



Pearson

Examiners' Report

June 2017

GCE Design and Technology
Production Design 6RM02 01

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Introduction

As this component is now approaching its final year of standard assessment, it is pleasing to see candidates giving much more attention to good exam techniques as well as subject knowledge. Candidates are clearly benefitting from good preparation and extensive use of past papers which bring an understanding of the types of responses required from questions. There is also some evidence of better quality sketches and more legible handwriting, which is also positive. Having said this there still remains the minority whose result is affected by poor exam techniques rather than lack of knowledge. Some samples of this have been included in this report in an attempt to continue to stress the importance of this topic.

Question 1 (a)

An introductory question which most candidates found straightforward. Correct answers drawn from across the mark scheme rather than focussing on one or two of the polymers. Frequent incorrect answers were acrylic, ABS and thermoplastic. Candidates used a mixture of abbreviations and full names to identify the polymers, either form being acceptable.

Question 1 (b)

The majority of candidates scored only one or two marks on this question. The most common features identified were the tapered shape of the yoghurt pots and their rounded corners. A minority of candidates showed a deeper understanding and went on to score higher marks, often referencing webbing and the absence of undercuts. One of the frequent incorrect responses identified the simple shape of the pots as a feature which made them suitable for vacuum forming. Complex shapes can be vacuum formed as long as they have the appropriate features, hence this response was not awarded.

Other incorrect responses focussed on a hole in the centre to suck the air out, or the purpose of the product rather than its shape, which then diverged into reasons why it could be mass produced rather than why the shape could or could not be vacuum formed.

(b) Outline **four** features of the yoghurt pot shape shown in figure 1 that make it suitable for the vacuum forming process.

(4)

1 the pot has an angle (draft angle) so can come off the mould easily

2 it has no undercut shapes

3 the corners all have slight curves / radius on so plastic forms properly

4 it is short enough not to stretch the plastic too thinly



Results
Examiner Com

A good example of a maximum mark response. The candidate has identified draft angles, no undercuts, rounded corners and understands that the shape should not be too tall.

(b) Outline **four** features of the yoghurt pot shape shown in figure 1 that make it suitable for the vacuum forming process.

(4)

1 All of the edges are rounded.

2 The bottom of the yoghurt pot is smaller than the top.

3 It has a dip at the bottom.

4 All the yoghurt pots are connected.



ResultsPlus Examiner Comments

The first two responses in this answer were awarded marks for rounded edges and a description of a tapered shape. The dip in the bottom of the yoghurt pots is incorrect as the shape will vacuum form whether the dip is present or not. Similarly the fact that they are connected as stated in the final response, has no bearing on whether the shape is suitable for vacuum forming. The shape would vacuum form whether the four pots are connected as one or are all singular.

