DESIGN AND TECHNOLOGY

Paper 0445/11
Design

General comments

The majority of candidates were well prepared. They responded as appropriate on the A3 pre-printed answer sheets and scripts were generally well presented. Candidates should avoid evaluating design ideas as part of their responses to part **(c)** as this should be carried out in part **(d)**. 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 intention of these questions is that candidates are allowed a wide interpretation of the design situations, as set out in the information provided for each question, so that they can be as creative as possible. There is no prescribed view of what the outcomes should be and all proposals are regarded positively.

Comments on specific questions

Question 1

The majority of candidates who opted for this question were familiar with most of the design requirements for a parcel storage system of this type. However, some of the solutions were not in keeping with the environs of a house even when this had been acknowledged as an additional functional point. There were some innovative ideas such as a non-returnable flap; other solutions overlooked the problem of the postman not needing to have a key to access the unit.

(a) Functional aspects, in addition to those given in the question, included: easy access; away from door; keep contents dry; can be locked by postman without key; in keeping with house; not an eyesore; etc. General functions such as: 'must be safe' do not earn credit.

(b) Most candidates were able to identify two different locking devices including: padlock; combination lock; self locking catch; deadlock; night latch; bolts; etc.

(c) It is possible for candidates to be awarded maximum marks for the presentation of just three different ideas. The majority of candidates did just that 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 pros and cons or advantages and disadvantages of each idea. This was then followed up by the selection of their chosen idea with reasons given. It is important that responses to this part are evaluations of the design ideas and not simply descriptions, as was sometimes the case. Sometimes candidates present a table of tick boxes where the designs are judged against three or four criteria, thereby limiting the number of marks available to them.

(e) Responses to this important part of the design process continue to improve wi providing more information on constructional details than has been the case i examinations. Candidates used a range of drawing techniques to present their chosen often showed construction and other detail through the use of smaller drawings and anno around the main drawing. This approach was normally very effective.

(f) Most candidates were able to suggest some of the materials that might be used to construct their final product. It is important that candidates suggest specific materials rather than generic terms such as wood, metal and plastics, which do not gain credit. Reasons for the choice of material clearly need to be relevant to the design presented in the previous section.

(g) Most candidates were generally able to outline the manufacture of one part of their suggested solution; in some cases the practical techniques were too general in description and not specific to the suggested design. Candidates who presented 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 one long paragraph.

Question 2

This question was intended for candidates following the Graphic Products option and it was anticipated that semi-resistant materials would be used for most solutions. Candidates generally realised that the feature required a fair degree of impact to encourage children to eat certain foods and the solution often included cartoon type characters to good effect. In some cases, designs were rather too simplistic without attention to the detail of how the menu would be constructed. The standard of drawing skills was often not as high as might be expected from candidates following a Graphics option.

(a) The majority of candidates were able to identify four additional functional requirements of the menu and these included: colourful; attract attention of child; easy for child to handle; keeps clean; hygienic; stable on table; etc.

(b) Most candidates were able to show two types of card mechanism including: sliding parts; pivots, fold out; levers; cams; simple gears; etc.

(c))

(d) See **Question 1 (c) – (g)**

(e))

(f))

(g))

Question 3

The requirements for the simple lifting device were such that candidates needed to make use of their knowledge and experience of mechanical systems and structures in some way. Designs proposed were generally suitable for the situation as set and most included some form of mechanical advantage. Some candidates did not consider the size and nature of sacks, and mechanical detail of the solution was often missing.

(a) **C**andidates were generally able to identify additional points about the function of the lifting device and these included: easy to move around; minimal input force; cannot tip over in use; can be locked in position; use on range of vehicle heights/types; compact or folds for easy storage; etc.

(b) Most candidates were able to draw two different mechanisms that might be part of a lifting device including; winch; rack and pinion; block and tackle, levers, screw threads; pulley/chain systems; etc.

(c))

(d))

(e)) See **Question 1 (c) – (g)**

(f))

(g))

DESIGN AND TECHNOLOGY

Paper 0445/12

Design

General comments

The majority of candidates were well prepared. They responded as appropriate on the A3 pre-printed answer sheets and scripts were generally well presented. Candidates should avoid evaluating design ideas as part of their responses to part **(c)** as this should be carried out in part **(d)**. 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 intention of these questions is that candidates are allowed a wide interpretation of the design situations, as set out in the information provided for each question, so that they can be as creative as possible. There is no prescribed view of what the outcomes should be and all proposals are regarded positively.

Comments on specific questions

Question 1

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

(a) Functional aspects in addition to those given in the question included: easy access under car; can be moved by worker; take a person's weight; comfortable in use; easy access to tools; low to ground; head rest built in; lock in position; include a light; etc.

(b) Most candidates were able to identify two methods by which a device of this nature might move and these included: small wheels; castors; skis; rollers; air cushion; track systems; etc.

(c) It is possible for candidates to be awarded maximum marks for the presentation of just three different ideas. The majority of candidates did just that 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 pros and cons or advantages and disadvantages of each idea. This was then followed up by the selection of their chosen idea with reasons given. It is important that responses to this part are evaluations of the design ideas and not simply descriptions, as was sometimes the case. Sometimes candidates present a table of tick boxes where the designs are judged against three or four criteria, thereby limiting the number of marks available to them.

(e) Responses to this important part of the design process continue to improve with candidates providing more information on constructional details than has been the case in previous examinations. Candidates used a range of drawing techniques to present their chosen idea and often showed construction and other detail through the use of smaller drawings and annotation around the main drawing. This approach was normally very effective.

(f) Most candidates were able to suggest some of the materials that might be used to construct their final product. It is important that candidates suggest specific materials rather than generic terms such as wood, metal and plastics, which do not gain credit. Reasons for the choice of material clearly need to be relevant to the design presented in the previous section.

(g) Most candidates were generally able to outline the manufacture of one part of th solution; in some cases the practical techniques were too general in description and no the suggested design. Candidates who presented the manufacturing process in simple step stages with tools identified in a meaningful way were often more successful than thos attempted to describe the process in one long paragraph.

Question 2

This question was intended for candidates following the Graphic Products option and it was anticipated that semi-resistant materials would be used for most solutions. Candidates generally realised that the feature required a fair degree of impact within or on the catalogue. The standard of drawing skills was often not as high as might be expected from candidates following a Graphics option.

(a) The majority of candidates were able to identify four additional functional requirements of the feature and these included: colourful; attract attention of reader; surprise when catalogue opened; skiing theme; simple design to keep down cost; flat when closed; etc.

(b) Most candidates were able to show two types of card mechanism including: sliding parts; pivots, fold out; levers; cams; simple gears; etc.

