JUNIOR CERTIFICATE EXAMINATIONS

1999

TECHNOLOGY

ORDINARY LEVEL CHIEF EXAMINER'S REPORT

HIGHER LEVEL CHIEF EXAMINER'S REPORT

Junior Certificate Technology 1999

General comments

Examination format : Technology Task - common task all levels.
Task comprises design folder and completed artefact.
Task completed in the school period January - May.
Written paper - two levels: Higher & Ordinary

Higher Level Paper

The number of candidates who sat the Higher Level paper was 2234

The grades achieved in Higher Level written paper were as follows:

Grade	A	B	C	D	E	F	N/G
No. candidates	423	776	604	324	87	20	0
%	18.9	34.7	27.0	14.5	3.9	0.9	0

1. General Comments

The paper was perceived as student friendly, well designed and laid out, balanced and testing of the candidates knowledge of the syllabus.

The high % of candidates achieving A - C grades reflects a good general standard of answering. With few exceptions candidates attempted all of the required sections of the paper.

Electronics, mechanisms and systems were identified as areas in which candidates produced answers of a lower standard and commonly failed to achieve full marks.

The sketching by candidates continues to show a very wide variation in technique and quality.

2. General comments by section

Section A

The quality of answering was generally good with many candidates achieving high marks in this section. Questions 1 - 10 and Questions 21 - 30 were generally answered well. Questions 11 - 20 (electronics, structures & mechanisms) again presented the greater challenge to candidates, with many students not attempting answers or offering poor

answers in this section. Numerical and 'technical' questions were generally identified as poorly answered.
Many candidates answered more than the required number of questions.
Questions 31 and 32 were frequently ignored or answered poorly.

Section B

Questions in Section B were satisfactorily answered. All questions were usually attempted. Grid paper was not used universally by candidates attempting sketches.
Q.1(a) & 1(b) were answered well with a marginally greater preference for Q.1(b).
Q.2(a) & 2(b) were equally popular but fewer candidates achieved full marks in either question.
Very few candidates attempted more than the required number of questions.

Section C

Q. 3 ranked as the most popular question, with fewer candidates attempting Q.4 and Q. 5 and only a small number of candidates attempting Q.6. The incorporation of a 'larger' technology & society element in all parts of section C has provided candidates with greater scope in question choice.

3. Detailed comments

Section A

All parts of these questions were seen correctly answered over a range of papers.

1. Frequently incorrect - A & D commonly identified as correct solution.
2. Reasonably well answered.
3. Answered well.
4. 'Y' - paint fill icon, frequently incorrect
5. Answered well.
6. Answered well but many natural fabrics offered as answers.
7. Not well answered, candidates frequently described how to crossfile/drawfile.
8. Answered well.
9. Tool use not well answered. Tool (i) frequently identified with cutting 'wood', some guesswork with tool (ii).
10. Generally answered well.
11. Not well answered - suggesting a lack of familiarity with the use of copper stripboard.
12. Generally answered well but frequently omitted.
13. Answered well - LED commonly suggested for LDR.
14. Generally poorly answered - some guesswork evident.
15. Poorly answered, both parts.
16. Frequently incorrect - 180 given as the most common incorrect answer.
17. Poorly answered.

18. Answer (ii) commonly incorrect.
19. Generally answered well.
20. Generally answered well. Redrawing the sketch given in place of 'a simple lever' was common.
21. Wide variation in standard of answering. Conversions frequently inaccurate.
22. Generally answered well.
23. Generally answered well but ignored by a significant number of candidates.
24. Answered well - wide variation in suggested features.
25. Answered well.
26. Generally answered well.
27. Answered well - a large variety of sports mentioned.
28. Generally answered well.
29. Generally answered well, but a certain lack of familiarity with the tool was shown in the frequently suggested precaution of wearing 'gloves'.
30. Answered well.
31. Frequently ignored or poorly answered.
32. Frequently ignored or poorly answered.

Section B

Q.1(a) Quality of sketching improving, however grid paper was not commonly used for answers on design fault modifications.

(i) Generally well answered. Duplication of sketch given in the question assisted candidates in generating solutions to the design faults.
(ii) Method of manufacturing identical pieces generally poorly answered. Native hardwood and finish well answered.
(iii) Generally well answered with some good designs.

Q.1(b) was well answered. Grid paper was generally not used.

