

DESIGN AND TECHNOLOGY

Paper 0445/11

Design 11

General comments

Centres had clearly prepared their candidates to respond as intended on the A3 pre-printed answer sheets and scripts were generally well presented. The areas on the A3 sheets have been designed to provide sufficient space for the response to each part of the chosen question and there should be no need for candidates to answer elsewhere. The majority of candidates seemed to choose the question linked to their optional paper.

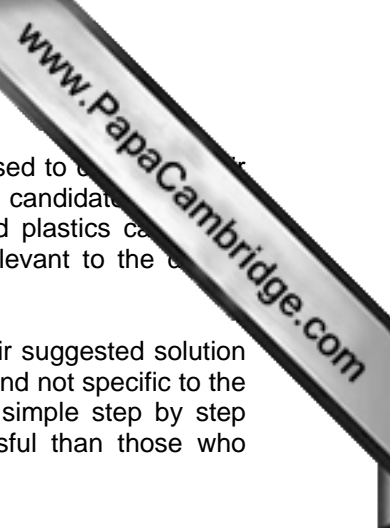
The intention of these design questions is that candidates should be allowed a wide interpretation of the situations as set out in the information provided for each question so that they can be as creative as possible. The Examiner has no prescribed view of what the outcomes should be and all proposals are marked in a very positive way.

Comments on specific questions

Question 1

The majority of candidates who opted for this question were clearly familiar with the design requirements for remote controller storage devices and appeared to have few problems using the information provided.

- (a) Functional aspects in addition to those given in the question included: easy to remove remote controllers; remotes can be seen easily; matches surroundings; stable in use; easily identifiable; buttons not pushed accidentally; etc.
- (b) Candidates identified both materials and construction methods that would help protect the remote controllers when in storage. These included: small contact surfaces; soft materials; rubber; foam; expanded polystyrene; lids; drawers; etc.
- (c) As has been mentioned before, it is possible for candidates to be awarded maximum marks for the presentation of just three different ideas. The majority of candidates did just this and showed that they were able to be quite creative in their approach to the design problem. For the award of high marks, candidates are required to present high-quality drawings using a wide range of drawing techniques, with clear annotation supporting the detail of each idea.
- (d) The majority of candidates carried out meaningful evaluations and in many cases did so by identifying advantages and disadvantages of each idea. This was then followed up by the selection of their chosen idea with reasons given. There are still a few cases of candidates presenting a table of tick boxes where the designs are judged against three or four criteria. However, in these cases the Examiner can award a maximum of just three marks out of the six available.
- (e) The Examiner is pleased to report that responses to this important part of the design process continue to improve with candidates providing more information on construction details than has been the case in previous examinations. Candidates used a range of drawing techniques to present their chosen idea and showed construction and other detail through the use of smaller drawings and annotation around the main drawing. This approach was often very effective.



- (f) Most candidates were able to suggest some of the materials that might be used to create their final product. As has been mentioned many times before, it is vital that candidates use **specific** materials, and the use of generic terms such as wood, metal and plastics can only be awarded marks. Reasons for the choice of material must obviously be relevant to the design presented in the previous section.
- (g) Candidates were generally able to outline the manufacture of one part of their suggested solution but, unfortunately, some practical techniques were too general in description and not specific to the suggested design. Candidates who present the manufacturing process in simple step by step stages with tools identified in a meaningful way were often more successful than those who attempted to describe the process in a long paragraph .

Question 2

This question was intended for candidates following the Graphics Products option and it was anticipated that semi-resistant materials would be used for most solutions. Candidates generally realised that the package had to both present and protect the contents.

- (a) The majority of candidates were able to identify four additional functional requirements of designs and these included: attract attention of shoppers; minimal use of materials; easy to pack/unpack; minimal storage space; high-tech appearance; protect contents in transportation; etc.
- (b) Most candidates were able to show two methods for accessing packages including: tuck-in flaps; lift-off tops; adhesive surfaces; sliding sections; use of 'velcro' type fixings; etc.
- (c)
- (d) See **Question 1 (c) – (g)**
- (e)
- (f)
- (g)

Question 3

The requirements for the light were such that candidates could make use of their knowledge and experience of systems and control in some way. Designs proposed were generally suitable for young children and incorporated simple timing controls.

- (a) Most candidates had little difficulty identifying additional points about the function of the battery-powered light and these included: easy to operate; minimal space required; stable in use; safe for child to operate; appealing to young children; etc.
- (b) Candidates responded well to the drawing of two different types of battery and those identified included; AAA; AA; C; D; PP3 and various lithium disk types.
- (c)
- (d)
- (e) See **Question 1 (c) – (g)**
- (f)
- (g)

DESIGN AND TECHNOLOGY

Paper 0445/12

Design 12

General comments

Centres had clearly prepared their candidates to respond as intended on the A3 pre-printed answer sheets and scripts were generally well presented. The areas on the A3 sheets have been designed to provide sufficient space for the response to each part of the chosen question and there should be no need for candidates to answer elsewhere. The majority of candidates seemed to choose the question linked to their optional paper.

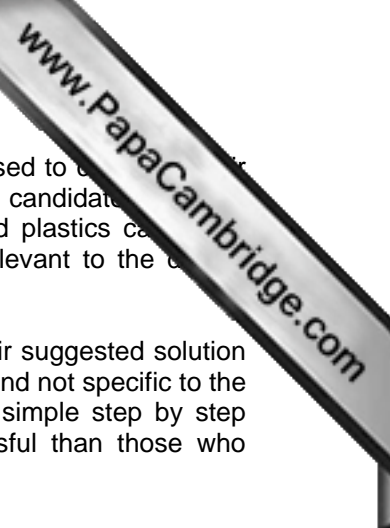
The intention of these design questions is that candidates should be allowed a wide interpretation of the situations as set out in the information provided for each question so that they can be as creative as possible. The Examiner has no prescribed view of what the outcomes should be and all proposals are marked in a very positive way.

Comments on specific questions

Question 1

The majority of candidates who opted for this question were clearly familiar with the design requirements for remote controller storage devices and appeared to have few problems using the information provided.

- (a) Functional aspects in addition to those given in the question included: easy to remove remote controllers; remotes can be seen easily; matches surroundings; stable in use; easily identifiable; buttons not pushed accidentally; etc.
- (b) Candidates identified both materials and construction methods that would help protect the remote controllers when in storage. These included: small contact surfaces; soft materials; rubber; foam; expanded polystyrene; lids; drawers; etc.
- (c) As has been mentioned before, it is possible for candidates to be awarded maximum marks for the presentation of just three different ideas. The majority of candidates did just this and showed that they were able to be quite creative in their approach to the design problem. For the award of high marks, candidates are required to present high-quality drawings using a wide range of drawing techniques, with clear annotation supporting the detail of each idea.
- (d) The majority of candidates carried out meaningful evaluations and in many cases did so by identifying advantages and disadvantages of each idea. This was then followed up by the selection of their chosen idea with reasons given. There are still a few cases of candidates presenting a table of tick boxes where the designs are judged against three or four criteria. However, in these cases the Examiner can award a maximum of just three marks out of the six available.
- (e) The Examiner is pleased to report that responses to this important part of the design process continue to improve with candidates providing more information on construction details than has been the case in previous examinations. Candidates used a range of drawing techniques to present their chosen idea and showed construction and other detail through the use of smaller drawings and annotation around the main drawing. This approach was often very effective.



- (f) Most candidates were able to suggest some of the materials that might be used to create their final product. As has been mentioned many times before, it is vital that candidates use **specific** materials, and the use of generic terms such as wood, metal and plastics can only be awarded marks. Reasons for the choice of material must obviously be relevant to the design presented in the previous section.
- (g) Candidates were generally able to outline the manufacture of one part of their suggested solution but, unfortunately, some practical techniques were too general in description and not specific to the suggested design. Candidates who present the manufacturing process in simple step by step stages with tools identified in a meaningful way were often more successful than those who attempted to describe the process in a long paragraph.