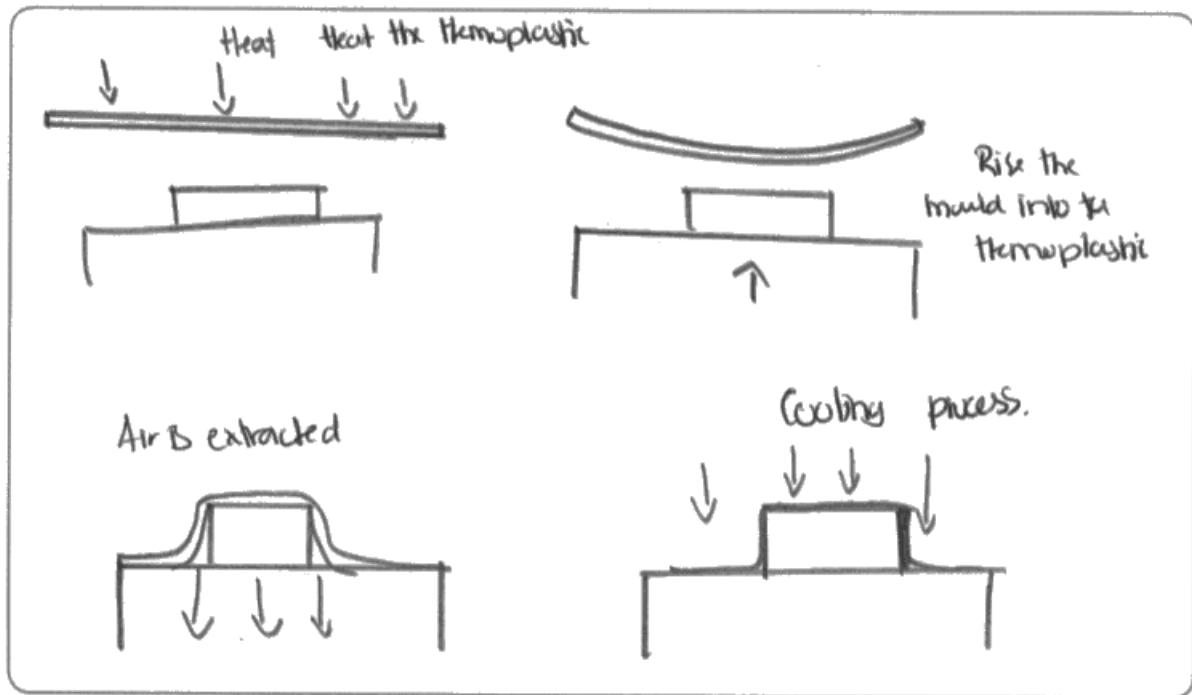
Question 1 (c)

The stem of this question stated that the vacuum forming process used a polymer sheet, a heater and a mould, therefore no marks were awarded for references to these components. Having said this it was a well answered question with a large majority of candidates scoring 4, 5 or the full 6 marks. It was clear many candidates had a good understanding of this process having experienced it rather than just having a theoretical knowledge of it.

(c) The vacuum forming process uses a polymer sheet, a heater and a mould.

Describe, using notes and/or sketches, the vacuum forming process.

(6)