(c))

(d)) See **Question 1 (c) – (g)**

(e))

(f))

(g) **)**

Question 3

The requirements for the automatic watering system were such that candidates were able make use of their knowledge and experience of systems and control in some way. Designs proposed were generally suitable for the situation as set and most included some form of simple timing system.

(a) Most candidates had little difficulty identifying additional points about the function of the watering system and these included: easy to set up; correct amount of water given to plants; large holding tank; attached to mains supply; does not stop if power fails; include timer; adjust amount of water; etc.

(b) Ways of controlling the flow of water included: mechanical valve; gate; sluice; switched pump; holding cistern; solenoid valve; compression of hose; etc. Candidates needed to identify and sketch two different ways in order to access higher marks.

(c))

(d))

(e)) See **Question 1 (c) – (g)**

(f))

(g))

DESIGN AND TECHNOLOGY

Paper 0445/13

Design

General comments

The majority of candidates were well prepared. They responded as appropriate on the A3 pre-printed answer sheets and scripts were generally well presented. Candidates should avoid evaluating design ideas as part of their responses to part **(c)** as this should be carried out in part **(d)**. 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 intention of these questions is that candidates are allowed a wide interpretation of the design situations, as set out in the information provided for each question, so that they can be as creative as possible. There is no prescribed view of what the outcomes should be and all proposals are regarded positively.

Comments on specific questions

Question 1

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

(a) Functional aspects in addition to those given in the question included: easy access under car; can be moved by worker; take a person's weight; comfortable in use; easy access to tools; low to ground; head rest built in; lock in position; include a light; etc.

(b) Most candidates were able to identify two methods by which a device of this nature might move and these included: small wheels; castors; skis; rollers; air cushion; track systems; etc.

(c) It is possible for candidates to be awarded maximum marks for the presentation of just three different ideas. The majority of candidates did just that 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 pros and cons or advantages and disadvantages of each idea. This was then followed up by the selection of their chosen idea with reasons given. It is important that responses to this part are evaluations of the design ideas and not simply descriptions, as was sometimes the case. Sometimes candidates present a table of tick boxes where the designs are judged against three or four criteria, thereby limiting the number of marks available to them.

(e) Responses to this important part of the design process continue to improve with candidates providing more information on constructional details than has been the case in previous examinations. Candidates used a range of drawing techniques to present their chosen idea and often showed construction and other detail through the use of smaller drawings and annotation around the main drawing. This approach was normally very effective.

(f) Most candidates were able to suggest some of the materials that might be used to construct their final product. It is important that candidates suggest specific materials rather than generic terms such as wood, metal and plastics, which do not gain credit. Reasons for the choice of material clearly need to be relevant to the design presented in the previous section.

(g) Most candidates were generally able to outline the manufacture of one part of th solution; in some cases the practical techniques were too general in description and no the suggested design. Candidates who presented the manufacturing process in simple step stages with tools identified in a meaningful way were often more successful than thos attempted to describe the process in one long paragraph.

Question 2

This question was intended for candidates following the Graphic Products option and it was anticipated that semi-resistant materials would be used for most solutions. Candidates generally realised that the feature required a fair degree of impact within or on the catalogue. The standard of drawing skills was often not as high as might be expected from candidates following a Graphics option.

(a) The majority of candidates were able to identify four additional functional requirements of the feature and these included: colourful; attract attention of reader; surprise when catalogue opened; skiing theme; simple design to keep down cost; flat when closed; etc.

(b) Most candidates were able to show two types of card mechanism including: sliding parts; pivots, fold out; levers; cams; simple gears; etc.

(c))

(d)) See **Question 1 (c) – (g)**

(e))

(f))

(g) **)**

Question 3

The requirements for the automatic watering system were such that candidates were able make use of their knowledge and experience of systems and control in some way. Designs proposed were generally suitable for the situation as set and most included some form of simple timing system.

(a) Most candidates had little difficulty identifying additional points about the function of the watering system and these included: easy to set up; correct amount of water given to plants; large holding tank; attached to mains supply; does not stop if power fails; include timer; adjust amount of water; etc.

(b) Ways of controlling the flow of water included: mechanical valve; gate; sluice; switched pump; holding cistern; solenoid valve; compression of hose; etc. Candidates needed to identify and sketch two different ways in order to access higher marks.

(c))

(d))

(e)) See **Question 1 (c) – (g)**

(f))

(g))

DESIGN AND TECHNOLOGY

Paper 0445/21
Graphic Products

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***.

The standard of work was comparable to that of the previous year. There are areas of the syllabus in which further improvements are needed. Candidates must be able to understand information given in one graphical format and be able to draw the same item correctly in another graphical format and also to scale. Circles that touch other arcs and lines is another area that needs to be improved.

It is important that candidates have access to coloured pencils in the examination so that they can respond to questions where 'add colour to enhance your illustration' appears.

Comments on specific questions

Question A1

Most candidates completed the remaining letters V, A, L and S. The V and A were achieved reasonably well by nearly all candidates; the S required a framework or grid to help construct the curves accurately. Nearly all candidates drew the letters to the correct height for one mark; for the final mark, candidates needed to plan the spacing carefully.

Question A2

Many candidates completed the octagonal outline of the sign. Not all the octagons drawn were regular. The drawing of the aircraft fuselage scored one mark for overall length and one mark for the correct width. The nose of the fuselage needed to be a full semi-circle and the tail of the fuselage an R30 quadrant. Most candidates managed to draw the tail angle at 30º. The wings of the aircraft appeared to be difficult for some candidates to draw. Wings that were drawn 20 back from the centre line and 60 x60 x 45ºon each side of the fuselage were given full credit.

Question A3

Some candidates missed out this question, losing the 10 marks available.

Many candidates drew circles that were 66 apart and equidistant about the centre line to score 2 marks

A few candidates drew an arc of R68 from each centre to find the centre of the R40 that would touch the Ø56.

Very few candidates drew a modification to the mask that would work. The best answers showed a modification that fitted the bridge of the nose better by adding a triangular piece.

Question B4

This question was derived from an actual 'Graphic Product' used in fast-food outlets.

This question was attempted by approximately half of the candidates. Candidates gained a wide range of marks for their answers.

(a) Many candidates drew the plan and elevation of the tray correctly to a scale of 1:2 number of candidates did not orientate the tray so that the elevation displayed the ope order that the thickness of the card could be awarded marks.

(b) The centre lines for the four holes needed to be 50 (to scale 25) in from each side. The cup needed to be drawn so that the top Ø80 (to scale Ø40) was positioned in the correct space in the plan view. The inside diameter (to scale Ø36) needed to be evident for full marks

(c) The cup **C** needed to have its top Ø and bottom Ø projected from the plan to gain full marks. The height of the cup needed to be 100 (to scale 50) from the inside of the base.