(i) Generally well answered - location of glue tabs presented a problem for some. Some considerable variations were seen in the proportions of the development produced.
(ii) Generally well sketched and answered.
(iii) Well answered.

Q.2(a) There was a wide variation in the standard of answers. The answering indicated a lack of familiarity with basic components and circuit manufacture.

(i) Electronic symbols commonly incorrect - buzzer in particular. Answer to leg identification on the transistor varied considerably.
(ii) Circuit diagram was generally well answered but a significant number of invalid 'circuits' were presented. Test switch was commonly omitted or incorrectly located – it was frequently located on the power line.
(iii) Well answered.

Q.2(b) A relatively small number of candidates achieved full marks.

(i) There was a wide variation in standard of answers - stating a second advantage to the gear system given proved a difficulty.
(ii) This was generally well answered but commonly omitted / confused with bevel gears.
(iii) Poorly answered. Completion of calculation presented the greatest difficulty.

Section C

Q.3 was the most popular question in Section C and was attempted by a large majority of candidates who generally achieved high marks. Candidates illustrated a good awareness of issues involved. Candidates tended to write 'far too much' in the area of technology and society.

(a) This part was well answered. Food 'processing' was frequently confused with 'production'.
(b) Generally well answered.
(c) Well answered.

Q.4 A small number of very good answers which were well sketched were presented for this question. This question was generally not answered as well as Q.3.

(a) Answered well.
(b) Not well answered - Quality and detail of sketches / designs varied considerably and suggested solutions were frequently not practical. Identification of limitations was generally well answered.
(c) Well answered but reference to a safety precaution was frequently omitted.

Q.5 was attempted by a small number of candidates and few good detailed answers were provided.

(a) Answered well.
(b) Generally well answered.
(c) Lacked detail on 'interface' and 'movement control'.

Q.6 was attempted by an even smaller number of candidates. Some very detailed answers were provided.

(a) Lack of detail in suggested solutions.
(b) Answered well.
(c) Answers showed great variation.

Ordinary Level Paper 1999

Section A

Q1. About half the candidates got this correct, with many opting for the "Tension" response.
Q2. Generally correctly answered.
Q3. Majority answered correctly, with some opting for "Paint Software" and a minority opting for "Communication Software".
Q4. Over half the candidates got this correct. Quite a few opted for the "Oscillating Motion" response.
Q5. Vast majority of candidates got this correct.
Q6. Majority of candidates got this correct.
Q7. Majority of candidates got this correct.
Q8. Generally well answered.
Q9. Majority got this correct.
Q10. Approximately half the candidates got this correct. Incorrect responses equally spread over the other two options.
Q11. Very well answered.
Q12. Generally well answered.
Q13. Generally well answered.
Q14. Generally well answered.
Q15. Vast majority got this correct.
Q16. Poorly answered. Less than half the candidates got this correct.
Q17. Part (i) was poorly answered, while part (ii) was generally well answered.
Q18. Most students scored at least 3 marks in this question.
Q19. Well answered although some students misunderstood the word "Rigid" to mean the opposite to rigid. In this case where a valid reason was given the student was awarded 2 to 3 marks depending on the quality of the response.
Q20. Quite well answered, with over half the candidates getting this correct.

Section B

Question 1

(a) (i) Approximately half the students scored 3 to 4 marks here. Some left it blank and some few more did 3D versions of the circuit.

(ii) Very well answered

(iii) Well answered, with the vast majority of the students securing the 2 marks.

(iv) Poorly answered. Many opted for 15000rpm or 750rpm. Very few included units in their response.

(v) Poorly answered.

(b) (i) Candidates scored very well here with most getting at least 5 of the 6 marks.

(ii) Quite well answered although some misunderstood the term to mean that the material would be easier to recycle.

(c) (i) Poorly answered and few candidates secured full marks. Many failed to include dimensions (perhaps the word "measurements" would have been better).

(ii) Well answered.

(iii) Poorly answered. Many did not understand the term "ferrous".

(d) Quite well answered, although many responses related to the display stand in the actual question.

(e) Well answered, although not many made reference to insulation, energy saving light bulbs, double glazing etc.

Question 2

(a) (i) Well answered.

(ii) Poorly answered, few fully correct answers, although many got the 140 mm correct. A common thread in this question was the failure of students to include units.

(iii) Generally not well answered approx. 15% got full marks. Many candidates omitted the hole in the reflection.