Question 2

This question was intended for candidates following the Graphics Products option and it was anticipated that semi-resistant materials would be used for most solutions. Candidates generally realised that the package had to both present and protect the contents.

- (a) The majority of candidates were able to identify four additional functional requirements of designs and these included: attract attention of shoppers; minimal use of materials; easy to pack/unpack; minimal storage space; high-tech appearance; protect contents in transportation; etc.
- (b) Most candidates were able to show two methods for accessing packages including: tuck-in flaps; lift-off tops; adhesive surfaces; sliding sections; use of 'velcro' type fixings; etc.
- (c)
- (d) See **Question 1 (c) – (g)**
- (e)
- (f)
- (g)

Question 3

The requirements for the light were such that candidates could make use of their knowledge and experience of systems and control in some way. Designs proposed were generally suitable for young children and incorporated simple timing controls.

- (a) Most candidates had little difficulty identifying additional points about the function of the battery-powered light and these included: easy to operate; minimal space required; stable in use; safe for child to operate; appealing to young children; etc.
- (b) Candidates responded well to the drawing of two different types of battery and those identified included; AAA; AA; C; D; PP3 and various lithium disk types.
- (c)
- (d)
- (e) See **Question 1 (c) – (g)**
- (f)
- (g)

DESIGN AND TECHNOLOGY

Paper 0445/13

Design 13

General comments

Centres had clearly prepared their candidates to respond as intended on the A3 pre-printed answer sheets and scripts were generally well presented. The areas on the A3 sheets have been designed to provide sufficient space for the response to each part of the chosen question and there should be no need for candidates to answer elsewhere. The majority of candidates seemed to choose the question linked to their optional paper.

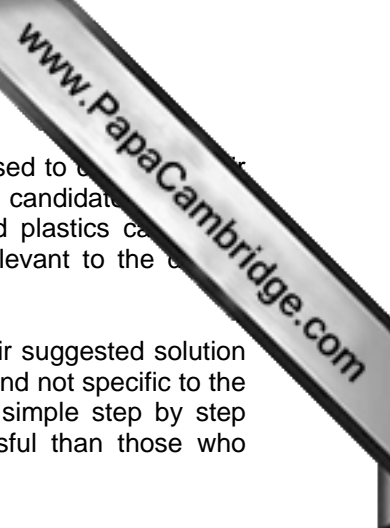
The intention of these design questions is that candidates should be allowed a wide interpretation of the situations as set out in the information provided for each question so that they can be as creative as possible. The Examiner has no prescribed view of what the outcomes should be and all proposals are marked in a very positive way.

Comments on specific questions

Question 1

The majority of candidates who opted for this question were clearly familiar with the design requirements for textbook storage systems and appeared to have few problems using the information provided.

- (a) Functional aspects in addition to those given in the question included: easy to remove books; match surroundings; correct height; closed/covered to keep out dust; easy to read titles; transparent front; etc.
- (b) Candidates had little difficulty in showing two methods by which items could be fixed securely to walls and these included: screws through back; brackets underneath; screw plates; bolts into wall; cantilever pins; runner systems; etc.
- (c) As has been mentioned before, it is possible for candidates to be awarded maximum marks for the presentation of just three different ideas. The majority of candidates did just this and showed that they were able to be quite creative in their approach to the design problem. For the award of high marks, candidates are required to present high-quality drawings using a wide range of drawing techniques with clear annotation supporting the detail of each idea.
- (d) The majority of candidates carried out meaningful evaluations and in many cases did so by identifying advantages and disadvantages of each idea. This was then followed by the selection of their chosen idea with reasons given. There are still a few cases of candidates presenting a table of tick boxes where the designs are judged against three or four criteria. However, in these cases the Examiner can award a maximum of just three marks out of the six available.
- (e) The Examiner is pleased to report that responses to this important part of the design process continue to improve with candidates providing more information on construction details than has been the case in previous examinations. Candidates used a range of drawing techniques to present their chosen idea and showed construction and other detail through the use of smaller drawings and annotation around the main drawing. This approach was often very effective.



- (f) Most candidates were able to suggest some of the materials that might be used to create their final product. As has been mentioned many times before, it is vital that candidates use **specific** materials and the use of generic terms such as wood, metal and plastics can only be awarded marks. Reasons for the choice of material must obviously be relevant to the design presented in the previous section.
- (g) Candidates were generally able to outline the manufacture of one part of their suggested solution but, unfortunately, some practical techniques were too general in description and not specific to the suggested design. Candidates who present the manufacturing process in simple step by step stages with tools identified in a meaningful way were often more successful than those who attempted to describe the process in a long paragraph .

Question 2

This question was intended for candidates following the Graphics Products option and it was anticipated that semi-resistant materials would be used for most solutions. Candidates sometimes had difficulty in converting the type of mechanism involved into a simple teaching aid.

- (a) The majority of candidates were able to identify four additional functional requirements of a model of this type and these included: simple in design; easy to create movement; all moving parts visible; parts labelled; will not wear out; large enough to see from back of class; etc.
- (b) Most candidates were able to show two moving joints for card or other lightweight materials including; stationery rivets; slots/followers; round pegs; folds; fabric hinges; etc.
- (c)
- (d) See **Question 1 (c) – (g)**
- (e)
- (f)
- (g)

Question 3

The topic for this systems and control question proved popular. Pull-along toy designs were generally suitable for young children and incorporated simple movement or sound effects.

- (a) Most candidates had little difficulty identifying additional points about the function of the pull-along toy and these included: easy to operate; stable in use; safe for children to operate; appealing to young children; colourful; hygienic; easy to clean; etc.
- (b) Candidates responded well to the identification of two different types of movement or sound generation including: springs; elastic; electric motors; buzzers; cams; gears; sliders; ratchets; etc.
- (c)
- (d)
- (e) See **Question 1 (c) – (g)**
- (f)
- (g)

DESIGN AND TECHNOLOGY

Paper 0445/21
Graphic Products 21

General Comments

Candidates were required to complete all questions in **section A** (A1, A2 and A3) and then go on to answer *either* B4 *or* B5 from **section B**. This instruction was not followed by all candidates.

Question B4 was the most popular of the option questions for candidates.

The standard of work was comparable to that of the previous year.

There are areas of the syllabus, however, where further improvements are needed. These include, in particular, drawing accurately circles touching other circles and straight lines. The graphical presentation of data is an area that appears to be less well known by many candidates. Furthermore, an experience of cutting out and making Graphic Products would benefit candidates taking this examination.

Centres are requested not to secure the papers together with string, staples or the use of a treasury tag.

Comments on specific questions

Question A1

Filling station Logo

Most candidates attempted this question with many scoring more than 4 marks. The drawing of the body of the pump was achieved by many but not always to size. All candidates managed to add a radius to the top of the body but few showed any construction of a radius to two straight lines. Nearly all candidates drew a hexagon with a majority drawing a regular hexagon of 30 side. A number of different methods were used to draw the second pump handle.

Question A2

'Station' - lettering

This question was attempted by all candidates giving them the opportunity to show their expertise at lettering. The letter 'O' proved to be difficult for candidates who did not 'crate' the available space. One mark was awarded for each correctly shaped letter and one mark each for spacing and height alignment.

Question A3

Rectangular Envelope

Unfortunately not all candidates attempted this compulsory question losing the 10 marks available. Some candidates failed to draw a development to the sizes given. Many candidates scored low marks on this compulsory question.