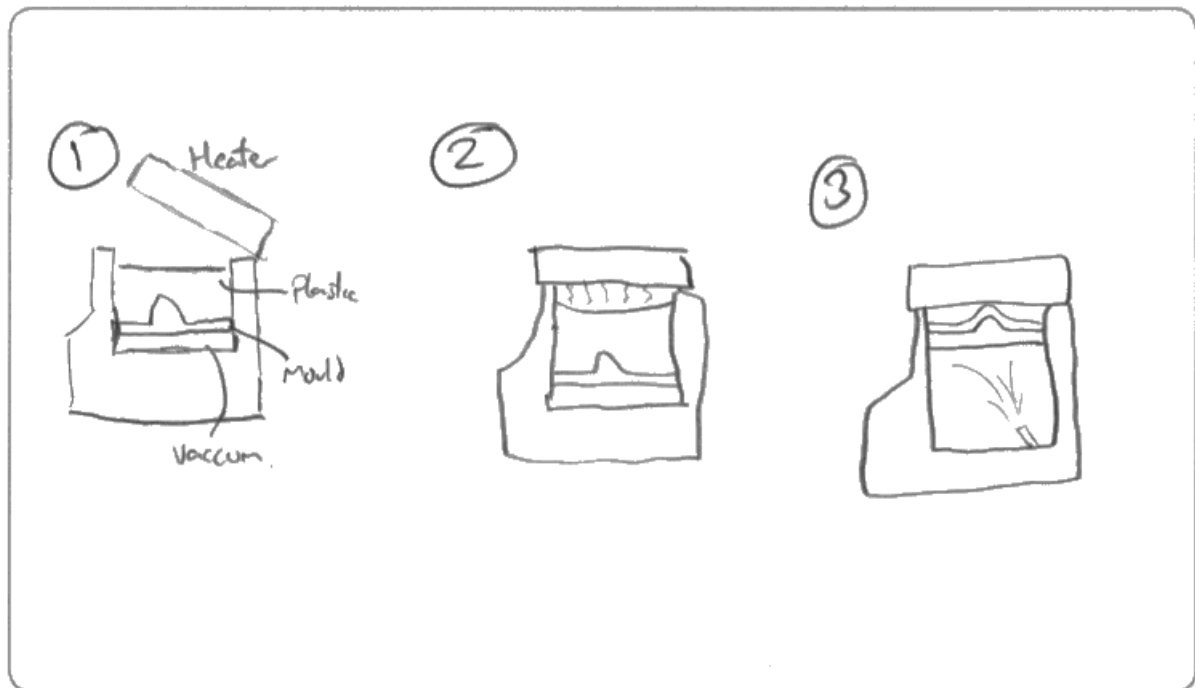
ResultsPlus Examiner Comments

The question states that notes and/or sketches can be used to describe the vacuum forming process. As such full marks can be gained with either method. This candidate chose to just use sketches and gained 4 marks for showing the mould in its lowered position (1) then being raised into the polymer (1) the polymer being sucked down onto the mould (1) and that it is cooled (1).

(c) The vacuum forming process uses a polymer sheet, a heater and a mould.

Describe, using notes and/or sketches, the vacuum forming process.

(6)



Firstly, the polymer sheet is added and fixed into place along with the mould, shown in ①. The top of the vacuum former then closes and begins to heat the plastic until it is ^{slightly} flexible, shown in ②. The mould is then brought up to meet the plastic and the plastic slightly fits around the mould shown in ③. The vacuum then begins to suck in the air, and through ~~the~~ small holes in the mould air is sucked from the space between the mould and plastic, pulling in the plastic to fit the mould accurately. The heater/lid is then opened and the piece is removed ~~and cooled~~ and left to harden.

**ResultsPlus****Examiner Comments**

In this response the candidate chose to both sketch the process and describe it. The diagrams show the same first three marking points as the previous response. In the text the candidate has also gained marks for stating that the polymer sheet is 'fixed in place' (1) and that 'the piece is removed' at the end of the process (1) and 'left to harden' (1). The final point here was also gained by the previous candidate, but the additional two simple stages brought this candidate's score to the full 6 marks.

**ResultsPlus****Examiner Tip**

Where a question says that you can use notes and/or sketches, full marks can be gained with either method, but it is more likely that more marks would be given if both are used as shown in the second sample rather than the first.

Question 2 (a)

This question allowed candidates to show their understanding of the differences between MDF and a solid wood (pine) when applied to the manufacture of a painted table. The full range of scores was frequently seen with the higher scoring candidates focussing on the faults which naturally occur in solid timber, the size differences and environmental issues. Some responses frequently stated that MDF was lighter in weight and more durable than pine.

- 2 Figure 2 shows a table made from medium density fibreboard (MDF) that has been painted.

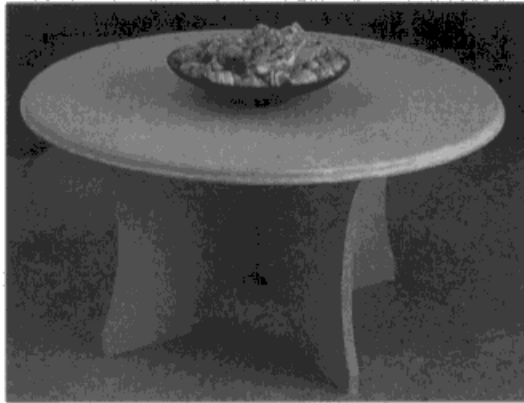


Figure 2

- veneered to higher finish quality
- no knots - manmade so easier to work
- allows for very smooth surface

- (a) Explain **three** advantages, other than cost, of manufacturing the table from MDF rather than pine.

