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Notes from the Examination Centre

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Contents

| | |
|---|----|
| Introduction..... | 4 |
| Section I..... | 5 |
| Section II..... | 7 |
| Automotive Industries..... | 7 |
| Engine Option..... | 8 |
| Body Option..... | 9 |
| Chassis Option..... | 10 |
| Electical Option..... | 11 |
| Electronics Industries..... | 11 |
| Graphics and Multimedia Industries..... | 12 |
| Architectural Drafting Option..... | 12 |
| Mechanical Drafting Option..... | 14 |
| Multimedia Option..... | 15 |
| Furniture and Timber Products Industries..... | 16 |
| Metals and Engineering Industries..... | 18 |
| Major Work and Folio (60 Marks)..... | 21 |

1999 Higher School Certificate Industrial Technology Notes from the Examination Centre

Introduction

General Comments

In 1999, 2263 candidates presented for the 2 Unit examination in Industrial Technology. This candidature represented an increase of 15% above the 1998 candidature. Current enrolments in the Preliminary Course in Industrial Technology signal a further increase in candidature for the 2000 Higher School Certificate.

The total candidature for the 1999 examination was divided amongst the syllabus areas of study as follows:

| Area of Study | Candidature |
|---|-------------|
| Automotive Industries | 90 |
| Building and Construction Industries | 1 |
| Electronics Industries | 113 |
| Graphics and Multimedia Industries – Architectural Drafting | 108 |
| Graphics and Multimedia Industries – Mechanical Drafting | 35 |
| Graphics and Multimedia Industries – Multimedia | 2 |
| Furniture and Timber Products Industries | 1716 |
| Metals and Engineering Industries | 198 |
| Plastics Industries | 0 |

The following marking schemes were used for Questions 1 – 7 in the Written Paper:

Question 1 – Section I – marked out of 30 – scaled to a mark out of 10

Question 2 – Section I – marked out of 20 – scaled to a mark out of 5

Question 3 – Section I – marked out of 30 – scaled to a mark out of 10

Question 4 – Section II – marked out of 20 – scaled to a mark out of 5

Question 5 – Section II – marked out of 20 – scaled to a mark out of 5

Question 6 – Section II – marked out of 20 – scaled to a mark out of 5

Question 7 – Section II – marked out of 20 – scaled to a mark out of 5

Note: Please refer to the exam paper for the questions.

Section I

Question 1 (10 marks)

Comments

- (a) Generally well answered. However, many candidates tried to answer the question with a single word response. This did not allow these candidates to maximise their marks.
- (b)
 - (i) Many candidates had an understanding of the term 'efficient'. However, they did not relate their definition to an increase in local and global competitiveness.
 - (ii) Poorly answered with few candidates understanding the concept of 'restructuring'.
 - (iii) Many candidates gave strategies, but did not expand on how management would implement these strategies.
- (c)
 - (i) Well answered. Candidates who made a comparison with other forms of distribution maximised their marks.
 - (ii) Many candidates gave examples of machinery and materials handling equipment. However, they did not explain how time reduction was achieved over previous methods.
- (d)
 - (i) One word answers which failed to address promotion to the international market were common.
 - (ii) Many candidates expanded upon the answer given in Part (d) (i) but failed to explain the process of implementation.
- (e)
 - (i) (Marks not awarded for this response)
 - (ii) Generally well answered by candidates who did not restrict themselves to one word answers.
- (f) 'Recycling' was the most common answer. Better responses also included the more efficient use of resource materials.

Question 2

Comments

- (a) This question was reasonably answered, however most candidates did not provide enough detail on IMPROVING the area. Responses described 'what a computer can do', rather than how it actually improves current or manual methods.
Candidates who selected 'Staffing' did not really understand the implications of how computer technology worked in that area.
- (b) Generally well answered. Candidates gave a range of answers which related to the advantages of word processing software.
- (c) Generally well answered. 'TAFE Courses', 'On Site Training', 'Use of consultants' were common responses.
- (d) Candidates could talk about computer technology but did not relate this to improved productivity. Productivity was often confused with profitability or efficiency.
- (e) Many candidates did not understand what the role of the union representative was. This question was generally answered by describing unionism and candidates did not refer to disputes between fellow workers.