(d) The drawing of the cup in the elevation gives the correct diameter of the circular hole that is needed in the upper surface of the tray. This Ø30 needed to be visible in any of the remaining centre positions to score full marks.

Question B5

This question was also derived from a real 'Graphic Product'.

(a) Many candidates managed to draw a pie chart and divide the circle up into 5 segments. A few candidates did not realise that the total flights for 2006 was 360. They therefore spent a lot of time working out the size of the segments in degrees. Nearly all candidates managed to get the proportions of 90/45/120/30/75 degrees. Most scored further marks for adding labels correctly to the two largest sectors (short haul and freight).

(b) A large number of candidates drew a bar chart to show long haul flights correctly to a scale that displayed the increase from 2005 to 2009. Not all candidates labelled the chart correctly, with some candidates not using colour to enhance their illustration. Some candidates used a single line/stroke of colour and did not shade in an area.

(c) Some candidates did not read this question fully before responding. The question required a symbol for freight and a symbol for private flights. The symbols needed to be drawn in a relative size to match the numbers of each type of flight. To score 6 marks, the symbol for freight needed to be drawn approximately 2.5 times larger than the symbol for private flights. Only a small number of candidates used colour to enhance their solutions.

DESIGN AND TECHNOLOGY

Paper 0445/22

Graphic Products

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***.

The standard of work was comparable to that of the previous year. There are areas of the syllabus in which further improvements are needed. Candidates must be able to understand information given in one graphical format and be able to draw the same item correctly in another graphical format and also to scale.

It is important that candidates have access to coloured pencils in the examination so that they can respond to questions where 'add colour to enhance your illustration' appears.

Comments on specific questions

Question A1

All candidates drew a Ø40 circle for the centre of the flower. Many candidates completed the hexagonal outline of the flower. Not all the hexagons drawn were regular. Candidates who drew in the diagonals as shown in the question were able to draw six petals accurately to size. Most candidates managed to draw the stem 10 wide. The drawing of the leaf was variable, with full marks being awarded to candidates who drew a quadrant R35 and not just an arc to touch the leaf.

Question A2

The signboard needed to be completed to 80 mm either side of the centre line. Some candidates did not draw the remaining part of the signboard to the correct length.

Most candidates completed the remaining letters E, R and S. The E was achieved reasonably well by nearly all candidates; the R and S required a framework or grid to help construct the curves accurately. Nearly all candidates drew the letters to the correct height for one mark; for the final mark, candidates needed to plan the spacing carefully.

Question A3

Some candidates missed out this question, losing the 10 marks available.

(a) Many candidates drew arcs on either side of the centre line. To access all the marks, candidates needed to show evidence of construction.

(b) Many candidates drew a square 80 to represent the base, a square of 40 to represent the neck and a square of 58 to represent the top. For full marks all the squares needed to be concentric.

The given development (net) provided the true length of the sloping sides that are needed to be drawn in the elevation. This was not generally realised. An overall height of 93 +/-2 was required for the elevation to score full marks.

Question B4

This question was derived from an actual 'Graphic Product' used in garden centres.

Overall, candidates gained a wide range of marks for their answers.

(a) Many candidates drew the plan and elevation of the tray correctly to a scale of 1:2. A number of candidates did not orientate the tray so that the elevation displayed the open pa order that the thickness of the card could be awarded marks.

(b) The centre lines for the four holes needed to be 50 (to scale 25) in from each side. The plant pot **C** needed to be drawn so that the top Ø70 (to scale Ø35) was positioned in the correct space in the plan view. The inside diameter (to scale Ø46) needed to be evident for full marks

(c) The plant pot **C** needed to have its top Ø and bottom Ø projected from the plan to gain full marks. The height of the plant pot needed to be 50 to the rim, (to scale 25) from the inside of the base.

(d) The drawing of the plant pot in the elevation gives the correct diameter of the circular hole that is needed in the upper surface of the tray. This Ø33 needed to be visible in any of the remaining centre positions to score full marks.

Question B5

This question was also derived from a real 'Graphic Product'.

(a) Many candidates managed to draw a pie chart and divide the circle up into 5 segments. A few candidates did not realise that the total sales for 2006 was 3600. They therefore spent a lot of time working out the size of the segments in degrees. Nearly all candidates managed to get the proportions of 90/45/120/30/75 degrees. Most scored a further 2 marks for adding labels correctly to the two largest sectors (garden plants and shrubs).

(b) A large number of candidates drew a 3-D bar chart to show the sales of shrubs from 2005 to 2009 correctly. Most used a scale that displayed the distribution with the largest increase from 2007 to 2008. Not all candidates labelled the chart correctly, with some candidates not using colour to enhance their illustration. Some candidates used a single line/stroke of colour and did not shade in an area.

(c) Some candidates did not read this question fully before responding. The question required a symbol for garden plants and a symbol for cut flowers. The symbols needed to be drawn in a relative size to match the sales of each. To score 7 marks, the symbol for garden plants needed to be drawn approximately 2.5 times larger than the symbol for cut flowers. Only a small number of candidates used colour to enhance their solutions.

DESIGN AND TECHNOLOGY

Paper 0445/23
Graphic Products

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***.

The standard of work was comparable to that of the previous year. There are areas of the syllabus in which further improvements are needed. Candidates must be able to understand information given in one graphical format and be able to draw the same item correctly in another graphical format and also to scale.

It is important that candidates have access to coloured pencils in the examination so that they can respond to questions where 'add colour to enhance your illustration' appears.

Comments on specific questions

Question A1

All candidates drew a Ø40 circle for the centre of the flower. Many candidates completed the hexagonal outline of the flower. Not all the hexagons drawn were regular. Candidates who drew in the diagonals as shown in the question were able to draw six petals accurately to size. Most candidates managed to draw the stem 10 wide. The drawing of the leaf was variable, with full marks being awarded to candidates who drew a quadrant R35 and not just an arc to touch the leaf.

Question A2

The signboard needed to be completed to 80 mm either side of the centre line. Some candidates did not draw the remaining part of the signboard to the correct length.

Most candidates completed the remaining letters E, R and S. The E was achieved reasonably well by nearly all candidates; the R and S required a framework or grid to help construct the curves accurately. Nearly all candidates drew the letters to the correct height for one mark; for the final mark, candidates needed to plan the spacing carefully.

Question A3

Some candidates missed out this question, losing the 10 marks available.

(a) Many candidates drew arcs on either side of the centre line. To access all the marks, candidates needed to show evidence of construction.

(b) Many candidates drew a square 80 to represent the base, a square of 40 to represent the neck and a square of 58 to represent the top. For full marks all the squares needed to be concentric.

The given development (net) provided the true length of the sloping sides that are needed to be drawn in the elevation. This was not generally realised. An overall height of 93 +/-2 was required for the elevation to score full marks.

