriately stated that a resistor could be used to adjust the motor speed.

Question 6

Generally not answered well (average 2.3/6).

Using a block diagram to describe the energy transformations may have confused many students in part a), leading to a limited number of satisfactory responses.

Many students were able to provide a schematic of an amplifier of some sort in part b). Only some were able to give the correct combination of class B for driving the speaker with either class A or op-amp for voltage amplification.

Section B – Criterion 5

General comments

This section was well-attempted by students, with the highest mark awarded being 34/36. It covered the content required by the criterion evenly, with all questions within the course requirements.

Question 7

Generally answered well (average 4.5/6). Most students were able to correctly identify the parallel pair of resistors and used either the voltage divider or ohms law formula to determine the voltage drop. Many students did not find the closest E12 resistor to their answer in part a), instead giving the colour code for 570.

Question 8

Generally answered very well (average 3/4). A common error was in giving the incorrect voltage drop across the LED in part a).

Question 9

Generally answered very well (average 3/4), with students either working their way easily through a series of steps to find the answer required or not attempting the question at all.

Question 10

Generally not answered well (average 3/6). Students seemed thrown by the two current sources but many successfully added these together and applied ohms law to determine the voltage.

Students who moved on to part b) were able to pick up marks there.

Many students struggled to correctly draw the equivalent circuit arrangement in a meaningful way.

Question 11

Generally not answered particularly well (average 4.2/8).

Various mistakes were made when choosing and applying gain formulas such as leaving out the negative or not adding one. Unfortunately, some students who calculated the right gains did not then go on to state the output voltage.

Very few students realised that a dual power supply would be required.

Question 12

Generally answered poorly (average 3.6/8).

Section C – Criterion 6

Question 13

Generally answered well (average 3.8/5).

Reading capacitor codes proved a challenge to some students.

Question 14

Generally answered very well (average 2.4/3).

Question 15

Generally not answered well (average 3.5/8).

Many responses failed to identify the voltage regulator or provide a detailed explanation of the roles of the transformer and polarised capacitor.

Question 16

Generally not answered well (average 2.6/6).

Most students capably found the time constant of the capacitor and correctly stated that increasing the resistance meant it would charge more slowly.

The vast majority of students struggled to graph the charging phase of the capacitor or show the direction of conventional current.

Question 17

Generally answered poorly (average 2.2/6). Answers demonstrated minimal understanding of a solenoid.

Question 18

Generally not answered well (average 3.4/8).

Responses demonstrated a limited ability to calculate frequency and peak-to-peak voltages from an oscilloscope display.

Section D – Criterion 7

Question 19

Generally not answered well (average 3.2/6). Partial marks were able to be awarded when working out was shown.

Partial marks were awarded for converting binary into decimal and subtracting correctly in part b).

Question 20

Generally answered very well (average 3.8/4).

Question 21

Generally answered well (average 2.4/4). Partial marks were given to the incorrect answer of 4 times for part c).

Question 22

Generally not answered well (average 4.5/10). Students struggled to identify the edge of the clock which triggers input D.

While many students got partial marks for having Q' opposite to Q, the timing diagrams were overall very poorly done.

Question 23

Generally answered well (average 2.8/4). Care should be taken with the placement of the comparators.

Question 24

Generally not answered that well (average 3.2/8).

Very few students were able to show a comprehensive understanding of how the circuit mimicked the roll of a six-sided die.

Section E – Criterion 8

General comments

Students were able to do quite well in this section. There were enough challenging questions, whilst remaining accessible to most students, with the vast majority of students receiving marks higher than 13/36.

There was a good range of questions covering the course content evenly. Students were not forced into a particular programming style and were required to understand concepts relating to the criterion to do well.

Question 25

Nearly all students were able to get full marks for this question.

Question 26

Generally answered very well (average 5.6/7)

Most lost marks due to missing the A1 input voltage being half of the 5V supply, hence resistor and thermistor having equal value.

Question 27

Generally not answered well (average 2.6/6).

Many responses to part a) either missed or failed to realise that some features are common to both protocols.

There were quite a few blank responses to part b).

Question 28

Generally answered well (average of 3.3/6)

Students commonly lost marks due to missing the inverted behaviour of the LED, missing some connections or using the incorrect pin type.

Question 29

Students either got nearly full marks or very few marks with this question, with very few in between (average 8.4/14).