- (a) The question required an accurate rectangle to be drawn 88 x 54. A graphical method of determining the centre of the semi-circles and the careful setting of a compass should have given arcs of R44 and R27.
- (b) Had the candidates experienced the cutting out and making of a protective envelope such as this, they would know how the folding and slotting together of the two parts makes a rigid Graphic Product.

Question B4

Advertising Postcard

This was, by far the most popular of the two choice questions. A full range of marks was seen for this question.

This question clearly showed the application of a 'Graphical Product' to a reasonably common requirement.

- (a) Many candidates failed to use a graphical method of dividing a line to put in the fold lines
- (b) Many candidates produced a drawing showing the logo given. Unfortunately, many candidates copied the sizes and not the dimensions from the logo given. The best solutions were from candidates who started by drawing the image of the person first and then added the fuel pump in alignment with this image. Many candidates failed to draw the 70 x 75 rectangle.
- (c) Very few candidates drew a graphical visual chart representing the data given.

The quantities of *Last year's fuel sales* were deliberately given so that they would fit into a pie chart of 180° (900 000 litres) Petrol, 60° (300 000 litres) LPG, 30° (150 000 litres) Engine Oil and 90° (450 000 litres) Diesel Oil.

It was hoped that the *loyalty points* data would be presented as a bar chart (as either 2D or 3D) A small number of candidates did manage to represent the data in this graphical format.

Question B5

Counter top display unit

This question was attempted by a small number of candidates.

- (a) (i) A number of candidates managed to get the body of the car correct with the semi ellipse correctly positioned. The drawing of the tail fin with the two arcs touching, appeared to be very challenging for many candidates.
- (ii) Most candidates drew a plan in projection to the front view. Very few candidates however, managed to draw the foam-board to the correct thickness.
- (b) Many candidates produced an orthographic symbol. Unfortunately very few drew a symbol that matched the projection used.
- (c) A small number of candidates drew a method of joining the jet car to the base. Not all solutions drawn would have worked in practice.

Had the candidates experienced the cutting out and making a display unit of this type, they would know how the main body and the base could be joined together by the use of slots and shouldered tabs. The making of this type of 3D Graphic Product is highly recommended.

DESIGN AND TECHNOLOGY

Paper 0445/22
Graphic Products 22

General Comments

Candidates were required to complete all questions in **section A** (A1, A2 and A3) and then go on to answer *either* B4 or B5 from **section B**. This instruction was not followed by all candidates.

Question B4 was the most popular of the option questions for candidates.

The standard of work was comparable to that of the previous year.

There are areas of the syllabus, however, where further improvements are needed. These include, in particular, drawing accurately circles touching other circles and straight lines. The graphical presentation of data is an area that appears to be less well known by many candidates. Furthermore, an experience of cutting out and making Graphic Products would benefit candidates taking this examination.

Centres are requested not to secure the papers together with string, staples or the use of a treasury tag.

Comments on specific questions

Question A1

Filling station Logo

Most candidates attempted this question with many scoring more than 4 marks. The drawing of the body of the pump was achieved by many but not always to size. All candidates managed to add a radius to the top of the body but few showed any construction of a radius to two straight lines. Nearly all candidates drew a hexagon with a majority drawing a regular hexagon of 30 side. A number of different methods were used to draw the second pump handle.

Question A2

'Station' - lettering

This question was attempted by all candidates giving them the opportunity to show their expertise at lettering. The letter 'O' proved to be difficult for candidates who did not 'crate' the available space. One mark was awarded for each correctly shaped letter and one mark each for spacing and height alignment.

Question A3

Rectangular Envelope

Unfortunately not all candidates attempted this compulsory question losing the 10 marks available. Some candidates failed to draw a development to the sizes given. Many candidates scored low marks on this compulsory question.

- (a) The question required an accurate rectangle to be drawn 88 x 54. A graphical method of determining the centre of the semi-circles and the careful setting of a compass should have given arcs of R44 and R27.
- (b) Had the candidates experienced the cutting out and making of a protective envelope such as this, they would know how the folding and slotting together of the two parts makes a rigid Graphic Product.

Question B4

Advertising Postcard

This was, by far the most popular of the two choice questions. A full range of marks was seen for this question.

This question clearly showed the application of a 'Graphical Product' to a reasonably common requirement.

- (a) Many candidates failed to use a graphical method of dividing a line to put in the fold lines
- (b) Many candidates produced a drawing showing the logo given. Unfortunately, many candidates copied the sizes and not the dimensions from the logo given. The best solutions were from candidates who started by drawing the image of the person first and then added the fuel pump in alignment with this image. Many candidates failed to draw the 70 x 75 rectangle.
- (c) Very few candidates drew a graphical visual chart representing the data given.

The quantities of *Last year's fuel sales* were deliberately given so that they would fit into a pie chart of 180° (900 000 litres) Petrol, 60° (300 000 litres) LPG, 30° (150 000 litres) Engine Oil and 90° (450 000 litres) Diesel Oil.

It was hoped that the *loyalty points* data would be presented as a bar chart (as either 2D or 3D) A small number of candidates did manage to represent the data in this graphical format.

Question B5

Counter top display unit

This question was attempted by a small number of candidates.

- (a) (i) A number of candidates managed to get the body of the car correct with the semi ellipse correctly positioned. The drawing of the tail fin with the two arcs touching, appeared to be very challenging for many candidates.
- (ii) Most candidates drew a plan in projection to the front view. Very few candidates however, managed to draw the foam-board to the correct thickness.
- (b) Many candidates produced an orthographic symbol. Unfortunately very few drew a symbol that matched the projection used.
- (c) A small number of candidates drew a method of joining the jet car to the base. Not all solutions drawn would have worked in practice.

Had the candidates experienced the cutting out and making a display unit of this type, they would know how the main body and the base could be joined together by the use of slots and shouldered tabs. The making of this type of 3D Graphic Product is highly recommended.

DESIGN AND TECHNOLOGY

Paper 0445/23
Graphic Products 23

General Comments

Candidates were required to complete all questions in **section A** (A1, A2 and A3) and then go on to answer *either* B4 *or* B5 from **section B**. This instruction was not followed by all candidates.

Question B4 was the most popular of the option questions for candidates.

The standard of work was comparable to that of the previous year.

There are areas of the syllabus, however, where further improvements are needed. These include, in particular, drawing accurately circles touching other circles and straight lines. The graphical presentation of data is an area that appears to be less well known by many candidates. Furthermore, an experience of cutting out and making Graphic Products would benefit candidates taking this examination.

Centres are requested not to secure the papers together with string, staples or the use of a treasury tag.

Comments on specific questions

Question A1

MP3 player

Most candidates attempted this question with many scoring more than 4 marks. The drawing of the outline was achieved by many but not always to size. All candidates managed to add a screen on the given centre lines and the Ø50 navigating pad. Only a few candidates showed any construction of the second triangular button. Nearly all candidates drew a radius to all corners of the outline, but only a few candidates managed to accurately construct arcs to the straight lines.

Question A2

'Player'- lettering

This question was attempted by all candidates giving them the opportunity to show their expertise at lettering. The letters 'Y' and 'R' proved to be difficult for candidates who did not 'crate' the available space. One mark was awarded for each correctly shaped letter and one mark each for spacing and height alignment.

Question A3

Envelope

Unfortunately not all candidates attempted this compulsory question losing the 10 marks available. Some candidates failed to draw a development to the sizes given. Many candidates scored low marks on this compulsory question.

- (a) The question required an accurate square of 64 side to be drawn. A graphical method of determining the centre of the semi-circles and the careful setting of a compass should have given arcs of R32.
- (b) Had the candidates experienced the cutting out and making of a protective envelope such as this, they would know how the folding and slotting together of the two parts makes a rigid Graphic Product. The two given images should have prompted candidates towards the correct response.