Question B4

This question was derived from an actual 'Graphic Product' used in garden centres.

Overall, candidates gained a wide range of marks for their answers.

(a) Many candidates drew the plan and elevation of the tray correctly to a scale of 1:2. A small number of candidates did not orientate the tray so that the elevation displayed the open part in order that the thickness of the card could be awarded marks.

(b) The centre lines for the four holes needed to be 50 (to scale 25) in from each side. The plant pot **C** needed to be drawn so that the top Ø70 (to scale Ø35) was positioned in the correct space in the plan view. The inside diameter (to scale Ø46) needed to be evident for full marks

(c) The plant pot **C** needed to have its top Ø and bottom Ø projected from the plan to gain full marks. The height of the plant pot needed to be 50 to the rim, (to scale 25) from the inside of the base.

(d) The drawing of the plant pot in the elevation gives the correct diameter of the circular hole that is needed in the upper surface of the tray. This Ø33 needed to be visible in any of the remaining centre positions to score full marks.

Question B5

This question was also derived from a real 'Graphic Product'.

(a) Many candidates managed to draw a pie chart and divide the circle up into 5 segments. A few candidates did not realise that the total sales for 2006 was 3600. They therefore spent a lot of time working out the size of the segments in degrees. Nearly all candidates managed to get the proportions of 90/45/120/30/75 degrees. Most scored a further 2 marks for adding labels correctly to the two largest sectors (garden plants and shrubs).

(b) A large number of candidates drew a 3-D bar chart to show the sales of shrubs from 2005 to 2009 correctly. Most used a scale that displayed the distribution with the largest increase from 2007 to 2008. Not all candidates labelled the chart correctly, with some candidates not using colour to enhance their illustration. Some candidates used a single line/stroke of colour and did not shade in an area.

(c) Some candidates did not read this question fully before responding. The question required a symbol for garden plants and a symbol for cut flowers. The symbols needed to be drawn in a relative size to match the sales of each. To score 7 marks, the symbol for garden plants needed to be drawn approximately 2.5 times larger than the symbol for cut flowers. Only a small number of candidates used colour to enhance their solutions.

DESIGN AND TECHNOLOGY

Paper 0445/31
Resistant Materials

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. It is important that candidates are familiar with the names of tools and equipment used when working with resistant materials and how they are used. For candidates to achieve high marks for this section they need to demonstrate the width of knowledge and understanding associated with wood, metal and plastics.

Section B

This section has a number of questions with large mark allocations, requiring a combination of clear and accurate sketches supported by detailed written notes. It is 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

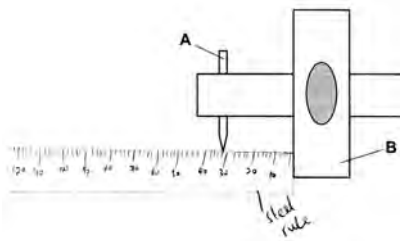
Question 1

(a) Many candidates were able to name a smoothing plane or jack plane.

(b) The best answers stated that the plane would be going against the grain and the result would be the surface of the wood becoming rough. Some candidates thought incorrectly that planing in the direction shown would result in damage to the plane.

Question 2

(a) There were some excellent answers similar to the one shown below.



Some candidates did not show the end of a steel rule against the stock of the marking gauge.

(b) A minority of candidates correctly named the ‘pin’ or ‘spur’ for part **A** and the ‘stock’ for part **B**.

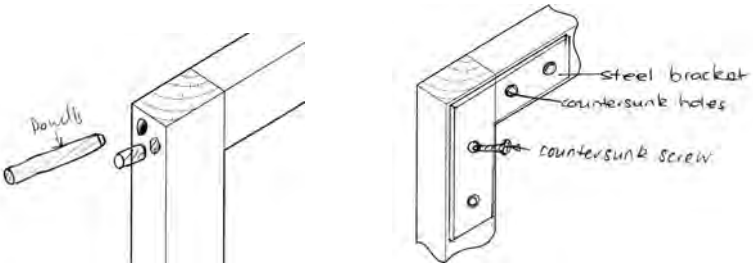
Question 3

(a) Few candidates correctly named the ball pein hammer.

(b) The correct purpose included riveting, bending and shaping metal and centre punching. M candidates thought incorrectly that the hammer would be used for hammering nails.

Question 4

The majority of candidates were able to show a successful method of strengthening the butt joint. The most common methods included dowel, corner plates and blocks.



Question 5

A minority of candidates were able to complete the drawing of a chamfered edge and a bevelled edge. Those candidates that completed the drawing by showing a bevel edge chisel gained some credit.

Question 6

(a) Few candidates named nylon as the specific plastic used for the gear wheels.

(b) There were few answers that correctly described the self-lubricating property of nylon.

(c) Most candidates correctly named injection moulding as the process used to produce the gear wheels.

Question 7

(a) Few candidates recognised sand casting or die casting as the appropriate process used to make the lamp base.

(b) Even if the process in **(a)** was incorrect, candidates could achieve a mark for naming a suitable metal for the base. Aluminium was the most common correct answer.

Question 8

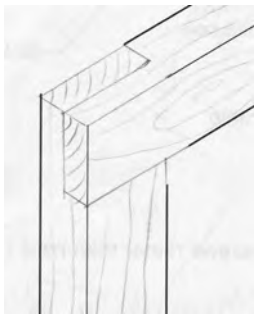
This was well answered, with many candidates recognising that the scrap wood would prevent the cramp from damaging the work piece and that the scrap wood would act as a guide for the saw blade.

Question 9

In general, candidates did not recognise the surface plate and the surface gauge for **A** and **B**. Credit was given for naming **B** as a scribing block.

Question 10

There were some excellent answers similar to that shown below.

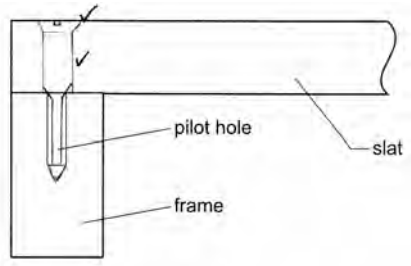


Section B

Question 11

(a) Many candidates suggested a suitable width and thickness for the slats; the accepted range being 30-40 mm and 12-20 mm respectively.

(b) (i) Many candidates achieved credit for drawing a countersunk. Better answers also included a clearance hole similar to that drawn below.



(ii) Most candidates understood that screws would be stronger, less likely to be pulled apart, provide better grip than nails and that they could be removed for maintenance.

(iii) Many answers conveyed correctly that steel screws corrode and that brass screws do not.