(6)

1 Manmade, so there are no knots, so it is easier to work and less weaknesses

2 Manmade, so not prone to warping, twisting or cupping and less weaknesses as no grain.

3 The lack of grain allows for a very smooth surface, so it is better for use with food, and more desirable finish aesthetics



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Examiner Comments

The first and second response in this answer both contain a correct point with a valid justification and were awarded 2 marks each. The final response starts with a repeat of the point made in the second response, 'lack of grain' followed by a correct justification concerning its 'smooth finish'. So the final response gained a single mark. The reference to 'better for food' and 'more desirable aesthetics' are invalid. This makes the final mark for this answer 5.



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Examiner Tip

Be aware of repeating the same point. Correct answers will only be awarded once even if they are justified differently.

- 2 Figure 2 shows a table made from medium density fibreboard (MDF) that has been painted.

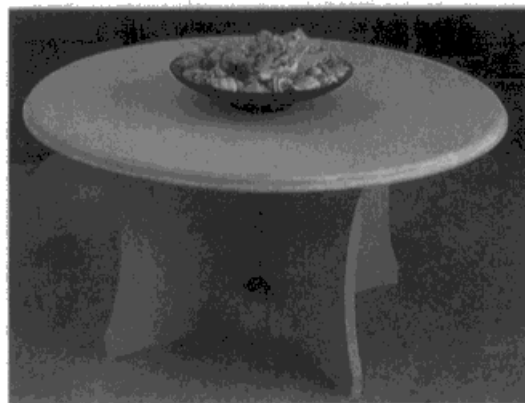


Figure 2

- (a) Explain **three** advantages, other than cost of manufacturing the table from MDF rather than pine.

(6)

- 1 It is a sustainable wood, ~~which means that~~ ^{because} it has been made from the dust of other woods which have been compressed together with glue.
- 2 It can easily be worked on, it's relatively easy to cut and change the shape of it, as it isn't at the correct measurements already.

3 The MDF ~~can be carried~~ is light, this means it can be carried around easily because it isn't heavy.



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Examiner Comments

The first response here has both a correct point with a correctly linked justification and gained 2 marks. The second response is superficial stating that MDF is 'easily worked' and 'easy to cut'. These responses needed to be more specific to gain mark as 'easy' could be referring to a range of different issues such as speed of cutting, less effort required, does not split, etc. The third response is incorrect, leading to a total of 2 marks.



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Examiner Tip

Candidates need to be specific and not use general terms such as 'easy' in order to show a depth of knowledge.

Question 2 (b)

A challenging question for many with most candidates scoring between 1 and 3 marks. Candidates were required to identify the issues which need to be considered under the COSHH regulations regarding the use of the paint. The issue of safe storage was given as an example, although it was occasionally seen in candidates' answers as well where it failed to score. Most candidates were able to state that risks and control measures were needed, or give an example of a risk or control measure relevant to the paint. Either form of answer was awarded marks. Responses that focussed on maintenance of PPE, monitoring systems to ensure safe practices were being complied with, and pre-planned first aid procedures were seen, but rarely.

(b) The paint used when manufacturing the table is subject to the Control of Substances Hazardous to Health (COSHH) regulations.

Give **five** issues, apart from safe storage, that need to be considered under COSHH regulations regarding the use of the paint.

(5)

- 1 It can be dangerous if inhaled
- 2 ~~Can be~~ Can be dangerous if swallowed
- 3 Can cause skin irritation
- 4 Depending on the type of paint, may be flammable.
- 5 Can cause respiratory diseases/issues



ResultsPlus Examiner Comments

In this response the candidate identifies a range of hazards which the paint can cause. Under COSHH regulations identifying the hazards the substance poses is one of the issues which must be considered. Hence one mark was awarded for the first example of a hazard, the remainder are just repeats of further hazards.

(b) The paint used when manufacturing the table is subject to the Control of Substances Hazardous to Health (COSHH) regulations.

Give **five** issues, apart from safe storage, that need to be considered under COSHH regulations regarding the use of the paint.