- (f) Generally not well answered. Candidates did not relate management to production and did not explain benefits, but only described management control and worker participation in general terms.

Question 3

Comments

- (a) Candidates had difficulty in linking the workforce and multiculturalism. Too many candidates related multiculturalism to racism and discrimination instead of safety.
- (b) Candidates had a satisfactory knowledge of the role of the 'safety officer'. Most candidates did not understand the role of Workcover and confused it with simply paying out compensation.
- (c) Candidates confused 'features of signs' and failed to explain how the features affected the design.
- (d) Many candidates were unaware of the government regulatory organisations and often did not distinguish between Government Authority and private organisations like Greenpeace.
- (e) Many candidates gave only a vague description without giving a specific method eg TQM. Many candidates dealt with quality control after the product was released.

Most candidates failed to explain how management could take advantage of quality control checks.

Section II

Automotive Industries

General Comments

There were a total of 93 candidates in the Automotive Industries options papers. Candidates' selections of options were:

| Option | No of Candidates |
|------------|------------------|
| Engine | 73 |
| Body | 15 |
| Chassis | 4 |
| Electrical | 1 |

The format of the elective examination papers in Automotive involved questions with parts that were common across all electives. Question 4 was compulsory and there were common parts to each of Questions 5, 6 and 7.

Candidates showed little understanding of drawing standards and had difficulty in interpreting what was required in the drawing question. Sketching was poorly done with candidates having little understanding of drawing concepts, dimensioning and layout. Most candidates had difficulty with 'explanation / description' although in their responses they were able to demonstrate some knowledge by providing key words.

There were a number of candidates who attempted all questions. It is advisable to discourage this process as the time constraints for the paper do not allow candidates to maximise marks for all four questions.

Question 4 This question was compulsory. (5 marks)

Comments

- Most candidates were able to answer this question. They were able to demonstrate an understanding of the processes involved in quotations although there were a number who had difficulty with simple additions.
- Candidates generally were able to draw the sketch of the brake cable connecting piece. Most understood the direction of view and the brake cable connecting pieces. In general, candidates had difficulty with the assembly and location of the drawing as was presented in the paper.
- In general, the responses were adequate. Most candidates recognised the diameter but were unable to recognise the pitch and tolerance.
- Candidates answered this question poorly. It was clear that candidates did not understand what pneumatic power tools were.
- Generally well answered, although candidates should expand the area of response in this style of question.

Questions 5, 6 and 7 Common

As there were common parts to each of Questions 5, 6 and 7 it is useful to integrate the responses of candidates in all options areas.

Question 5

Comments

- (a) (i) This question was well answered. Candidates demonstrated a knowledge of routine maintenance procedures.
- (ii) This question was well answered with most candidates understanding the stages of combustion in a four-stroke engine.
- (b) Those candidates who understood the workings of a rotary engine answered this question well.

Question 6

Comments

In general this part of the question was well answered. Candidates across all options had a sound knowledge of lubricants, their properties and their uses.

- (a) (i) Generally well answered.
- (ii) Candidates had difficulty with this explanation although they were still able to demonstrate their knowledge using key words.
- (b) (i) Candidates indicated a range of suitable responses in relation to synthetic oils.
- (ii) Candidates had a sound knowledge of terms related to the properties of oils.

Question 7

- (a) (i) This question was well answered by most candidates although many failed to recognise the need for regular maintenance and for specific time or distance intervals for a maintenance schedule.
- (ii) This question was well answered, with the majority of candidates relating their answers to lubrication of the engine.

Engine Option

Question 5

- (c) Most candidates had little understanding of the operations of a diesel engine. They had difficulty with this question and had little understanding of diagnosis mechanisms. All parts of Part (c) were poorly answered.