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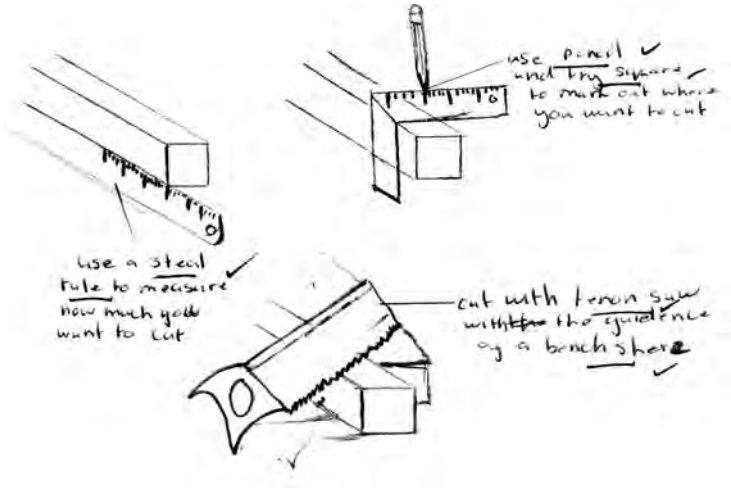

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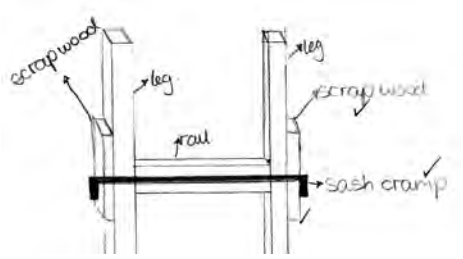

(f) (i) and (ii) Most candidates named varnish or paint as a suitable finish for the stool and gave sensible reasons for their choice, the most common being that it would protect the stool and enhance its appearance.

Question 12

(a) The majority of candidates drew the bend lines accurately on the net and gained maximum marks.

(b) The majority of candidates gave two good reasons for making a model of the spice rack before making it in acrylic, the most common being to test it, to check its appearance and to see if the jars would fit.

(c) Details of three processes were needed to produce the slot in acrylic: drilling a hole, sawing to open the slot and filing to achieve the finished shape. Many candidates provided good answers to part of the question but rarely to all parts. Candidates who provided information relating to marking out gained marks but it was possible to achieve maximum marks without this information.

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(a) (i) Most candidates were able to name a suitable sheet material, the most common being p MDF, aluminium or steel.

(ii) Candidates need to understand a range of properties associated with a variety of resistan materials, and to avoid vague references such as 'strong' or 'easy to work'.

(iii) Candidates are required to know about standard sections and available sizes for a variety of resistant materials. Some candidates did not suggest a realistic thickness of sheet material

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(c) The majority of candidates achieved some marks for this question. The best answers referred to speed and repetitive accuracy.

(d) (i) The question did state three specific processes: 'mark out', 'cut and shape' and asked candidates to name the tools and equipment used. Candidates could answer in the material of their choice. Marking out tools were generally well answered; sometimes inappropriate tools were named to cut the sheet material and often no mention was made of how the final shape would be achieved.

(ii) There were many specific safety precautions described, including the use of eye protection when using machine saws and the need to tie back hair or loose clothing. There were also vague references to the use of an apron or gloves which had no relevance.

(e) In this part, candidates needed to relate their method of joining to their chosen material. Many candidates showed a practical method such as the use of metal rods, wooden dowel or the inclusion of a solid board or sheet of material and gained some credit. Sometimes the method of joining was inappropriate; for example aluminium cannot easily be soldered and wooden dowel cannot simply be glued against sheet material without first drilling a hole

(f) (i) This part required information of how to prepare the sides for finishing, rather than details about the chosen finish and its application. The best answers included details about glasspaper or 'wet and dry' or silicon carbide paper and the need to use different grades to achieve a fine finish.

(ii) Most candidates named varnish or paint for their chosen finish and gave good reasons such as to protect and enhance the appearance.

DESIGN AND TECHNOLOGY

Paper 0445/32
Resistant Materials

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. It is important that candidates are familiar with the names of tools and equipment used when working with resistant materials and how they are used. For candidates to achieve high marks for this section they need to demonstrate the width of knowledge and understanding associated with wood, metal and plastics.

Section B

This section has a number of questions with large mark allocations, requiring a combination of clear and accurate sketches supported by detailed written notes. It is 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

(a) Many candidates were able to name a smoothing plane or jack plane.

(b) The best answers stated that the plane would be going against the grain and the result would be the surface of the wood becoming rough. Some candidates thought incorrectly that planing in the direction shown would result in damage to the plane.

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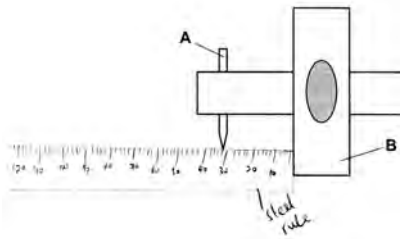
(a) There were some excellent answers similar to the one shown below.



Some candidates did not show the end of a steel rule against the stock of the marking gauge.

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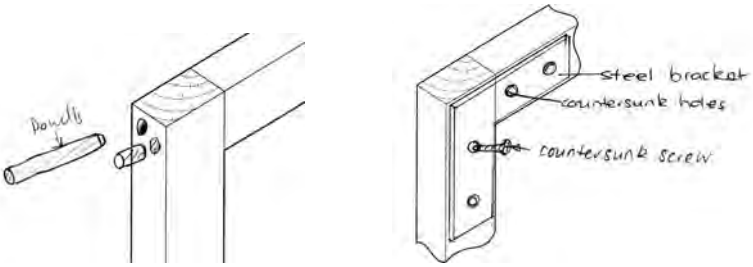

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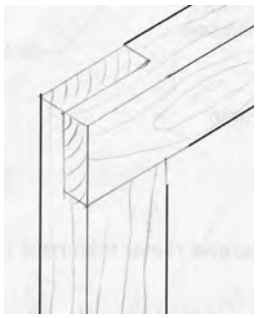

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Question 11

(a) Many candidates suggested a suitable width and thickness for the slats; the accepted range being 30-40 mm and 12-20 mm respectively.