(5)

- 1 Safe disposal of waste.
- 2 ~~the~~ appropriate signage giving detailed warnings
- 3 training of employees on risks.
- 4 sourcing of high quality materials
- 5 Usage of PPE when ~~the~~ working with paint.
such as ~~respirators~~ masks.

(Total for Question 2 = 11 marks)



ResultsPlus Examiner Comments

Safe disposal, signage, training and the control measure of PPE were correctly identified issues in this response which gained 4 marks. The fourth response is not related to COSHH regulations.

Question 3 (a)

Question 3 (a) asked candidates to identify three disadvantages of CAD systems when compared with manual drawing methods. Most candidates scored 2 or the full 3 marks. The most common answers included the need for training and the vulnerability of the systems to data loss from a variety of causes. The disadvantage of the 'initial cost' was given in the stem in order to help candidates focus on disadvantages rather than advantages, and to remove what would have been the most common response. Having said this the issue of cost was still given from a significant number of candidates.

- 3 (a) Computer-aided design (CAD) systems are now used extensively during the design of products in preference to manual drawing methods.

One disadvantage of CAD systems is their initial cost.

Outline **three** further disadvantages of CAD systems when designing products.

- (3)
- 1 files can become corrupted which can result in loss of very detailed designs
 - 2 most CAD packages require skilled workers which incurs a higher labour cost
 - 3 using CAD for prolonged periods can result in possible eye damage from looking at a monitor for too long



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Examiner Comments

A good answer with the candidate scoring the full 3 marks for responses that identified file corruption, the need for skilled (trained) workers, and health issues.

- 3 (a) Computer-aided design (CAD) systems are now used extensively during the design of products in preference to manual drawing methods.

One disadvantage of CAD systems is their initial cost.

Outline **three** further disadvantages of CAD systems when designing products.

(3)

- 1 One disadvantage is that CAD systems are very complex and lot of training is often needed.
- 2 few systems allow you to see 360° of product
- 3 When working on the computer it is hard to get dimensions and proportions correct.



ResultsPlus

Examiner Comments

The need for training was correctly identified in this candidate's first response. The second and third responses refer to issues that are not disadvantages of CAD systems compared to manual sketching methods. Only 1 mark was awarded.



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Examiner Tip

Ensure answers are focussed within the context of the question.

Question 3 (b) (i)

This question shows an image of a CNC machined component. The majority of candidates correctly identified that the most suitable CNC machine for manufacturing the component was the CNC milling machine. A large minority gave incorrect answers of which the most common ones were CNC lathe, router or a die casting system.

Question 3 (b) (ii)

Question 3 (b) (ii) asked candidates to outline three manufacturing faults that could have occurred during the machining of the component. All scores were commonly seen among candidates' responses. One common incorrect response focussed on the wrong material being used which is not a fault that could have occurred during manufacture.

(ii) After manufacture, the component in figure 3 would undergo a range of quality control tests to identify possible faults.

Outline **three** manufacturing faults that may have occurred during the machining of the component.

(3)

1 diameter of overall circle

2 diameter of the 2 inner circles

3 thickness of overall component



ResultsPlus Examiner Comments

This response illustrates the most common form of low scoring response. The candidate has identified three different dimensional faults, the first of which was awarded 1 mark.



ResultsPlus Examiner Tip

Ensure all your answers are different from each other and do not cover the same area repeatedly.

(ii) After manufacture, the component in figure 3 would undergo a range of quality control tests to identify possible faults.

Outline **three** manufacturing faults that may have occurred during the machining of the component.

(3)

- 1 Finishing, product could have sharp edges, Burrs. -
- 2 Accuracy of the holes / the milling, to make sure that it is 100% accurate / within tolerance.
- 3 Damages, such as scratches from tools.



ResultsPlus
Examiner Comments

This response outlines the faults of burrs, accuracy and scratches and gained the full 3 marks.