Question 6

Comments

Candidates answered this part of the question well. They were able to demonstrate a sound knowledge of fault diagnosis and the processes required to rectify problems in a four-stroke engine.

- (c) (i) Generally well answered, with candidates recognising specified tools and their uses in engine fault diagnosis.
- (ii) Generally well answered, although some candidates were unable to determine a broad list of steps required to remove a cylinder head.
- (iii) Generally well answered, with candidates understanding the process of repair for a burnt valve.

Those candidates who understood the process of removal of a cylinder head had no difficulty in answering parts (d) and (e).

- (d) Generally well answered.
- (e) Well answered, with most candidates correctly naming the tool used to tighten a cylinder head.

Question 7

Comments

- (b) Most candidates understood the function of multivalve engines in the modern car.
- (c) There were very few candidates who knew the meaning of a ‘thermosyphon’.
- (d) (i) There were very few candidates who understood the different types of fuel pumps and how they operate.
(ii) Most candidates understood the symptoms of a faulty fuel pump.
- (e) Generally well answered, with candidates understanding the necessity for well maintained exhaust systems.
- (f) Generally well answered, with candidates understanding how faulty radiators are repaired.

Body Option

Question 5

Comments

- (c) As a general comment, most candidates understood the process of fitting a car windscreen and why particular materials are used in the process. All parts were well answered.

Question 6

Comments

Candidates answered this part of the question well. They were able to demonstrate a sound knowledge of body design, materials and problems related to material selection.

- (c) Generally well answered although some candidates had difficulty recognising specified reasons for materials selection other than weight
- (d) Generally well answered with most candidates recognising the function of plastics in vehicle manufacture
- (e) There were very few candidates who knew the meaning of ‘corrosion’ or who could describe methods of prevention.
- (f) Generally well answered although few candidates recognised that cost related to design and development rather than economical use of the vehicles involved.
- (g) Candidates generally concentrated on discussions related to one particular effect. Candidates should be advised to include a number of points for their discussion.

Question 7

Comments

There were very few candidates who attempted this question. In general, those candidates who attempted this part of the paper were able to show sound knowledge of the process of repairing damaged motor vehicle panels. As a general criticism, the markers felt that the candidates were unable to use the sketch and describe mechanism within the questions to fully demonstrate their knowledge of this topic.

- (b) (i) Generally well answered.
- (ii) Generally well answered.
- (iii) Generally well answered with most candidates recognising the function of the MTA in the process of repairs.

Chassis Option

With only 4 candidates selecting this option, trends within questions are difficult to identify.

Question 5

Comments

- (c) The candidates understood drive shaft operation although there were very few candidates who understood the function of the universal joint.

Question 6

Comments

- (c) All parts were well answered by most candidates.
- (d) (i) Generally well answered by candidates, although they were unable to recognise the effects of high speed cornering on tyre wear.
- (ii) Generally well answered by candidates.
- (e) Most candidates were able to describe the process of wheel alignment.

Question 7

Comments

- (b) Most candidates were able to answer this question well showing an understanding of brake operations although they had difficulty in describing brake fade.
- (c) Most candidates understood the function of the servo-assist mechanism.
- (d) Candidates were able to demonstrate their knowledge of the components for a rear suspension. In general this part of the question was well answered although some had difficulty with the effects of wear on shackle rubbers.

Electrical Option

Only one candidate selected this option.

Question 5

Comments

- (c) (i) Poorly answered by the candidate.
- (ii) Well answered by the candidate.

Question 6

Comments

- (c) (i) Well answered by the candidate.
- (ii) Well answered by the candidate.
- (d) Poorly answered. The candidate showed little understanding of the effect of engine conditions on spark plugs.
- (e) Poorly answered by the candidate.

Question 7

Comments

This question was not answered by the candidate.