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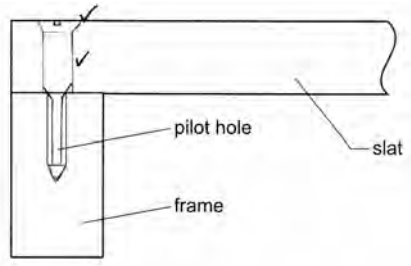

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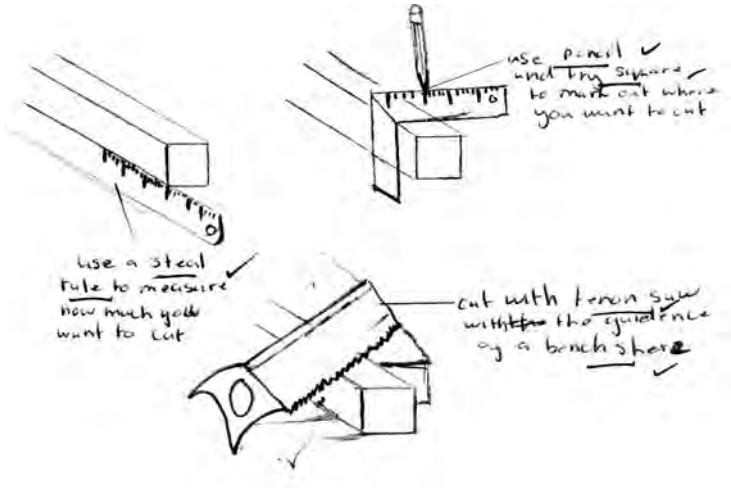

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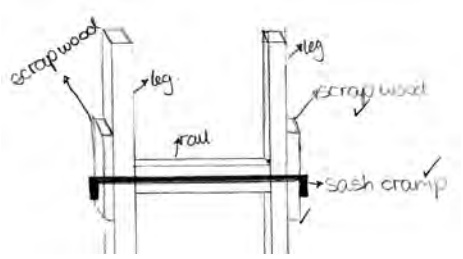

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DESIGN AND TECHNOLOGY

Paper 0445/33
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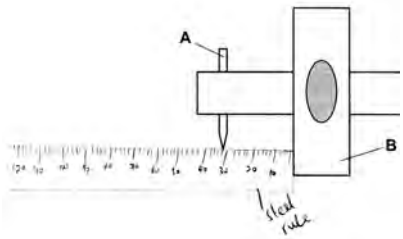

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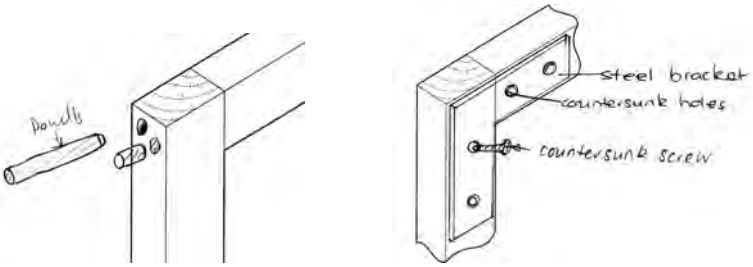

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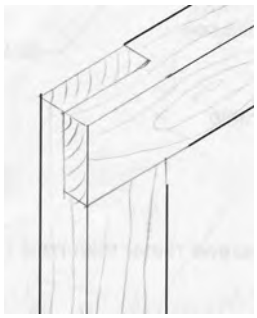

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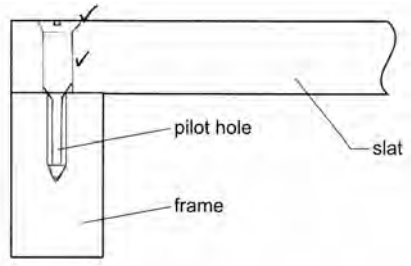

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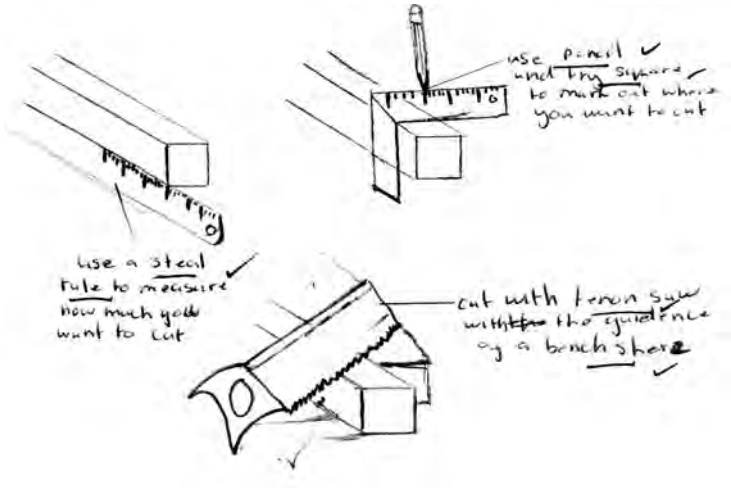

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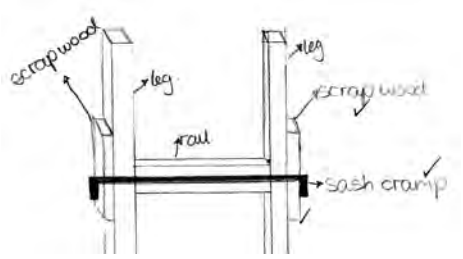

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DESIGN AND TECHNOLOGY

Paper 0445/41
Systems and Control

General comments

In general, good responses were characterised by the use of appropriate technological terminology and were supported by examples drawn from candidates' hands-on experience of processes, components and project work. The use of annotated sketches was also indicative of good responses. In the 'Electronics' part, there was clear evidence of good preparation and practical application of knowledge. For the 'Mechanisms' question, many responses were also characterised by good levels of knowledge and understanding. Candidates' knowledge and understanding of 'Structures' were not as strong in the compulsory questions. All candidates were able to access the paper and a range of response styles and attainments was seen.

Comments on specific questions

Section A

Question 1

Most candidates correctly identified four types of motion using the correct technological vocabulary.

Question 2

Most candidates were able to draw and label a lever. The better responses included high-quality sketches and some were related to real-life examples.

Question 3

Few candidates identified an appropriate application for a screw mechanism: for example, as adjustment of height on a machine or clamping devices such as 'G' Cramps.

Question 4

Most candidates were able to distinguish between static and dynamic forces and some candidates were able to give good examples from real life, such as wind loading on roofs or traffic loading on bridges, to clarify their responses.

Question 5

Some candidates were able to give an appropriate example of compressive forces acting on a structure, such as columns in bridges or pillars in buildings.

Question 6

Few candidates were able to show that turning the beam on its edge thus making its vertical axis greater than its horizontal would improve rigidity and thus its capability to support the load with less bending.

Question 7

Some candidates were able to identify an appropriate example of reinforcement such as reinforced concrete beams as lintels in a door opening of a house wall.

Question 8

Most candidates were able to identify appropriate benefits for using LEDs as small, robust or self coloured.

Question 9

(a) Few candidates correctly explained the operation of the circuit in terms of the charging of the capacitor and the time delay effected by the RC combination.

(b) Some candidates correctly explained that the variable resistor allowed adjustment of the time period for illumination of the LED in this circuit.

(c) Most candidates were able to identify the capacitor as an electrolytic capacitor.