Question B4

Advertising Postcard

This was, by far the most popular of the two choice questions. A full range of marks was seen for this question.

This question clearly showed the application of a 'Graphical Product' to a reasonably common requirement.

- (a) Many candidates failed to use a graphical method of dividing a line to put in the fold lines
- (b) Many candidates produced a drawing showing the company logo given. Unfortunately many candidates copied the sizes and not the dimensions from the logo given. The best solutions were from candidates who started by drawing the image of the person first and then added the MP3 player in alignment with this image. Many candidates failed to draw the 70 x 77 rectangle.
- (c) Very few candidates drew a graphical visual chart representing the data given.

The quantities of *Types of music available* were deliberately given so that they would fit into a pie chart of 180° (90) Pop, 60° (30) Rock, 30° (15) Indie and 90° (45) Dance.

It was hoped that the *download costs* data would be presented as a bar chart (as either 2D or 3D) A small number of candidates did manage to represent the data in this graphical format.

Question B5

Counter top display unit

This question was attempted by a small number of candidates.

- (a) (i) A number of candidates managed to get the body of the plane correct with the ellipse correctly positioned. The drawing of the tail fin with the two arcs touching, appeared to be very challenging for many candidates.
- (ii) Most candidates drew a plan in projection to the front view. Very few candidates however, managed to draw the foam-board to the correct thickness.
- (b) Many candidates produced an orthographic symbol. Unfortunately, very few drew a symbol that matched the projection used.
- (c) A small number of candidates drew a method of joining the aeroplane to the base. Not all solutions drawn would have worked in practice.

Had the candidates experienced the cutting out and making a display unit of this type, they would know how the main body and the base could be joined together by the use of slots and shouldered tabs. The making of this type of 3D Graphic Product is highly recommended.

DESIGN AND TECHNOLOGY

Paper 0445/31
Resistant Materials 31

General comments

Section A

This section tests a very wide area of knowledge concerned with materials, tools and processes used when working with resistant materials. Many candidates achieved fewer marks for this section than **section B** because they were unable to demonstrate the width of knowledge and understanding associated with wood, metal and plastics.

Section B

This section always has a number of questions with large mark allocations requiring a combination of clear and accurate sketches supported by detailed written notes. It is very important that candidates focus on the key requirements of each question and, in particular, provide details of materials, fittings and fixings when this is stated.

Comments on specific questions

Section A

Question 1

- (a) Candidates generally were able to draw two different types of screw head. Quality of sketching was varied.
- (b) Most candidates understood that the Phillips head screw would provide more positive grip.

Question 2

Most candidates were able to describe two checks that would be carried out to the coping saw; the most popular referring to the blade being tight and the teeth pointing in the required direction.

Question 3

- (a) It was clear that many candidates did understand what a tongue and groove joint looked like. Quality of sketching was varied.
- (b) There were many vague uses provided. The best answers referred to its use for flooring.

Question 4

The majority of candidates were able to identify three good working practices when using a drilling machine.

Question 5

- (a) Only a minority of candidates were able to name polyester resin or GRP for the boat hull.
- (b) Very few candidates could name urea or phenol formaldehyde as the thermoset used to make the light switch.

Question 6

- (a) There were very few accurate Tee hinges drawn. Some candidates incorrectly sketched a hinge.
- (b) Very few candidates named a large door or shed door for the Tee hinge. There were many answers naming a cupboard door which would have been inappropriate.

Question 7

- (a) and (b) Very few candidates could name the tools used to produce a screw thread in a hole or on a rod.
- (c) Some candidates thought that the purpose of the chamfer was to make it easier for a threaded rod to be inserted rather than it make the starting of cutting a thread easier.

Question 8

- (a) Only a small minority of candidates could name the claw hammer.
- (b) Most candidates recognised that the scrap wood would provide added leverage or that it would protect the surface of the wood.

Question 9

Many candidates gained at least one mark for showing one countersunk head rivet.

Question 10

Many candidates achieved one mark for showing at least a 'variation' of a bench hook.

Section B

Question 11

- (a) Many candidates were able to complete the cutting list accurately.
- (b)(i) There were many magnets and catches named to keep the door closed.

Very few candidates named a stay to hold the door horizontally but those who named a chain were rewarded.

Most candidates named a hinge, often specifically a butt hinge.
- (ii) Candidates were rewarded for showing an accurate sketch of one named component and how it would be fitted to the cabinet. Most chose a hinge and gave some accurate details. However, very few candidates provided a recess for the hinge and simply mounted it on the surface. Named tools were generally accurate.
- (c) The majority of candidates did not focus on the key words of the question: "...how the edges of the veneered MDF could be lipped..." and simply gave information relating to glasspapering and applying a finish. There were some good answers showing how a solid wood strip could be glued over the edges and the use of iron-on veneer.
- (d) Many candidates sketched a recognisable KD fitting and showed it in the correct position. The most popular was a plastic corner block. Dowel was not rewarded.
- (e)(i) There were many correct answers showing an appropriate construction; the most popular being some form of housing joint or mortise and tenon. For maximum three marks the sketch had to be accurately drawn.
- (ii) Generally the name of the construction matched the sketch.

Question 12

- (a) Very few candidates were able to name all six tools or items of equipment used in the construction of the mild steel tube base.
- (b) The most popular methods of holding the board against the base included the use of hinges and recesses with some form of pin to allow the board to pivot. Very often there was insufficient detail provided about materials, fittings and fixings used to gain more than two or three marks.
- (c) (i) and (ii) Most candidates named aluminium for the non-ferrous rod and provided a sensible advantage, the most common being that it would not rust and that it was easy to bend.
- (iii) Many candidates did not read the information in Fig. 2 carefully enough when showing how the ends of the support could be fitted to the base. The best answers showed the rod bend at 90° for two marks. Very often candidates used nuts and bolts which would have been difficult with Ø8 rod.
- (iv) It was not necessary to give information about marking out a length of Ø8 rod for the support, simply how to **make** it. The important information included details of a former around which the rod could be shaped, the method of force and how the rod was secured while it was shaped. It was not necessary to heat up non-ferrous rod in order to make a simple 90° bend.
- (d) Most candidates attempted to show a device that would hold the board securely at 30° and 45°.

The most common methods included the use of applied strips or recessed grooves in which the board could sit. Unfortunately many devices would not have held the board securely enough and candidates generally failed to provide details of materials, fittings and fixings used in their device.

Question 13

- (a) The best reasons for using MDF for a former were that it was stable and it had no grain and therefore it was smoother. Stating that it was cheaper than solid wood was rewarded.
- (b) Most candidates were able to describe one or two considerations to be taken when making a former for vacuum forming; the most popular referring to the need for rounded edges and corners and some form of taper or draught angle. Some candidates did describe the need for air holes.
- (c) Many candidates included details relating to the marking out of the former. This was not necessary. What was important was to provide information showing how the former could be cut from MDF using some type of saw and how the sawn edges could be smoothed and tapered to enable it to be released from the plastic after forming.
- (d) Only a small minority of candidates could name a specific type of drill or bit to cut a hole 10 mm deep.
- (e) This question was very poorly answered by most candidates who failed to read the question and accompanying information carefully enough. Most tried to drill out the slot right through the material and inserted a coping saw blade. The hole was only 6 mm deep. The best answers showed how a hole would be drilled 6 mm deep and the rest cleaned up using a chisel and mallet. There was also good use of a machine router and mortising machine that would carry out the whole process.
- (f) There were many excellent answers to this question. It was apparent that most candidates had a very good understanding of the vacuum forming process and were able to communicate this through very detailed sketches and notes.
- (g) Most candidates achieved one or two marks for showing a simple hole or grip that would enable the palette to be held using one hand.