Electronics Industries

Question 4

- (a) Generally well answered. Candidates had a good knowledge in identifying electrical components.
- (b) Wording of the question tended to allow for more than one answer. Candidates with poor mathematics skills struggled with this part.
- (c) Not well understood – particularly the ‘inverter’ stage. The functions of each part and the link between them was not answered well, with only superficial answers given.
- (d) Nearly all candidates attempted a flow chart, which is a noticeable improvement compared to previous years. Candidates had little knowledge, however, of the steps in a photographic process of manufacturing a PCB.

Question 5

Comments

- (a) Most candidates answered this question correctly, with only a small number believing a car battery is A.C.
- (b) (i) Very few candidates could answer this part to the correct depth of knowledge. There was not a deep understanding of how a voltage regulator worked.
- (ii) Approximately half of the candidates could describe the function of the 2500 μ F capacitor.

- (c) (i) Most candidates who attempted this part described the function of the transformer well.
- (ii) Not a well answered question. It appeared as though many candidates had not done the power supply experiment: half wave v full wave.
- (iii) A lot of calculation was required. Few candidates did this correctly. Most looked for the easiest 'plug-in' formula without understanding WHAT it was they were trying to do.

Question 6

Comments

- (a) (i)-(ii) Most candidates had a good understanding of soldering faults.
- (b) (i)-(ii) Not very well done. Candidates had little idea on simple testing procedures.
- (c) Grid drawn as 5 mm squares. This created confusion as to whether it was drawn to scale, as the convention for a CRO screen is in 1cm squares.
 - (i) Few candidates had correct units (Hz) for frequency.
 - (ii) Most candidates knew the peak voltage of the sine wave.
 - (iii) Few candidates knew how a signal generator works in conjunction with a CRO. This part discriminated the better candidates.

Question 7

Comments

- (a) Many candidates referred to multimeters.
- (b) (i) AND gate was answered well but the NOR gate was more difficult, with a lot of candidates seeing an OR gate without doing a truth table to obtain the correct answer.
- (ii) Truth table could have had two extra columns to assist. Candidates who did not draw their own truth tables had difficulty in answering the question. Not many candidates were awarded full marks.
- (c) Not well answered. Candidates were not clear as to the intent of the question, but realised the RS flip-flop was made up of logic gates.
- (d) Many candidates had seen the soldering processes but mixed up the terminology in explaining how they were used.
- (e) Generally well done, but many candidates answered in terms of soldering the devices.

Graphics and Multimedia Industries

Architectural Drafting Option

Question 4

Comments

- (a) Most candidates answered this question well, with a good understanding of pictorial drawings.
- (b) Very few candidates attempted to include the true shape of the inclined face. Centrelines were generally not included and labelling of views was minimal. Most candidates could draw the top and front views without problems.

- (c) (i) Most candidates could identify that the drawing was in 3rd angle projection.
- (ii) Identification of 3rd angle projection symbol was generally not attempted very well, with candidates only completing one part of the symbol.
- (d) Candidates could identify Hidden Detail lines and Centrelines but most could not identify (name) extension lines for the dimensioning.

Question 5

Comments

- (a) The sketch plan of the garage was well attempted, with most candidates having a good knowledge of features.
- (b) Generally well answered, as there was a large number of drawings available to choose from.
- (c) Most candidates could describe features of a concrete slab even if they did not know the correct terminology, thus gaining marks available.

Question 6

Comments

- (a) Generally well answered as there was a large number of answers available to choose from.
- (b) This question was not clearly understood by most candidates. The responses indicated minimal knowledge of contour lines or fall/slope of land. Generally, the few candidates who attempted this question did it correctly.
- (c) Most candidates answered the question as if they had to produce a set of drawings for council and did not describe the process leading up to the final drawing. There were some good answers from those who understood the question correctly.
- (d) (i) Most candidates explained features of different architectural styles in the space provided, but their explanations were not detailed or were hard to interpret.
- (ii) Sketches drawn were very hard to interpret, with few candidates labelling their drawings.