(b) (i) Well answered, most candidates receiving at least 4 of the 6 marks.

(ii) Approximately half the candidates got this correct. Some mixed them up.

(c) (i) Poorly answered although the majority attempted it. Most candidates received 3 marks of the 8 with few securing 8 marks.

(ii) The vast majority of candidates received full marks here.

(iii) The vast majority of candidates received full marks here.

(d) Quite well answered.

(e) Well answered, most students getting at least 3 of the 4 marks.

Question 3

(a) (i) The response here was very much split down the middle.
(ii) Most candidates didn't know the answer to this.
(iii) Poorly answered. Few referred to energy efficiency. Many candidates thought that the display was outside and that the LEDs would stand up to the weather better. Quite a few made reference to the fact that the bulb would blow and hence the LED would last longer, for which of course they received full marks.
(iv) Well answered.
(v) Well answered.

(b) (i) About half the candidates got this correct. Some candidates had not been introduced to the term logic gates.
(ii) Well answered.
(iii) Poorly answered. Very few candidates gave a correct answer to this question, perhaps as low as 5%.
(iv) Most candidates got this correct.

(c) (i) Poorly answered with very few students securing full marks. Most candidates simply redrew the logo and made no reference to the stand.
(ii) Well answered.
(iii) Well answered.

(d) Reasonably well answered, although many candidates listed off components instead of equipment.

(e) (i) Well answered.
(ii) Many included acrylic/perspex in their answer. A minority listed two other plastics. The "clever candidates" got the answer from section A (Polythene & expanded polystyrene).

Question 4.

This was the highest scoring of all the questions.

(a) (i) Well answered.
(ii) Most candidates got at least 3 of the 4 marks here.

(b) Reasonably well answered although few students got 10 marks. On average they would have scored in the region of 6 marks in the question.

(c) Reasonably well answered although many students outlined the design process here instead of the stages of manufacture.

(d) Reasonably well answered, with many candidates getting 4 marks.

(f) Many candidates scored 8 out of 8 here.

Technology Task

Introduction

A total of 3083 tasks were submitted for assessment, 923 (30%) from girls and the remaining 2160 (70%) from boys. The ratio of girls:boys presenting tasks has remained unchanged from last year. (Appendix 1 gives the overall breakdown of the grades for 1999.)

The lighthouse (design task D) and the novelty light (design task E) were by far the most popular tasks. Of the boys, 53% opted to do the lighthouse and 22% opted for the novelty light. Of the girls, 40% opted to do the novelty light and 30% opted for the lighthouse (see appendices 4 & 5).

In general, the creativity and the presentation of projects by girls was significantly better than that by boys. Hence girls obtained on average, better results than boys. Of the girls 24% obtained an A grade in comparison with 11% of boys. In the B category, 28% of girls scored a B grade in comparison with 23% of boys (see appendix 3)

The overall performance of candidates was similar to that of last year, and an improvement on the previous year (see appendix 2).

Design Folders

General

The design folders showed some further improvement on previous years. The majority of the folders adhered to the subheadings and sequence as outlined in the Technology Design Task Examination Paper (S-67). A number of candidates however misinterpreted the requirements of some of the subsections.

The presentation of the folders was vastly improved. The majority of folders were produced using I.T. The inclusion of the requirement for colour and shading in the Design Task Examination Paper (S-67) contributed to the enhancement of the folders.

Reference to and the treatment of the subsystem (electronic/mechanical/other) was weak throughout the folders.

Analysis of chosen task

- Generally well answered by the majority of the candidates.
- Some candidates failed to generate any specifications for their chosen task.
- A small number of candidates analysed their own performance in the making of the task rather than analysing the given design brief.
- Some candidates misinterpreted the analysis of the chosen design task as an appraisal for the selection of the correct task to undertake.
- A few candidates incorrectly interpreted this section as “problems I will face” while making this task.

Research-Investigation of existing solutions

- Evidence of research has improved on previous years.
- Analysis/evaluation of researched material was scarce.
- Research on the subsystem aspect of the brief was largely ignored (e.g. The Lighthouse – there was an abundance of evidence of research on lighthouse structures, however very little evidence of research on beacons, switching devices etc.).