DESIGN AND TECHNOLOGY

Paper 0445/32
Resistant Materials 32

General comments

Section A

This section tests a very wide area of knowledge concerned with materials, tools and processes used when working with resistant materials. Many candidates achieved fewer marks for this section than **section B** because they were unable to demonstrate the width of knowledge and understanding associated with wood, metal and plastics.

Section B

This section always has a number of questions with large mark allocations requiring a combination of clear and accurate sketches supported by detailed written notes. It is very important that candidates focus on the key requirements of each question and, in particular, provide details of materials, fittings and fixings when this is stated.

Comments on specific questions

Section A

Question 1

- (a) Candidates generally were able to draw two different types of screw head. Quality of sketching was varied.
- (b) Most candidates understood that the Phillips head screw would provide more positive grip.

Question 2

Most candidates were able to describe two checks that would be carried out to the coping saw; the most popular referring to the blade being tight and the teeth pointing in the required direction.

Question 3

- (a) It was clear that many candidates did understand what a tongue and groove joint looked like. Quality of sketching was varied.
- (b) There were many vague uses provided. The best answers referred to its use for flooring.

Question 4

The majority of candidates were able to identify three good working practices when using a drilling machine.

Question 5

- (a) Only a minority of candidates were able to name polyester resin or GRP for the boat hull.
- (b) Very few candidates could name urea or phenol formaldehyde as the thermoset used to make the light switch.

Question 6

- (a) There were very few accurate Tee hinges drawn. Some candidates incorrectly sketched a hinge.
- (b) Very few candidates named a large door or shed door for the Tee hinge. There were many answers naming a cupboard door which would have been inappropriate.

Question 7

- (a) and (b) Very few candidates could name the tools used to produce a screw thread in a hole or on a rod.
- (c) Some candidates thought that the purpose of the chamfer was to make it easier for a threaded rod to be inserted rather than it make the starting of cutting a thread easier.

Question 8

- (a) Only a small minority of candidates could name the claw hammer.
- (b) Most candidates recognised that the scrap wood would provide added leverage or that it would protect the surface of the wood.

Question 9

Many candidates gained at least one mark for showing one countersunk head rivet.

Question 10

Many candidates achieved one mark for showing at least a 'variation' of a bench hook.

Section B

Question 11

- (a) Many candidates were able to complete the cutting list accurately.
- (b) (i) There were many magnets and catches named to keep the door closed.

Very few candidates named a stay to hold the door horizontally but those who named a chain were rewarded.

Most candidates named a hinge, often specifically a butt hinge.
- (ii) Candidates were rewarded for showing an accurate sketch of one named component and how it would be fitted to the cabinet. Most chose a hinge and gave some accurate details. However, very few candidates provided a recess for the hinge and simply mounted it on the surface. Named tools were generally accurate.
- (c) The majority of candidates did not focus on the key words of the question: "...how the edges of the veneered MDF could be lipped..." and simply gave information relating to glasspapering and applying a finish. There were some good answers showing how a solid wood strip could be glued over the edges and the use of iron-on veneer.
- (d) Many candidates sketched a recognisable KD fitting and showed it in the correct position. The most popular was a plastic corner block. Dowel was not rewarded.
- (e) (i) There were many correct answers showing an appropriate construction; the most popular being some form of housing joint or mortise and tenon. For maximum three marks the sketch had to be accurately drawn.

(ii) Generally the name of the construction matched the sketch.

Question 12

- (a) Very few candidates were able to name all six tools or items of equipment used in the construction of the mild steel tube base.
- (b) The most popular methods of holding the board against the base included the use of hinges and recesses with some form of pin to allow the board to pivot. Very often there was insufficient detail provided about materials, fittings and fixings used to gain more than two or three marks.
- (c) (i) and (ii) Most candidates named aluminium for the non-ferrous rod and provided a sensible advantage, the most common being that it would not rust and that it was easy to bend.
- (iii) Many candidates did not read the information in Fig. 2 carefully enough when showing how the ends of the support could be fitted to the base. The best answers showed the rod bend at 90° for two marks. Very often candidates used nuts and bolts which would have been difficult with Ø8 rod.
- (iv) It was not necessary to give information about marking out a length of Ø8 rod for the support, simply how to **make** it. The important information included details of a former around which the rod could be shaped, the method of force and how the rod was secured while it was shaped. It was not necessary to heat up non-ferrous rod in order to make a simple 90° bend.
- (d) Most candidates attempted to show a device that would hold the board securely at 30° and 45°.

The most common methods included the use of applied strips or recessed grooves in which the board could sit. Unfortunately many devices would not have held the board securely enough and candidates generally failed to provide details of materials, fittings and fixings used in their device.

Question 13

- (a) The best reasons for using MDF for a former were that it was stable and it had no grain and therefore it was smoother. Stating that it was cheaper than solid wood was rewarded.
- (b) Most candidates were able to describe one or two considerations to be taken when making a former for vacuum forming; the most popular referring to the need for rounded edges and corners and some form of taper or draught angle. Some candidates did describe the need for air holes.
- (c) Many candidates included details relating to the marking out of the former. This was not necessary. What was important was to provide information showing how the former could be cut from MDF using some type of saw and how the sawn edges could be smoothed and tapered to enable it to be released from the plastic after forming.
- (d) Only a small minority of candidates could name a specific type of drill or bit to cut a hole 10 mm deep.
- (e) This question was very poorly answered by most candidates who failed to read the question and accompanying information carefully enough. Most tried to drill out the slot right through the material and inserted a coping saw blade. The hole was only 6 mm deep. The best answers showed how a hole would be drilled 6 mm deep and the rest cleaned up using a chisel and mallet. There was also good use of a machine router and mortising machine that would carry out the whole process.
- (f) There were many excellent answers to this question. It was apparent that most candidates had a very good understanding of the vacuum forming process and were able to communicate this through very detailed sketches and notes.
- (g) Most candidates achieved one or two marks for showing a simple hole or grip that would enable the palette to be held using one hand.

DESIGN AND TECHNOLOGY

Paper 0445/33
Resistant Materials 33

General comments

Section A

This section tests a very wide area of knowledge concerned with materials, tools and processes used when working with resistant materials. Many candidates achieved fewer marks for this section than **section B** because they were unable to demonstrate the width of knowledge and understanding associated with wood, metal and plastics.

Section B

This section always has a number of questions with large mark allocations requiring a combination of clear and accurate sketches supported by detailed written notes. It is very important that candidates focus on the key requirements of each question and, in particular, provide details of tools, materials, fittings and fixings when this is stated.

Comments on specific questions

Section A

Question 1

Candidates generally did not understand the advantages of both types of seasoning. The most common advantage of kiln seasoning was speed but answers about air seasoning tended to be vague.

Question 2

Most candidates were able to name plywood correctly but fewer named blockboard correctly.

Question 3

It was clear that many candidates did not know the purpose of a sliding bevel. However, there were some excellent sketches showing it used to mark out across the grain of the wood.

Question 4

- (a) The majority of candidates were able to give two reasons why plastic is suitable for children's toys; the most popular being its durability and inherent colour.
- (b) Many candidates named injection moulding correctly but there were some incorrect processes including vacuum forming and extrusion.

Question 5

Only a minority of candidates were able to complete the drawing of a bevel edge chisel. Many candidates achieved one mark for showing a bevel either along the length of the chisel or across its end.

Question 6

- (a) Very few candidates could give the cause of the cracking as workhardening. Many thought the metal had been bent too many times.
- (b) There were very few answers that suggested that the metal should be annealed. There were some good answers that stated that the metal should be heated to make it softer.

Question 7

Many candidates named the round or rat tail file correctly for the round hole and the warding, flat or hand file for the slot. Candidates were less accurate about naming the triangular or three square file for the third shape.