Question 7

Comments

- (a) Many candidates described the drawing type rather than indicating an appropriate use for it. Few candidates answered the question well.
- (b) Most candidates indicated a single type of drawing rather than the most suitable drawing types to present concepts to inexperienced consumers. The explanation was well answered.
- (c) (i) Generally well answered by majority of candidates.
- (ii) Most candidates listed physical size of structure as influencing scale selection but few listed complexity as an influence.
- (d) (i) CAD was generally given as an example of new technology.
- (ii) Candidates struggled to fully explain the use of this technology.
- (iii) Generally well answered as candidates could relate more easily to mechanical means of producing drawings.

- (iv) Reasonably well answered, although many candidates did not know the meaning of 'workplace reform.'
- (v) Well answered, with most candidates referring to a reduction in resource usage.

Mechanical Drafting Option

Question 4

Comments

- (a) This part was generally well attempted. Candidates appeared to understand that a 3D view of the object was required with an inclined section 'face' with hole, although some candidates chose an orientation that did not show maximum detail.
- (b) Not handled well by candidates. The auxiliary view was generally not attempted and placement of the required views often bore no relationship to 'orthogonal.' Labelling of views was well done but centrelines were often neglected.
- (c) (i)-(ii) Most candidates could answer the questions on AS1100 but some found drawing the symbol for 3rd angle projection too challenging.
- (d) 'Hidden Detail' and 'Centrelines' were well known. 'Extension lines' were not known and generally called Dimension Lines or Leader Lines.

Question 5

Comments

- (a) (i) Generally well answered, but there appears to be a weakness in factual knowledge of drawing types: detail, exploded, isometric, etc.
- (ii) This type of drawing was well explained.
- (iii) A large number of candidates could not name the detail drawing.
- (iv) This type of drawing was well explained.
- (b) Most candidates could sketch an assembled front view of the wheel arbor.
- (c) Very few candidates knew what 'unidirectional dimensioning' meant.
- (d) Most candidates could name the symbols, but had difficulty in giving an adequate explanation / use.

Question 6

Comments

- (a) (i) Quite well done, but some candidates described the item's appearance rather than its application.
- (ii) There appeared to be an understanding of computer-aided drafting tools, however, there was little knowledge of template libraries or symbol libraries and how they are used.
- (b) Candidates could name stages but had difficulty explaining each stage. Very few candidates had a real understanding of the design process in creating drawings for a new component.
- (c) (i) Most candidates named CAD as an example of new or emerging technology, but failed to explain its use.

- (ii) Candidates could name the technology but few made the effort to describe the technology it replaces.
 - (iii) The term 'workplace reform' was not well recognised by candidates.
 - (iv) Generally well answered.
 - (v) Generally, candidates only described the saving in paper usage. Candidates should be encouraged to expand their thinking to include: use of power, electromagnetic radiation, etc.
- (d) The majority of candidates had a good knowledge of the AS1100 standards.

Question 7

Comments

- (a)
 - (i) Generally well answered by most candidates, with oblique causing the most problems.
 - (ii) Many candidates found 'steps in producing a drawing' difficult. They had some knowledge but could not explain the steps very well.
 - (iii) Generally well answered.
- (b)
 - (i) Few candidates could identify the type of dimensioning used on the drawing.
 - (ii) Technical definitions directly related to mechanical drafting were not well understood. Candidates could not name the type of dimensioning or explain functional and non-functional dimensions.
 - (iii) 'Chamfer' and 'Counterbore' were quite well known but 'Thread runout' was not. Few related their answers to the G clamp.
- (c)
 - (i) Reasonably well answered but a lot of candidates tried to guess the answer without actually knowing the name, or tried, to explain the feature without naming it.
 - (ii) Most candidates could explain the stages in producing the assembly, but not in the correct order.
- (d) The majority of candidates understood the sectioning process, but very few could accurately determine the 'web.' A common mistake was hidden detail being used to indicate holes even though the drawing was sectioned.

Multimedia Option

General Comments

There were only two candidates in this area of Graphics and Multimedia. There was little written on their exam paper to comment upon.