Question 3 (b) (iii)

This question focussed on the balance that a business needs to strike concerning the quality of their goods and costs of maintaining this quality. Candidates were asked to justify three ways that the business could save money whilst maintaining effective quality control systems.

The full range of marks was frequently seen and many candidates scored well. The most common correct answers focussed on the use of sample testing. Common incorrect answers focussed on the introduction of TQM systems, or applying BSI standards. Both of these strategies would likely lead to increased costs rather than a reduction.

(iii) Justify **three** ways a business can reduce the cost of testing whilst maintaining effective quality control systems.

(6)

- 1 Use of Non Destructive Testing (NDT) - this limits the waste being produced in the testing process leading to reduced raw materials and reduced manufacturing
- 2 Batch testing - by testing a set number per batch rather than every one, this allows labour to be reduced and faster production.
- 3 Use of CMM (Computer Numerical Measuring) - this reduces labour costs as a machine is able to systematically test a product by using a probe and preloaded dimensions



ResultsPlus Examiner Comments

A top scoring answer with three justified points. Use of non-destructive testing which limits waste, batch testing leading to faster production, and the use of CMM which reduces the amount of labour needed. 6 marks.

(iii) Justify **three** ways a business can reduce the cost of testing whilst maintaining effective quality control systems.

(6)

- 1 Perform less ~~the~~ quality control checks for ~~the~~ the stages that have found the least amount of ~~the~~ faults.
- 2 Create a system where a computer checks the ~~computer~~ components, allowing for there to be less labour required.
- 3 Create a prototype before the creation of the product. This would allow ~~for~~ for the major faults in testing to be discovered.



ResultsPlus Examiner Comments

The first response in this answer was awarded 1 mark as it correctly identifies that less tests could be performed but does not justify how this strategy would save the business money. The second response was awarded 2 marks for the use of a computer system for checking which would require less labour. The final response is focussed on wider quality assurance procedures that would be used during product development rather than quality control during production, and therefore gained no marks. The total for this answer was therefore 3 marks.



ResultsPlus Examiner Tip

Take careful note of command words in the question and ensure you justify points when the question requires it.

Question 4 (a)

Broadly a well understood topic with many candidates scoring 4, 5 or the full 6 marks for showing their knowledge of how to manually cut an external screw thread. A small percentage of responses described screw cutting using a lathe which demonstrated poor exam technique. Candidates need to identify the key points in the question carefully.

Relatively few candidates described the need to produce a chamfer on the end of the bar and very few mentioned the need to put the die on to the rod with the numbered face or tapered side downwards.

*4 (a) Figure 4 shows an external screw thread cut on the end of a piece of steel rod.



Figure 4

Describe the process of manually cutting the external screw thread on the steel rod.

(6)

to cut the thread, a die and die-stock would have been used. To start the correct size die would be secured in the die-stock. Then the ~~metal~~ steel rod would be secured in a ^{engineers} vice. Before the thread would have been cut, cutting compound would have ~~been~~ put on the bar to allow for a ~~be~~ better cut. To start cutting, you push down on top of the rod with the die and turn it ~~at~~ clockwise. Once the thread is started continue turning the die ~~clockwise~~ clockwise, and clearing the swarf by turning anti-clockwise, once the thread

is cut to desired length, remove the dye by turning it anti-clockwise.



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Examiner Comments

A top quality response gaining the full 6 marks for a clear description of the process which included the following points: Dye (Die), cutting compound, push down, turn clockwise, turn anticlockwise and cut to the desired length.

Describe the process of manually cutting the external screw thread on the steel rod.

(6)

x The steel rod will be clamped into position using a vice. Then using an external tap, place it over the end of the steel rod, start to twist the tap two clockwise twists in one direction and one twist in the opposite direction.



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Examiner Comments

This candidate's knowledge of the process was much more superficial. This description scored only 2 marks for twisting, and twisting in the opposite direction.