Question 8

Only a small minority of candidates could name the two standard metal sections. The most common answer simply gave the name of the shape; square or hexagonal, without reference to the tube or bar/rod respectively, for which some credit was given.

Question 9

Many candidates gained at least one mark for showing nuts to secure the wheels on the axle. Many answers did not label the parts correctly and there were many instances of nuts being used as washers.

Question 10

Many candidates achieved one mark for stating that the metal would need to be heated or left to cool. There were very few answers that described three important stages when plastic coating mild steel.

Section B

Question 11

- (a) Many candidates understood the benefits of self-assembly furniture to the manufacturer, the most popular being that it saved on labour costs or that it saved on storage space or that it meant savings could be passed on to the customer, making them competitive.
- (b) There were many good answers to this question, including personal satisfaction of self-assembly and that customers could collect and take the furniture home with them.
- (c) Many candidates achieved marks for this question. Few gained maximum four marks because of a lack of knowledge on how to make the edge of the wood flat and smooth. Many answers described using a file which is inappropriate. The wood must be planed using a smoothing or jack plane.
- (d) Many candidates achieved one mark for this question. Many recognised that the two screws would have hit each other or that the wood might split. Very rarely were two correct answers provided.
- (e) Most candidates identified one or two named holes correctly. Only a minority identified all three.
- (f) (i) Very few candidates understood that boards are joined because there is not the width available in solid wood.
 - (ii) Many candidates referred to the 'strength' of the boards rather than to the specific stability of the construction.
 - (iii) While many candidates achieved one or two marks for showing the arrangement of sash cramps when gluing the boards together, very few achieved maximum three marks.
 - (iv) There were many sensible reasons given for the use of scrap wood when clamping the boards together; the most popular being to prevent damage to the edges of the wood and to distribute the pressure more evenly.

- (g)(i) Most candidates gave information about the use of various grades of glass paper and received one or two marks. For maximum three marks information about wiping down between coats was important. Some candidates described how a finish would be applied. This was not required for the question.
- (ii) Many candidates named an appropriate finish and a reason for their choice. Varnish was the most popular finish and to enhance the appearance and to add protection the most popular reasons.

Question 12

- (a) The most popular choice of non-ferrous metal was aluminium and the reason was that it was easy to bend or did not corrode. There were also some ferrous metals named.
- (b) There was a wide range of marking out tools available for candidates to select. Most were not able to name three.
- (c) Although the best method of cutting out the metal frame was to use tin snips, some candidates selected hacksaws and guillotine which were acceptable. It was important that candidates showed how the work piece was supported. Marks were given for the accurate naming of tools and equipment used in the process.
- (d) Many candidates suggested the use of a vice and hammer to fold the sides of the photo frame. This was only partially successful as a former was also required.
- (e)(i) The most common finish for the frame was paint.
- (ii) The use of emery cloth and to thoroughly degrease the surface were two of the processes involved in preparing the metal to take the painted finish.
- (f)(i) and (ii) Most candidates achieved at least one or two marks for the modifications that would allow the photo frames to be wall-mounted and freestanding respectively. The main reason why few gained maximum three marks was due to the poor quality of communication in terms of sketches and notes.

Question 13

- (a)(i) Most candidates were able to draw the bend lines and the slot in the correct orientation.
- (ii) The most common correctly named marking out tools included felt marker, rule and try square.
- (iii) Most candidates understood the purpose of the backing sheet.
- (b) Easily formed, range of colours and attractive appearance were the most popular correct properties of acrylic.
- (c) The majority of candidates achieved some marks for this question. The best answers showed a hole drilled in the acrylic for a coping saw or Hegner saw blade. The slot would then be sawn out, filed and finished with wet and dry paper. Candidates who gave details of how the slot could be cut using a laser cutter received credit.
- (d) For three marks candidates could have described using a file to draw file the edges or use a scraper. This should be followed by wet and dry paper and finally polished using a polishing mop and polishing compound. There were instances where 'sandpaper' was incorrectly named.
- (e) Many candidates recognised that without clamping there was a danger that the sheet could snag, spin and possibly crack. Those candidates who only made vague references to personal injury received no marks.
- (f) This area of the syllabus is one in which many candidates seem confident; reflected in some excellent detailed answers. The level of accurate detail and clarity of sketches was generally the difference between those answers achieving high marks and those achieving low marks.

DESIGN AND TECHNOLOGY

Paper 0445/41
Systems and Control 41

General comments

Good responses were characterised by the use of appropriate technological terminology and were supported by examples drawn from candidates' experiences of processes, components and project work. The use of annotated sketches was important in good responses. One area of very good practice was in 'Mechanisms' where there was clear evidence of good teaching, preparation and practical application of knowledge. For the 'Electronics' question many responses were characterised by good levels of knowledge and understanding. Candidates' knowledge and understanding of 'Structures' were less satisfactory, and only a few candidates attempted this question.

Comments on specific questions

Section A

Question 1

- (a) Most candidates correctly identified rotary and reciprocating motion.

Question 2

- (a) Most candidates identified the eccentric cam
(b) Many candidates were able name the roller follower.

Question 3

Most candidates identified three appropriate examples but some responses were unspecific and did not therefore warrant full marks.

Question 4

Most candidates correctly explained the need for lubrication in mechanical systems.

Question 5

- (a) Most candidates correctly sketched/identified an example of frame and shell structures from the Figure.
(b)(i) Most candidates were able to identify Tension as the force acting in the cable.
(ii) Many candidates were able to define the term "Moments".

Question 6

Many candidates were able to explain the need for triangulation in structures.

Question 7

Most candidates were able to name either DTI or Strain Gauge as methods of accurate measurement of deflection in structures.

Question 8

Most candidates correctly identified the units of current and were able to name the Voltmeter as a measuring device for Voltage but few were able to identify the use of a multimeter to measure resistance when checking the continuity of an electrical lead.

Question 9

- (a) Most candidates correctly identified the LDR (Light dependent resistor).
- (b) Some candidates were able to explain the use of the diode to prevent damage to the transistor from back emf generated from the buzzer coil.

Question 10

Many candidates correctly sketched the symbol for an AND gate.

Section B

Question 11

- (a) Most candidates were able to name the reed switch, many were able to explain the use of the tilt switch in alarms to detect movement, but only a few were able to fully sketch the membrane panel in sufficient detail to warrant full marks.
- (b) Some candidates correctly drew a circuit diagram showing the operation of a slider switch to select different functions within a circuit.
- (c) (i) Most candidates correctly explained the operation of a transistor.
(ii) Most candidates were able to draw and label an NPN transistor.
- (d) Very few candidates were able to explain how the use of a heat sink would reduce the hazards of damaging a transistor during soldering.
- (e) Most candidates were able to give an appropriate example of the use of logic gates.
- (f) (i) Many candidates correctly identified the OR gate.
(ii) Many candidates correctly completed the Truth table for an OR gate.
(iii) Most candidates correctly sketched the logic symbol for an OR gate.

Question 12

- (a) Most candidates correctly completed the table describing the motion of the pulley systems.
- (b) Some candidates correctly calculated the driven pulley speed but some candidates were confused about the velocity ratio and consequently determined the value incorrectly to be decreased.
- (c) (i) Some candidates were able to specify an appropriate use for small pulley system belts.
(ii) Most candidates correctly explained the use of the “V” pulley belt for larger machinery.
(iii) Most candidates were able to give an appropriate example of the use of a “V” belt.
- (d) (i) Few candidates were able to determine the VR for the system shown.
(ii) Few candidates were able to identify that the output speed would be decreased.
(iii) Most candidates were able to show the use of an idler gear to enable to output motion direction to be the same as the input motion direction.