Question 4

Comments

- (a) Well done by both candidates.
- (b) Only one candidate attempted this section, struggling with the placement of orthogonal views and did not understand auxiliary views.
- (c) Candidates could not determine angle of projection or sketch symbol.
- (d) Poorly answered by both candidates.

Question 5

Comments

Only one candidate attempted this question. It was very poorly answered with most parts of the question not attempted.

Question 6

Comments

Not attempted by either candidate.

Question 7

Comments

Both candidates were weak in all areas tested, with large sections of the question not attempted.

Furniture and Timber Products Industries

Question 4

Comments

- (a) Overall, this question was well presented and accurately sketched. Some candidates drew a pictorial representation rather than an orthogonal view in the direction of the arrow.
- (b) (i) Generally well attempted, candidates had a sound understanding of cutting list requirements.
 - (ii) Many candidates did not recognise that the question only required the front and the back leg length, not the rail measurements. The candidates who did the correct calculation had to ensure that their answers were in linear metres and not millimetres.
 - (iii) This question was poorly answered because many candidates failed to convert the measurements to metres before finding m^2 . As a result, answers were out by a factor of 10 or 100. In addition, those candidates who did the correct calculation failed to convert their final result to the nearest dollar.
- (d) (i) The quality of the sketches of the joint proposed by the candidate needed more attention, particularly in the pictorial form. Many candidates understood the theory of an acceptable joint but had difficulty in communicating these knowledge pictorially.
 - (ii) Many candidates' answers did not relate to the sketch drawn in part d(i). If the candidate drew an alternative sketch in part d(i) then they needed to correctly name that joint.

Question 5

Comments

Generally, this question was very poorly answered. Candidates showed little understanding that the question related to mass production and not to production in the school workshop. Consequently, candidates had difficulty in producing answers that went even close to fulfilling the requirements for scoring full marks in this question.

Candidates also demonstrated little understanding of exam technique. They had little idea of the difference between 'explain', 'describe' and 'discuss'. Answers were therefore vague, poorly

constructed and often skirted around the required responses. Clearly, candidates have not been taught how to read the examination questions and to formulate an answer in response to that question.

- (a) Many candidates had great difficulty in distinguishing between issues of mass production and issues of design. Many candidates were unclear of what mass production and design actually were. Many candidates were able to describe the design of the chair, eg height, comfort, width, joints, etc, but few could explain issues that a manufacturer would have to consider when taking the given design and adapting it for mass production, eg competency of the workforce, finance, machinery requirements, storage, etc.
- (b) (i) Candidates had little difficulty in naming a suitable joint.
(ii) Candidates had difficulty in ‘outlining’ the steps in constructing the joint. Most candidates simply gave steps in the construction related to school workshop practices. Most had great difficulty in giving any more than two basic steps in the construction. A typical answer consisted of: dowel joint, drill holes, insert dowel and glue.
More detail and steps were required to score full marks.
- (c) Candidates were confused by the terminology used in this part of the question. When asked to describe methods to ensure squareness during production, most candidates could give two methods for checking for square, but not for ensuring squareness. Most candidates related their answers to only the assembly of the chair, rather than the entire production of the chair.
- (d) Most candidates had difficulty with ‘briefly describe’. Many could name a process or tool, but could not describe it. Candidates showed only minimal expertise in upholstery techniques. Again, the steps needed to complete the processes were too briefly described. Typical answers consisted of ‘glue it on’, ‘screw it on’, ‘staple it’ and ‘tack it’. These brief answers fell short of the expectations of the examiners.

Question 6

Comments

A large percentage of candidates did not attempt this question.

- (a) (i) In general, most candidates had a good knowledge of suitable manufactured boards for mass production.
(ii) Some candidates experienced difficulty in identifying and sequencing basic manufacturing steps. Candidates failed to recognise basic operations, eg marking out, cutting, assembly, finishing, etc. The graphic representation of the flow chart was generally satisfactorily answered.
- (b) (i)-(ii) The majority of candidates had a good understanding of the function, application, advantages and disadvantages of knockdown fittings.
(iii) Generally well answered, however freehand sketches in many cases were poor and did not clearly indicate the method of adjustability. The description was often brief and relatively poorly answered. Some candidates did not describe the method but instead described the fitting itself.
- (c) (i) Generally well answered.
(ii) Poorly answered. The majority of candidates were vague in their responses.
(iii) Generally well answered.