Generation of Ideas

- This section was greatly improved. Nearly all folders included at least two design ideas. However these ideas generally referred to structural/ housing solutions only. Where reference was made to ideas on the subsystem (electronic/ mechanical/other) it was generally weak.
- The quality of the sketches and the use of colour on the design ideas has improved.
- Annotation on the design ideas was poor and frequently missing.
- In a small number of folders candidates incorrectly submitted design ideas for two or three of the examination design briefs, instead of limiting design ideas to the chosen brief.

Selection and justification of solution.

- Reasonably well answered section.
- The vast number of candidates indicated their choice for a particular structure or housing and the reasons given were quite good. However many candidates failed to indicate their chosen subsystem design (electronic/ mechanical /other).
- In a small number of cases the final chosen design was not one of the initial design ideas.

Drawings for Manufacture

- Well answered section of the folder.
- Some candidates omitted any reference to scale/dimensions on their drawings.
- A number of candidates did not produce drawings of the subsystem for this section.

Materials list, Cost of materials, Plan of manufacture

- Well answered section of the folder.
- Some candidates omitted any reference to the material sizes in their materials list.
- A number of candidate's folders again contained material that was not required (e.g. theory relating to the materials and processes used, as distinct from a sequence of manufacture).

Testing and evaluation

- Most candidates made reference to:
    1) The functionality of the product/subsystem.
    2) Problems encountered during manufacturing.
- Some candidates correctly identified changes/modifications they would make if manufacturing the product again, however a number of candidates failed to appraise the product against the chosen brief/design specifications.

Presentation of folder

- The overall standard of presentation has greatly improved due to the increased use of computer applications.
- Many folders adhered to the required layout and sequence of presentation as specified in the Design Task Examination Paper (S-67).
- In a small number of centres the candidates followed the sequence specified for Materials Technology Wood rather than the design process specified for Technology.
- The use of shading and colour has greatly improved the presentation of sketches and drawings.

Note: It is strongly recommended that teachers consult the sample design folders produced and distributed by the Incareer Development Unit in the University of Limerick.

Product

General

- The overall standard of finish and presentation of products was an improvement on the previous years.
- The presentation, finish and creativity of tasks by girls were generally better than by boys.
- Wood and plastic were the predominant materials used in the tasks. Very few students incorporated metal as a material into their tasks.
- It was evident that some candidates had great difficulty with the level of technological competence and skill required to execute any one of the seven tasks offered. This was reflected in the standard and finish of some of the products presented. The majority of examiners were of the opinion that these candidates would have benefited from having an option of executing an ordinary level task.
- Despite the strict restriction stated on the task examination paper of maximum voltage of 12-volt DC, some candidates submitted tasks working directly off the mains supply. **This practice must be discouraged.**

Subsystem

- The standard of electronic circuits has improved greatly. The majority of the students submitted a suitable and functional circuit.
- In some cases however (particularly tasks A & C) the subsystem solution was inappropriate/incomplete and did not meet all the requirements of the brief.
- Access to the subsystem was sometimes a problem. In many instances an examiner was unable to gain access to a subsystem. Please refer to the student instructions on the Technology Design Task Examination Paper.
- The quality of the integration of an assembled circuit/ mechanism was often poor as a result of wires and parts being left loose, unattached switches etc.

Tasks

Task A

Design and manufacture a working model of an automatic gate (or barrier) for a level crossing which will close on the approach of a train and open automatically when the train has passed through the crossing. Appropriate safety features should be included. Note-: For this design task a single gate (or barrier) will suffice.

- The third most popular task overall, chosen by 13% of the boys and 3% of the girls.
- A difficult task to execute. Many solutions did not function properly.
- Advanced solutions consisted of latched relays or chips which were triggered by a sensing device on the track and reset by the safety features which consisted mainly of micro-switches.
- Some candidates did not attempt to make the barrier automatic.
- The safety feature in a small number of cases consisted only of the barrier being painted in red and white stripes.

Task B

Design and manufacture a pannier bag for a bicycle. The design must include (i) your family or school crest, (ii) a safety feature for high visibility at night.

- Not a very popular task, chosen by only 9% of the girls and 2% of the boys.
- Some excellent pannier bags with multiple pockets and detailed stitching were presented.
- The safety feature on the vast majority of pannier bags consisted of a stick on/sew on reflective strip.
- Some students omitted a method of attaching the pannier bag to the bicycle.

Task C

Design and manufacture a panic alarm for an elderly/disabled person, which will latch a sounding device in another room or house. There should be a visual indicator with both the sensor and the alarm to indicate it is ready for use. A means by which the latch can be broken by the person who is being alerted is also required. Note: All electronics should be neatly housed. Commercially available housings or circuits are not permitted.