Section B

Question 10

(a) Better candidates correctly explained how the circuit operated in terms of input being the pressure on the switch that activated the 555 IC which then activated the time delay circuit and finally signalled the time period by activating the LED output device..

(b) (i) Most candidates were able to identify the PTM (Push to Make) switch.

(ii) Only the best candidates were able to explain that this switch has been selected so that the input is only momentary and that the circuit would not remain latched on after it had performed the timing function.

(c) Most candidates were able to explain the use of R_2 as a current limiting resistor to avoid damage to the LED.

(d) (i) Most candidates were able to sketch and label the circuit symbol for a 9 V battery showing the polarity and the cell configuration.

(ii) Few candidates were able to identify three benefits of using a battery to power the circuit in terms of portability, flexibility of usage and safety.

(iii) Candidates needed to indicate that chemical energy is converted to electrical energy in the battery and then electrical energy is converted into light and heat energy by the LED.

(e) Many candidates were able to sketch a standard representational graph showing the charging of a capacitor with reference to voltage and time.

(f) Most candidates were able to sketch a 3D drawing of an LED and label the connections correctly according to the length of leg and the side notching on the LED lens body.

Question 11

(a) (i) Many candidates correctly identified the magnitude and direction of the output force for the system shown.

(ii) Few candidates correctly identified the magnitude (greater) and direction (reversed) of the output force for the system shown.

(b) (i) A few candidates correctly explained that the mechanism transferred motion from one plane to another through 90˚.

(ii) Stronger candidates were able to name an appropriate application for a bell crank lever in terms of transmitting motion through a 90º for the operation of a window shutter or a bell pull system.

(c) Some candidates were able to calculate the correct distance for balancing of the we using the principle of moments and equilibrium showing that anticlockwise moment clockwise moments about a common pivot point.

(d) Most candidates were able to explain the term 'moment' in terms of the force applied to a syst perpendicular to the pivot point and the distance from the pivot.

(e) Few candidates correctly explained the use of levers for the pantograph system in magnifying an image by referring to the principle of moments and equilibrium in a system.

(f) (i) Some candidates were able to give an appropriate example of the use of a toggle clamp for example the clamping mechanism on a vacuum forming machine.

(ii) Few candidates were able to explain the operation of the toggle clamp. Those candidates that did successfully respond made good use of labelled and annotated sketches to show how the force is transferred and how the linkage goes over top dead centre to cause a locking action.

(g) (i) and (ii) Most candidates were able to add arrows and labels to the diagram of a floor mop linkage to show input and output motion and to identify a fixed and a moving pivot.

Question 12

(a) (i) Most candidates identified structure 'A' as a roof truss.

(ii) Fewer candidates were able to explain fully the use of internal members in the truss to add rigidity to the truss.

(iii) Most candidates were able to sketch and label the use of a gusset plate to reinforce the truss joint though some candidates suggested adding more members which in this case would not effectively reinforce the corner joint as well as a gusset plate.

(b) Few candidates were able to explain how the corrugation of the sheet material increased its rigidity and thus its ability to support loading.

(c) (i) Some candidates were able to identify the reinforced beam but some referred to it as simply 'concrete' for which they could not gain credit.

(ii) Most candidates were able to identify a specific example, such as a lintel or a section of a road bridge as the use of the beam in building practice. Some responses were too non-specific to gain the mark.

(d) (i) Most candidates correctly identified "welding" as a method of permanently fixing of the mild steel sheet, though brazing or soft soldering would have also been acceptable methods for this material..

(ii) Some candidates identified the use of nuts / bolts or self tapping screws but there were a number of candidates who incorrectly specified "Hot glue".

(e) Very few candidates were able to calculate successfully the reactions for the simply supported beam; candidates need to be confident in the principle of moments and equilibrium to manage this type of calculation.

(f) (i) Most candidates were able to explain that the specified structural sections were selected due to their advantageous load to weight ratio.

(ii) Some candidates were able to identify an appropriate structural application for the square-section tubing material including furniture construction and space frames.

(iii) Very few candidates were able to explain that the 'I' section beam is shaped so that the material at the outer sections carries the highest loading.

(g) Many candidates were able to draw and label a typical stress / strain graph for mild steel and were able to identify elastic, plastic regions and the break point for mild steel.

DESIGN AND TECHNOLOGY

Paper 0445/42
Systems and Control

General comments

In general, good responses were characterised by the use of appropriate technological terminology and were supported by examples drawn from candidates' hands-on experience of processes, components and project work. The use of annotated sketches was also indicative of good responses. In the 'Electronics' part, there was clear evidence of good preparation and practical application of knowledge. For the 'Mechanisms' question, many responses were also characterised by good levels of knowledge and understanding. Candidates' knowledge and understanding of 'Structures' were not as strong in the compulsory questions. All candidates were able to access the paper and a range of response styles and attainments was seen.

Comments on specific questions

Section A

Question 1

Most candidates correctly identified four types of motion using the correct technological vocabulary.

Question 2

Most candidates were able to draw and label a lever. The better responses included high-quality sketches and some were related to real-life examples.

Question 3

Few candidates identified an appropriate application for a screw mechanism: for example, as adjustment of height on a machine or clamping devices such as 'G' Cramps.

Question 4

Most candidates were able to distinguish between static and dynamic forces and some candidates were able to give good examples from real life, such as wind loading on roofs or traffic loading on bridges, to clarify their responses.

Question 5

Some candidates were able to give an appropriate example of compressive forces acting on a structure, such as columns in bridges or pillars in buildings.

Question 6

Few candidates were able to show that turning the beam on its edge thus making its vertical axis greater than its horizontal would improve rigidity and thus its capability to support the load with less bending.

Question 7

Some candidates were able to identify an appropriate example of reinforcement such as reinforced concrete beams as lintels in a door opening of a house wall.

Question 8

Most candidates were able to identify appropriate benefits for using LEDs as small, robust or self coloured.

Question 9

(a) Few candidates correctly explained the operation of the circuit in terms of the charging of the capacitor and the time delay effected by the RC combination.

(b) Some candidates correctly explained that the variable resistor allowed adjustment of the time period for illumination of the LED in this circuit.

(c) Most candidates were able to identify the capacitor as an electrolytic capacitor.

Section B

Question 10

(a) Better candidates correctly explained how the circuit operated in terms of input being the pressure on the switch that activated the 555 IC which then activated the time delay circuit and finally signalled the time period by activating the LED output device..

(b) (i) Most candidates were able to identify the PTM (Push to Make) switch.

(ii) Only the best candidates were able to explain that this switch has been selected so that the input is only momentary and that the circuit would not remain latched on after it had performed the timing function.

(c) Most candidates were able to explain the use of R_2 as a current limiting resistor to avoid damage to the LED.