Replication of answers was quite common throughout this part.

Question 7

Comments

It was quite clear from the answers received to this question that candidates did not read the entire question before answering. In many cases, the question was not completed.

- (a) (i) A large number of candidates were not able to give the name of an 'outdoor' timber.
- (ii) Most candidates were only able to give 2 correct responses relating to the characteristics of the timber they had chosen in (i). The most common response was 'strong' or 'durable', which could apply to any timber. Too many responses were general and not specific to the particular timber. Price is not a characteristic.
- (iii) Most candidates could name two defects in timber. Few were able to give a good explanation and most showed a very basic knowledge of what a defect is and how it affects the timber. Most candidates gave a very simple answer.
- (b) (i) Few candidates were able to fully name a 'suitable outdoor finish' and then give appropriate reasons for the choice in (ii).
Many candidates answered with 'lacquer' or 'oil' but did not qualify why it was an outdoor finish.
- (c) (i) Only half the candidates were able to give a correct edge treatment for a solid timber board. Of the remainder, many candidates described the treatment for a manufactured board. Others described a painting treatment.
- (ii) Once candidates were on the right track from Part (i), most were able to sketch and label reasonably well.
- (iii) Most descriptions were reasonably clear and appropriate.

NB If candidates started off on the wrong train of thought in (i), then their answers for (ii) and (iii) were usually wrong.

Metals & Engineering Industries

General Comments

In general, this paper was poorly attempted by the candidates. There was little understanding of drawing standards and candidates had difficulty in interpreting what was required in the drawing question. Most candidates did not attempt Question 6 on machining. The mean/average mark for this question was very low, which indicated that candidates had little understanding of the processes involved in machining the punch. The two questions on fabrication were generally well done.

Question 4

Comments

- (a) Most candidates had difficulty with this question. There was a lack of understanding of the dimensions that were required in the answer.
- (b) Generally, candidates were able to draw the sketch of the arbour. Most understood the direction of view and the arbor's shape. There were very few candidates who understood the concept of proportion.
- (c) Very poorly answered. Most candidates left out this part of the question.
- (d) This question was well answered by better candidates. They were able to identify and describe the symbols.

Question 5

Comments

This question was answered by most candidates. There was good range of candidate's responses. Candidates responded well to questions related to metal fabrication and welding. They generally had a sound knowledge of relevant industrial processes.

- (a) Candidates demonstrated a knowledge of suitable industrial processes for the manufacture of the frame.
- (b) Generally well answered.
- (c) Candidates indicated a range of suitable responses in relation to suitable bending operations.
- (d) (i) Generally well answered. Candidates had a sound knowledge of suitable finishing processes.
(ii) The descriptions of the applications of the processes were generally sound.
- (e) Candidates had difficulty in explaining concepts through sketching.
- (f) (i) Generally well answered, indicating sound knowledge of spot welding and its applications.
(ii) The advantages and disadvantages of the spot welding process were recognised by most candidates.

Question 6

Comments

Most candidates chose not to attempt this question. They had difficulty in answering questions in relation to specific knowledge of lathe operations.

- (a) (i) Most candidates had difficulty in recognising TWO tools that would be used for this operation.
(ii) Generally poorly answered.
- (b) (i) Most candidates were unable to identify both knurling patterns and discuss the usage of each.
(ii) Generally poorly answered with candidates not understanding the process involved in knurling.
- (c) Very poorly answered. Most candidates had no knowledge of the correct formula for the calculation of lathe speed.
- (d) Limited responses were made in relation to CNC operations. Candidates also neglected to satisfactorily describe the operations in the setting and use of the compound slide.
- (e) (i) The description of the hardening process was generally well done.
(ii) Again, most candidates were able to adequately describe the steps in the heat treatment process.