- (e) (i) Most candidates correctly named an appropriate application for the ratchet and pawl system.
- (ii) Most candidates were able to explain the purpose of a ratchet and pawl system.
- (iii) Most candidates correctly sketched and labelled a ratchet and pawl system.

Question 13

- (a) Few candidates correctly identified the cantilever system.
- (b) Few candidates were able to redraw the system showing tension, compression and load for a cantilever.
- (c) Most candidates were able to explain the term equilibrium.
- (d) Few candidates correctly calculated the reaction at the wall.
- (e) Few candidates were able to explain the choice of tubing for the towel rail in terms of strength to weight ratio.
- (f) (ii) Few candidates were able to identify the need to distribute the loading on the wall mount to maximise stability.
 - (iii) Few candidates were able to identify torsion as the force applied by the screwdriver.
 - (iv) Few candidates were able to explain how the screw could shear off at either the head or across its shaft.
- (g) (i) Some candidates were able explain how the triangular shape promotes stability and allows forces to be better distributed.
 - (ii) Few candidates were able to explain how the legs would be prevented from splaying by the rail and thus making a more stable and rigid structure avoiding failure.
 - (iii) Few candidates were able to identify the use of folding of sheet material to promote greater structural rigidity.
 - (iv) Few candidates were able to explain the effect of loading on one of the ladder treads showing load and reactions in schematic or 3D terms.

DESIGN AND TECHNOLOGY

Paper 0445/42
Systems and Control 42

General comments

Good responses were characterised by the use of appropriate technological terminology and were supported by examples drawn from candidates' experiences of processes, components and project work. The use of annotated sketches was important in good responses. One area of very good practice was in 'Mechanisms' where there was clear evidence of good teaching, preparation and practical application of knowledge. For the 'Electronics' question many responses were characterised by good levels of knowledge and understanding. Candidates' knowledge and understanding of 'Structures' were less satisfactory, and only a few candidates attempted this question.

Comments on specific questions

Section A

Question 1

- (a) Most candidates correctly identified rotary and reciprocating motion.

Question 2

- (a) Most candidates identified the eccentric cam.
(b) Many candidates were able name the roller follower.

Question 3

Most candidates identified three appropriate examples but some responses were unspecific and did not therefore warrant full marks.

Question 4

Most candidates correctly explained the need for lubrication in mechanical systems.

Question 5

- (a) Most candidates correctly sketched/identified an example of frame and shell structures from the Figure.
(b)(i) Most candidates were able to identify Tension as the force acting in the cable.
(ii) Many candidates were able to define the term "Moments".

Question 6

Many candidates were able to explain the need for triangulation in structures.

Question 7

Most candidates were able to name either DTI or Strain Gauge as methods of accurate measurement of deflection in structures.

Question 8

Most candidates correctly identified the units of current and were able to name the Voltmeter as a measuring device for Voltage but few were able to identify the use of a multimeter to measure resistance when checking the continuity of an electrical lead.

Question 9

- (a) Most candidates correctly identified the LDR (Light dependent resistor).
- (b) Some candidates were able to explain the use of the diode to prevent damage to the transistor from back emf generated from the buzzer coil.

Question 10

Many candidates correctly sketched the symbol for an AND gate.

Section B

Question 11

- (a) Most candidates were able to name the reed switch, many were able to explain the use of the tilt switch in alarms to detect movement, but only a few were able to fully sketch the membrane panel in sufficient detail to warrant full marks.
- (b) Some candidates correctly drew a circuit diagram showing the operation of a slider switch to select different functions within a circuit.
- (c) (i) Most candidates correctly explained the operation of a transistor.
(ii) Most candidates were able to draw and label an NPN transistor.
- (d) Very few candidates were able to explain how the use of a heat sink would reduce the hazards of damaging a transistor during soldering.
- (e) Most candidates were able to give an appropriate example of the use of logic gates.
- (f) (i) Many candidates correctly identified the OR gate.
(ii) Many candidates correctly completed the Truth table for an OR gate.
(iii) Most candidates correctly sketched the logic symbol for an OR gate.

Question 12

- (a) Most candidates correctly completed the table describing the motion of the pulley systems.
- (b) Some candidates correctly calculated the driven pulley speed but some candidates were confused about the velocity ratio and consequently determined the value incorrectly to be decreased.
- (c) (i) Some candidates were able to specify an appropriate use for small pulley system belts.
(ii) Most candidates correctly explained the use of the "V" pulley belt for larger machinery.
(iii) Most candidates were able to give an appropriate example of the use of a "V" belt.
- (d) (i) Few candidates were able to determine the VR for the system shown.
(ii) Few candidates were able to identify that the output speed would be decreased.
(iii) Most candidates were able to show the use of an idler gear to enable to output motion direction to be the same as the input motion direction.

- (e) (i) Most candidates correctly named an appropriate application for the ratchet and pawl system.
- (ii) Most candidates were able to explain the purpose of a ratchet and pawl system.
- (iii) Most candidates correctly sketched and labelled a ratchet and pawl system.

Question 13

- (a) Few candidates correctly identified the cantilever system.
- (b) Few candidates were able to redraw the system showing tension, compression and load for a cantilever.
- (c) Most candidates were able to explain the term equilibrium.
- (d) Few candidates correctly calculated the reaction at the wall.
- (e) Few candidates were able to explain the choice of tubing for the towel rail in terms of strength to weight ratio.
- (f) (ii) Few candidates were able to identify the need to distribute the loading on the wall mount to maximise stability.
 - (iii) Few candidates were able to identify torsion as the force applied by the screwdriver.
 - (iv) Few candidates were able to explain how the screw could shear off at either the head or across its shaft.
- (g) (i) Some candidates were able explain how the triangular shape promotes stability and allows forces to be better distributed.
 - (ii) Few candidates were able to explain how the legs would be prevented from splaying by the rail and thus making a more stable and rigid structure avoiding failure.
 - (iii) Few candidates were able to identify the use of folding of sheet material to promote greater structural rigidity.
 - (iv) Few candidates were able to explain the effect of loading on one of the ladder treads showing load and reactions in schematic or 3D terms.

DESIGN AND TECHNOLOGY

Paper 0445/43
Systems and Control 43

General comments

Good responses were characterised by the use of appropriate technological terminology and were supported by examples drawn from candidates' experiences of processes, components and project work. The use of annotated sketches was important in good responses. One area of very good practice was in 'Mechanisms' where there was clear evidence of good teaching, preparation and practical application of knowledge. For the 'Electronics' question many responses were characterised by good levels of knowledge and understanding. Candidates' knowledge and understanding of 'Structures' were less satisfactory, and only a few candidates attempted this question.

Comments on specific questions

Section A

Question 1

- (a) Most candidates correctly identified rotary and reciprocating motion.

Question 2

- (a) Most candidates identified the eccentric cam.
(b) Many candidates were able name the roller follower.

Question 3

Most candidates identified three appropriate examples but some responses were unspecific and did not therefore warrant full marks.

Question 4

Most candidates correctly explained the need for lubrication in mechanical systems.

Question 5

- (a) Most candidates correctly sketched/identified an example of frame and shell structures from the Figure.
(b)(i) Most candidates were able to identify Tension as the force acting in the cable.
(ii) Many candidates were able to define the term "Moments".

Question 6

Many candidates were able to explain the need for triangulation in structures.

Question 7

Most candidates were able to name either DTI or Strain Gauge as methods of accurate measurement of deflection in structures.

Question 8

Most candidates correctly identified the units of current and were able to name the Voltmeter as a measuring device for Voltage but few were able to identify the use of a multimeter to measure resistance when checking the continuity of an electrical lead.

Question 9

- (a) Most candidates correctly identified the LDR (Light dependent resistor).
- (b) Some candidates were able to explain the use of the diode to prevent damage to the transistor from back emf generated from the buzzer coil.