(d) (i) Most candidates were able to sketch and label the circuit symbol for a 9 V battery showing the polarity and the cell configuration.

(ii) Few candidates were able to identify three benefits of using a battery to power the circuit in terms of portability, flexibility of usage and safety.

(iii) Candidates needed to indicate that chemical energy is converted to electrical energy in the battery and then electrical energy is converted into light and heat energy by the LED.

(e) Many candidates were able to sketch a standard representational graph showing the charging of a capacitor with reference to voltage and time.

(f) Most candidates were able to sketch a 3D drawing of an LED and label the connections correctly according to the length of leg and the side notching on the LED lens body.

Question 11

(a) (i) Many candidates correctly identified the magnitude and direction of the output force for the system shown.

(ii) Few candidates correctly identified the magnitude (greater) and direction (reversed) of the output force for the system shown.

(b) (i) A few candidates correctly explained that the mechanism transferred motion from one plane to another through 90˚.

(ii) Stronger candidates were able to name an appropriate application for a bell crank lever in terms of transmitting motion through a 90º for the operation of a window shutter or a bell pull system.

(c) Some candidates were able to calculate the correct distance for balancing of the we using the principle of moments and equilibrium showing that anticlockwise moment clockwise moments about a common pivot point.

(d) Most candidates were able to explain the term 'moment' in terms of the force applied to a syst perpendicular to the pivot point and the distance from the pivot.

(e) Few candidates correctly explained the use of levers for the pantograph system in magnifying an image by referring to the principle of moments and equilibrium in a system.

(f) (i) Some candidates were able to give an appropriate example of the use of a toggle clamp for example the clamping mechanism on a vacuum forming machine.

(ii) Few candidates were able to explain the operation of the toggle clamp. Those candidates that did successfully respond made good use of labelled and annotated sketches to show how the force is transferred and how the linkage goes over top dead centre to cause a locking action.

(g) (i) and (ii) Most candidates were able to add arrows and labels to the diagram of a floor mop linkage to show input and output motion and to identify a fixed and a moving pivot.

Question 12

(a) (i) Most candidates identified structure 'A' as a roof truss.

(ii) Fewer candidates were able to explain fully the use of internal members in the truss to add rigidity to the truss.

(iii) Most candidates were able to sketch and label the use of a gusset plate to reinforce the truss joint though some candidates suggested adding more members which in this case would not effectively reinforce the corner joint as well as a gusset plate.

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DESIGN AND TECHNOLOGY

Paper 0445/43
Systems and Control

General comments

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DESIGN AND TECHNOLOGY

Paper 0445/05

School Based Assessment

General comments

There was a wide range of interesting and innovative work submitted for moderation. The overall quality of the projects was good with some work of a very high standard both in the quality of design thinking evident in the folder and the skills demonstrated in the manufacture of the final outcome.

Candidates are generally well prepared for this component; the vast majority produce structured and well presented folders covering all elements of the assessment criteria and make a product that can be tested and evaluated.

The best work tends to come from candidates who generate a brief that evolves from a personal interest. They are more likely to carry out the appropriate research, generate a wide range of imaginative possible ideas and make reasoned decisions regarding the development of a feasible solution. Being a 'real' need, the product is mostly completed to a standard that can be effectively tested in its intended situation and fully evaluated.

A number of candidates produced models for their final product realisation. The quality of architectural modelling was generally of a very high standard, some of a professional standard, innovative design and exceptional quality of manufacture.

Some candidates produced scale models of potentially large products. Many of these models were not constructed to the standard required to achieve high marks.

Some project folders were exceptionally large. They were generally of a very high standard but candidates can still achieve full marks with a more concise approach to their work.

Centres are reminded to ensure that all relevant documentation is forwarded with the coursework sample.

Comments on specific headlines

1. Identification of a need or opportunity with a brief analysis leading to a Design Brief

Most candidates made clear their intentions in this section. They explained in some detail, many making good use of photographs, the need or problem that they had selected and produced a brief. Candidates who went on to consider the users achieved the top mark range.

2. Research into the Design Brief resulting in a Specification

There has been some improvement in this area. Many candidates produced focused research relevant to the brief that would assist in the production of a specification and help to produce appropriate designs. Some of the research on material and manufacturing methods could be more appropriately used in the Development of Proposed Solution section.

Some candidates would benefit from sifting through the research that they gather and only include information that is relevant. When including anthropometric data, only select those particular features that apply to the brief.

Many candidates included details of existing products as part of their research. Candidates who analysed the products, detailing the strong and/or weak design features to explore or avoid when coming up with their own designs, obtained the highest marks.

Most specifications were clear and justified. Some candidates focused on generic points such as 'look good' or 'must be safe' without the further clarification or direct link to the product to be designed.

3. Generation and exploration of Design Ideas

Most candidates used good quality, annotated sketches to explore a range of possibilities. Some focused on a single concept and did not access the higher mark ranges. Those achieving the highest marks produced a number of discrete solutions or part solutions, each evaluated against relevant points of the specification. Tick charts should only be used if a viable comment is made or a point is substantiated.

There are an increasing number of Centres making excellent and appropriate use of CAD in this section as well as in the development and planning of the final proposal.

Some candidates used photographs of existing products with no further personal design involvement. Marks cannot be awarded if a candidate does not generate their own ideas.

4. Development of Proposed Solution

Some candidates produced very detailed developments, including details of how decisions relating to the selection of materials and manufacturing processes were arrived at. Many made reasoned refinements to their design, incorporating form and function requirements with material and manufacturing decisions.

Many candidates did not show any decision -making, simply stating the chosen material. To achieve the highest marks, candidates must show evidence of the trialling or testing of alternatives and of the decision made.

5. Planning for Production

Most candidates produced excellent plans for production. The sequence of operations was clearly identified and described in most cases, and many including detailed cutting lists, time allocations and Health and Safety considerations.

Some candidates referred back to their plan during the manufacture of their product and made appropriate changes.

Working drawings were generally very good. They were clear, fully dimensioned and would be suitable for a third party to manufacture the product. Many Centres made excellent use of CAD in this section

6. Product Realisation

There was a wide range of practical outcomes submitted. A significant number of very high-quality products were presented this year. Most candidates used good-quality photographs to show full details of their product. The majority were taken whilst the product was in use and were also used in the Testing and Evaluation section.

Architectural modelling was of a very high standard.

Most Centres were accurate in awarding marks commensurate with the quality of work produced.

7. Testing and Evaluation

Many candidates achieved high marks by getting a user to test the product in its intended environment and producing detailed evaluations, making clear reference to the specification. A number of candidates went on to recommend modifications and possible improvements based on their evaluation.

Some candidates use this section to evaluate their own personal performance. This is not required and marks should not be awarded; the focus must be on the product.