Question 7

Comments

This question was attempted by most candidates. There was good range of candidates responses. As in Question 5, candidates responded well to questions related to metal fabrication and welding.

- (a) (i) Responses to safety issues were generally well answered .
- (ii) Many candidates failed to appreciate the full extent of the effect of the coating on arc-welding electrodes.
- (b) This question was poorly answered. Candidates had limited knowledge of the principal difference between AC and DC arc-welding machines.
- (c) (i) Many candidates did not recognise the difference between the oxy-acetylene and arc-welding processes. As a result they were unable to clearly indicate the advantages and disadvantages of each process.
- (ii) Most candidates were able to identify and list the steps in the lighting and adjusting of the oxy-acetylene equipment.
- (iii) Many candidates confused the welding process indicated in the question with brazing.
- (d) (i) Generally well answered. Candidates had a sound knowledge of suitable processes.

Major Work And Folio (60 Marks)

There was a general improvement in the overall standard of projects presented by candidates, with a wide variety of projects presented as the number of candidates increases. The new syllabus presented teachers and candidates an opportunity to expand upon more traditional projects and involve new and different materials and processes.

The markers indicated that a number of schools were not using the new syllabus. This led to difficulties in allocating marks to specific examination criteria.

Schools should be aware that for 1999 and 2000 there is a new syllabus with new marking criteria.

Planning, Management and Design Folio

There was a large number of schools using 1998 syllabus and examination rules and criteria. This meant that many areas within the syllabus were not addressed. It was evident that many folios were superficial in their approach to key elements of the Subject Rules. Once again, many appeared to have been written after the projects were completed, with little thought being given to management of the project and the management of time.

There seemed to be a lack of understanding of the criteria that involves the candidates in planning and research. A small number of candidates attempted a finance plan and timeplan.

There was a general lack of understanding of appropriate research and the consequence of that research. In many cases, the research was unrelated to the specifics of the project.

The continuing problem of candidates not understanding the process of design development was again highlighted. Candidates should understand and demonstrate a process which incorporates a progression from their initial ideas through research, critical analysis, modification and evaluation leading to the development of the practical project.

Choice and justification of materials, components and processes was generally well attempted, with candidates being able to highlight each area and document within the folio their research. It was noticeable that candidates were more able to address this criteria through the record of project activities. In other cases they dealt with it as an individual area.

In general, the recording of project activities was well attempted. This section of the folio gives the markers the greatest insight into the production of the project. The use of photographs, videos and labelled displays also assisted in this criteria.

Those candidates who were able to identify and apply the examination rules and criteria presented work of high quality. Most of these candidates were able to demonstrate an awareness of new and appropriate technologies in the presentation of their folios.

Communication

In general, this section was well attempted. Candidates must ensure that their folios are well presented and are logical in their layout. The use of new technologies was relevant. Some candidates used digital cameras while others utilised video presentations.

The use of the computer in the folio was widespread, although candidates should be aware that the examination criteria 'evidence of a range of communication techniques' includes 'drawing, sketching, computer applications such as graphics and word processing'.

Project Production

Production was generally of a better standard than in previous years. There were less poor quality projects and the range of projects were greater. Candidates selected projects that were within their ability, although there was still a significant number whose projects were too 'basic' and therefore

received limited marks. Those who followed a systematic approach to project selection and development generally attained enhanced results.

Candidates need to be made aware that the all the work required to make the project needs to be displayed at the time of marking. Jigs, models, prototypes, preliminary sketches, working rods and all other material that is used during construction needs to be exhibited when the markers are present.

The finishing of projects has improved but there are still candidates using inappropriate timber finishes. Candidates need to give more consideration to the finishing phase of their projects during the initial planning phase.

Industry Study

Most candidates were able to demonstrate the use of appropriate industrial processes.

Candidates that were familiar with the subject rules generally did well in this area. The use of photographs to demonstrate safe working practice was widespread. Some candidates assigned a specific area within the folio and included written comments along with photographic evidence.