- A task with electronics as its primary focus, chosen by 8% of boys and 7% of girls.
- The most common circuit solution was a latched relay circuit.
- The reset requirement of the brief was frequently omitted. Some tasks incorrectly used the master switch as the reset switch.
- The wording of the task was misinterpreted by a significant number of candidates as requiring a house to be constructed rather than a housing.
- In some cases the visual indicators were ignored or did not operate until the alarm was activated.

Task D

Design and manufacture a working model of a lighthouse for a maritime museum which will allow visitors to activate the lighthouse beacon from a switch.

- Most popular task chosen by 53% of boys and 40% of girls.
- Most products functioned well.
- Some very creative and inventive solutions were presented.
- Subsystem solutions varied. Complete electronic solutions included flashing bulbs, flashing light circuits, timer circuits. The most common electro-mechanical solution was a simple bulb plus a rotating mirror/lens.
- The size and quality of the products varied from superb lighthouses with some excellent sea-scapes/rocks/cliffs incorporated into the finished product, to commercial piping and tubing covered with a glass/jam jar and attached to a wooden base.

Task E

Young children are often frightened of the dark. Design and manufacture a novelty light which will automatically switch on/off according to the level of light present in the room.

- Second most popular task chosen by 22% of boys and 40% of girls.
- The novelty aspect provided scope for creativity and inventiveness as was evident from the very high standard of some of the products presented.
- Most candidates used an LDR circuit incorporating a single transistor/Darlington pair successfully.

Task F

Design and manufacture a mobile based on a Hans Christian Anderson fairytale. The mobile should incorporate a sound as well as movement.

- Third most popular task amongst the girls (12%) but chosen by only 2% of boys.
- Some candidates presented beautifully crafted figures and used a motorised solution to provide movement.
- Sound was frequently provided by wind chimes or a bought-in music box unit.
- A significant number of candidates omitted a suitable subsystem for music or sound.
- Some candidates did not concentrate on a theme from Hans Christian Anderson.

Task G

Design and make a computer-controlled toy "buggy". The buggy may be programmed to follow a particular route. NOTE: Power sources where used (only DC permitted) should not exceed 12 volts.

- Only a very small number of candidates (8 boys) attempted this task.
- The standards of the tasks presented were exceptionally high.

General comments

- Receiving the Design Task Examination Paper (S-67) earlier in the school year was welcomed by all.
- The student instructions on the Design Task Examination Paper should be clearly adhered to e.g.
  (i) The restriction that products must work on a maximum voltage of 12 volts DC.
  (ii) A means of access to the subsystem must be provided for examiners.
- The inclusion of the requirement on shading and colour will be considered for further Design Task Examination Papers.
- The design folders were greatly improved this year. However the treatment of the subsystem **throughout** the task folders was largely ignored.
- In some centres all the design folders presented were poor. These centres may need particular inservice.
- New teachers of Technology should access sample folders.
- The Commissioners of Irish Lights and Iarnród Éireann deserve a special mention since they were very helpful in the provision of information to all the students who wrote to them.
- The possibility of establishing a Web Site as a teaching resource in relation to the Technology Design Tasks will be explored with teachers of this subject.

Appendix 6

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Subjects	Grade A	Grade B	Grade C	Grade D	Grade E	Grade F	Grade NG	Totals
Technology	284	783	751	330	81	23	1	2253
%	12.6	34.8	33.3	14.6	3.6	1.0	0.0	
Total Female	121	223	215	63	8	6	0	636
% Female	19.0	35.1	33.8	9.9	1.3	0.9	0.0	
Total Male	163	560	536	267	73	17	1	1617
% Male	10.1	34.6	33.1	16.5	4.5	1.1	0.1	

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Subjects	Grade A	Grade B	Grade C	Grade D	Grade E	Grade F	Grade NG	Totals
Technology	6	110	279	293	130	82	11	911
%	0.7	12.1	30.6	32.2	14.3	9.0	1.2	
Total Female	2	50	101	94	39	13	1	300
% Female	0.7	16.7	33.7	31.3	13.0	4.3	0.3	
Total Male	4	60	178	199	91	69	10	611
% Male	0.7	9.8	29.1	32.6	14.9	11.3	1.6	