Question 10

Many candidates correctly sketched the symbol for an AND gate.

Section B

Question 11

- (a) Most candidates were able to name the reed switch, many were able to explain the use of the tilt switch in alarms to detect movement, but only a few were able to fully sketch the membrane panel in sufficient detail to warrant full marks.
- (b) Some candidates correctly drew a circuit diagram showing the operation of a slider switch to select different functions within a circuit.
- (c) (i) Most candidates correctly explained the operation of a transistor.
(ii) Most candidates were able to draw and label an NPN transistor.
- (d) Very few candidates were able to explain how the use of a heat sink would reduce the hazards of damaging a transistor during soldering.
- (e) Most candidates were able to give an appropriate example of the use of logic gates.
- (f) (i) Many candidates correctly identified the OR gate.
(ii) Many candidates correctly completed the Truth table for an OR gate.
(iii) Most candidates correctly sketched the logic symbol for an OR gate.

Question 12

- (a) Most candidates correctly completed the table describing the motion of the pulley systems.
- (b) Some candidates correctly calculated the driven pulley speed but some candidates were confused about the velocity ratio and consequently determined the value incorrectly to be decreased.
- (c) (i) Some candidates were able to specify an appropriate use for small pulley system belts.
(ii) Most candidates correctly explained the use of the “V” pulley belt for larger machinery.
(iii) Most candidates were able to give an appropriate example of the use of a “V” belt.
- (d) (i) Few candidates were able to determine the VR for the system shown.
(ii) Few candidates were able to identify that the output speed would be decreased.
(iii) Most candidates were able to show the use of an idler gear to enable to output motion direction to be the same as the input motion direction.

- (e) (i) Most candidates correctly named an appropriate application for the ratchet and pawl system.
- (ii) Most candidates were able to explain the purpose of a ratchet and pawl system.
- (iii) Most candidates correctly sketched and labelled a ratchet and pawl system.

Question 13

- (a) Few candidates correctly identified the cantilever system.
- (b) Few candidates were able to redraw the system showing tension, compression and load for a cantilever.
- (c) Most candidates were able to explain the term equilibrium.
- (d) Few candidates correctly calculated the reaction at the wall.
- (e) Few candidates were able to explain the choice of tubing for the towel rail in terms of strength to weight ratio.
- (f) (ii) Few candidates were able to identify the need to distribute the loading on the wall mount to maximise stability.
 - (iii) Few candidates were able to identify torsion as the force applied by the screwdriver.
 - (iv) Few candidates were able to explain how the screw could shear off at either the head or across its shaft.
- (g) (i) Some candidates were able explain how the triangular shape promotes stability and allows forces to be better distributed.
 - (ii) Few candidates were able to explain how the legs would be prevented from splaying by the rail and thus making a more stable and rigid structure avoiding failure.
 - (iii) Few candidates were able to identify the use of folding of sheet material to promote greater structural rigidity.
 - (iv) Few candidates were able to explain the effect of loading on one of the ladder treads showing load and reactions in schematic or 3D terms.

DESIGN AND TECHNOLOGY

Paper 0445/05
School Based Assessment

General comments

A good range of work was submitted for moderation with projects scoring between 20 and 100 marks. The overall standard of work was comparable with previous examination sessions. It was clear that there are many talented designers who have been well supported by their teachers.

The work covered all of the material areas, although Resistant Materials work was the most common. Architectural and environmental models were also very popular. A number of candidates presented work with multiple outcomes e.g. a poster, a display stand and a tee shirt. This approach is acceptable providing the products are linked to a single design situation, such as promotional material for a holiday company, and the emphasis is on *'quality'* rather than *'quantity'*.

The coursework samples and documentation were generally correctly presented for moderation and many Centres had their marks confirmed by the moderation process. Centres are, however, reminded of the following key points:

1. Centres must include both the Coursework Assessment Summary Form (0445/05/CW/09) and the Moderator copy of form MS1 with the sample of work. Without these two documents moderation cannot proceed.
2. The individual assessment objective scores must be recorded on the Coursework Assessment Summary Form and the totals checked. Fortunately, significantly fewer errors were found in the addition of marks this session.
3. If more than one teacher is involved in the delivery of the subject all work must be internally moderated to establish a reliable rank order.
4. Marks should not be awarded if there is no supporting evidence in the folder. For example, a small number of Centres gave high marks for the Development of proposed solution when there was little or no evidence to support the judgement.
5. The vast majority of projects were A3 in size. It is acceptable to use A4 size paper but a mixture of A3 and A4 sheets is discouraged. Regardless of the size of paper used the work should be arranged in order and securely fastened together.
6. Folders should not contain excessive *'padding'*. Printing of information from the Internet or copying from a text book is of little value unless it has been analysed and conclusions drawn.
7. Photographic evidence should record both progress in making and the final outcome. In some cases the photographs were of a quality that may not have done justice to the product.

Comments on specific questions

Identification of a need

Almost all candidates successfully completed this assessment objective and Centre assessment of this objective was usually in line with the awarding body standards. It is, however, important that maximum marks are not given unless both the need and the user are fully considered. Many candidates found it particularly challenging to clearly express the design need. Superficial mention of a user, for example 'My uncle...', may not justify the award of maximum marks.

Research into the design brief resulting in a specification

Candidates produced a wide range of responses to this assessment objective. Typically, these responses included a questionnaire, collection of relevant information and a specification. All candidates should be encouraged to analyse their research and draw conclusions that lead to the formation of the specification.

The specification should be a clear and concise list of points that define the final design requirements. It should not contain vague statements.

Generation of ideas

The majority of candidates produced a range of design ideas, with appropriate evaluation that led to the selection of one idea. Candidates should be encouraged to use their specification to evaluate their design ideas. Subjective comments, such as 'I like this one', should be discouraged.

Candidates should also be discouraged from focussing on a single concept or producing ideas that are very similar to an existing product. A range of imaginative ideas is required for the top marks.

Pencil and crayon sketches were a common method of recording ideas, although a number of Centres used more formal drawing or simple CAD drawings. Some outstanding graphical skills were seen in this objective.

Development of proposed solution

This assessment objective was, once again, the weakest section in many folders. High marks should not be awarded unless a candidate has carried out testing and trialling in order to make reasoned decisions about form, materials and production methods.

In many cases decisions had clearly been made but the process was not evident. For example, the sizes of the product were determined but there was no indication of how these decisions were reached. It was also common to see candidates simply listing alternative methods of construction or finishes.

The production and evaluation of simple models and mock-ups may assist candidates in demonstrating capability in this objective. Digital photographs of the models and mock-ups should be included in the folder.

Planning for production

This assessment objective was a real strength in many folders. Typically, candidates produced orthographic or exploded drawings, a materials list and some form of flow chart to identify the stages in making. For the award of top marks these drawings should accurately define the product to the extent where it could be made by a 'skilled third party'.

In some cases there were omissions or discrepancies between the drawings and the materials list. Candidates are advised to cross check these before the realisation begins.

Product realisation

A wide range of products were seen that were mainly made from wood and plastics. The use of metal or electronic components was less common. There was clear evidence that a wide range of tools and equipment were appropriately used to shape, join and finish the materials.

It is essential that good quality photographic evidence records both progress in making and the final outcome.

Testing and evaluation

Responses to this assessment objective were very variable. Many candidates compared the product to their design specification, carried out some form of testing and then made recommendations for further development. In some cases testing was largely superficial in that it did not take account of the views of users or show the product in the environment for which it was designed. Many evaluation comments were subjective (*I think...*) rather than objective (*My questionnaire showed the users...*).

Effective testing should quite naturally lead to proposals for further development.