



General Certificate of Secondary Education

Design and Technology (Systems and Control Technology) 3546/F

3546/F Foundation Tier

Report on the Examination

2007 examination - June series

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GENERAL

This year was the first cohort to use the new format examination paper and preparation sheet, which gave information about the theme of the examination. Whilst it was not necessary for the candidates to have prior knowledge of railways, the preparation sheet was introduced to help candidates to understand the context of the questions prior to the examination. The examination paper now has a single Section A, which was written to be answerable in either a mechanical or pneumatic way, followed by a Section B where candidates must answer one question, choosing either the pneumatic or mechanical focus.

Most of the questions were attempted by all candidates, with varying degrees of success. Many questions on the paper were developed to build upon the knowledge and skills developed by candidates during their coursework.

Questions requiring the candidates to design systems met with a range of responses. Design issues and Health and Safety questions were answered very well and the majority of candidates gained good marks. AQA is pleased to note the high quality responses to the logic and the control sequence questions. However, it was noted that few candidates gave the correct colours for the resistor using the colour code printed in the front of the exam paper.

Some candidates lost marks because their answers were unreadable. Although marks are not given for hand writing or presentation skills, candidates should be reminded that if their answers cannot be understood, it will obviously affect the mark they can attain.

At the lower end of the ability range some questions were not attempted. Candidates need to be reminded that an attempt at a question always has the chance of gaining marks.

FOUNDATION TIER 3546/F

Section A

Question 1(a)

The Resistor and LED section were both well answered. The Variable resistor and its symbol section was not well answered, answers commonly calling it a 'switch' or 'motor'. Candidates generally scored well overall on this question.

Question 1(b)

This question was well answered with the Thermistor being the most common component not known. The requirement for a product was sometimes missed with only the name of the component given. Candidates generally scored well.

Question 2(a)

The Breadboard section was well answered. Its versatile use in prototyping was well known. The Veroboard section was not well answered reflecting its rarity in GCSE work. Veroboard is still used both commercially and in schools and colleges and forms part of the content of the specification. Centres should expect questions of this type to be asked.

The Printed Circuit Board and its advantages and disadvantages were well answered. However, the requirement not to repeat an answer was often missed by candidates. Answers such as 'cheap' and 'easy to use' were common errors throughout the question.

Question 2(b)

Candidates scored well on this question, reflecting the use of CAD/CAM software commonly used in schools. A common error was missing the point of 'circuit building'.

Question 3(a)

Candidates scored well on this question with reasons for the use of Aluminium and Steel being well known. A common error was giving 'easy' as a reason. Materials for the door track was not as well answered, candidates selecting 'Steel' as the most obvious answer to taken from the question. Common errors were answers using material generics e.g. wood, metal and plastic.

Question 3(b)

Many candidates scored well in terms of a basic mechanism. Rack and Pinion / Crank Slider were common responses. However, the door and beam fixings question was rarely well answered except by the most able candidates. Most candidates appreciated the need for a power source e.g. motor. A common answer was unconnected batteries. Graphics were generally weak, often not using a ruler to draw straight lines. The quality of labelling was good at the top end of the ability range, but as with the graphics, was difficult to decipher at the lowest end of the ability range. Pneumatic solutions were very rare.

Question 3(c)

Candidates generally scored well in describing their systems reflecting particularly their knowledge of mechanisms.

Question 3(di)

Responses with reason given were rare. Common answers which did not score were 'quick' 'It would work' 'effective'. There was little reference made to function and reliability.

Question 3 (dii)

LDR for two marks and Switch for one mark were common answers. No pneumatics responses seen.

Question 3 (diii)

Candidates scored well with health and safety responses. Occasionally design criteria were given in error, e.g. 'the door must be reliable/strong' rather than being health and safety specific.

Question 3(e)

Mechanism gear responses were common and scored well. Pneumatics responses were very rare.

Question 3(f)

Candidates scored well who gave connections from power source to switch and from one pole of switch to motor. Candidates who answered by reversing the motor connections were less successful. Short circuits were common both across the power source and with the switch connections. Most candidates picked up 2 or 4 marks.

Question 4 (ai)

This question was often missed. However, monostable was regularly given reflecting this components common use in coursework.

Question 4 (aii)

Candidates were aware of the need for a push to make switch. Common errors seen were 'switch' 'resistor' and 'transistor'.

Question 4 (aiii)

Generally if a candidate named a component was named in (ii) (even if incorrect) then an attempt was made at drawing its symbol in the circuit diagram.

Question 4 (aiv)

Candidates generally did not know the relay. Common errors made included 'output and 'motor'.

Question 4(b)

It was rare to see correct answers to the resistor colours. The third band was often confused but many responses were random colours showing the candidate's did not refer to the colour code given in the paper.

Question 4(c)

The PCB layout was well answered, with many candidates scoring full marks. The error on the circuit diagram was negated by the very clear task instructions. Answers to Pins 6 7 & 8 were usually done correctly. Common errors were crossed tracks particularly with pin 2 and pin 4 connections. Many candidates also correctly followed the grid pattern and scored well for track neatness. Overall the question was very well answered reflecting the common use of PCB in coursework.

Question 5

The lights sequence flow chart was very well answered with the correct lights sequence, decision box outputs, and feedback loops (arrow heads sometimes missing). Full marks were regularly scored by candidates. Common errors included incorrect feedback loops and copying the commands from the left page to the right page, with candidates guessing the sequence.

Question 6(a)

This logic question was not well answered overall. However, some candidates did score well. The completion of the truth tables was often guesswork by the less able candidates adding the logic outputs left to right and getting 2 was a common error.

Question 6(b)

The door operation system diagram was very well answered with most candidates scoring well. The 'input-process-output' approach to system design is well established in schools and the candidate's responses reflected this. Common errors were incorrect or missing connecting lines.

Question 7(a)

Candidates usually scored well when they had a good understanding of the advantages for passengers of the automatic door system. Credit was given in (ii) even if the answer given earlier was incorrect.

Question 7(b)

Candidates usually scored well when they had a good understanding of the advantages for the train company of the automatic door system. Credit was given in (ii) even if the answer given earlier was incorrect.

Question 7(c)

Methods of escape were well known by candidates. Credit was given for a clear description or a range of methods suggested. Candidates generally scored well on this question.

Question 7(d)

This question was not well answered by candidates. The section about maintenance requirements was often missed. Common errors were in giving door design criteria and 'checks' and 'testing' as answers.

Question 7(e) (f)

Candidates scored well on these questions. Candidates responses included many common environmental issues and methods used to encourage car drivers to use public transport.

Section B

Question 8(a)

The types of drive mechanisms were well known and candidates generally scored well. The pulley was often confused. The answer 'wheel' was common. The section where the candidates must say 'What it does' often showed they were confused between linear/reciprocating. Much non technological vocabulary was seen. The correct application for the worm and wheel was rarely given.

Question 8(bi)

This question was only well answered by the higher ability candidates. The correct application of a ratchet and pawl was rarely seen and the answer, 'brakes' was sometimes given. Many missed the point of preventing the load dropping and presented alternative lifting mechanisms. The general standard of graphics and labelling was poor/untidy at times.

Question 8(bii)

Many candidates scored well on this question as they were able to describe (however inappropriate) the system they had drawn in (bi).

Question 8(biii)

Candidates scored well on this question. Gear mechanism responses were common with more able candidates giving 'worm & wheel' responses.

Question 9

A minority of candidates chose to attempt this question and, where this was evidenced, it was clear that candidates struggled to achieve an understanding of what was required.