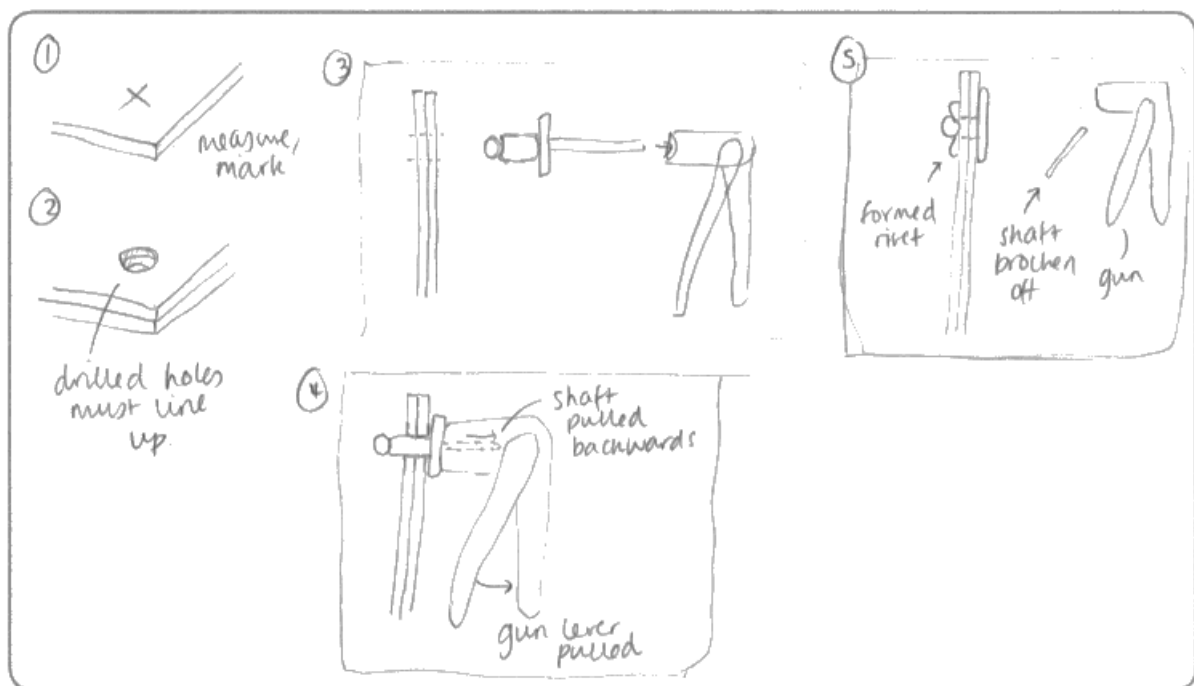
Question 4 (b)

Pop riveting caused many candidates to think hard as many stated their advantages over solid rivets, even though the question did not ask this, but struggled to show an understanding of how the pop rivet actually functioned. A large number of answers gained some marks for a superficial understanding with points being picked up from both the diagrams and the text. A small number described the fitting of snap head rivets with a hammer and gained no marks. Having said this a good proportion of candidates showed clear knowledge of the process gaining 4 or the full 5 marks available.

(b) Pop rivets are used to join sheet metal together and require holes to be drilled prior to fitting.

Describe, using notes and/or sketches, the process of pop riveting. Your answer should show clearly how the pop rivet holds the pieces of sheet metal together.

(5)



~~Measure~~ Measure and and mark the placement of the holes, ensuring they line up correctly. Drill the holes the correct diameter. Select the correct size pop rivet and place shaft in the gun, pop rivet gun. Push and of rivet through both holes and pull the lever on the gun. If the shaft does not snap off the first time repeat the action and the pop rivet will be formed. The metal ball is pulled back, squashing the softer metal so it can no longer fit tight to the hole. The rivet gun grips the shaft which is used to pull ~~through~~ the rivet into shape. The Only one side of the work needs to be accessed to form the pop rivet.

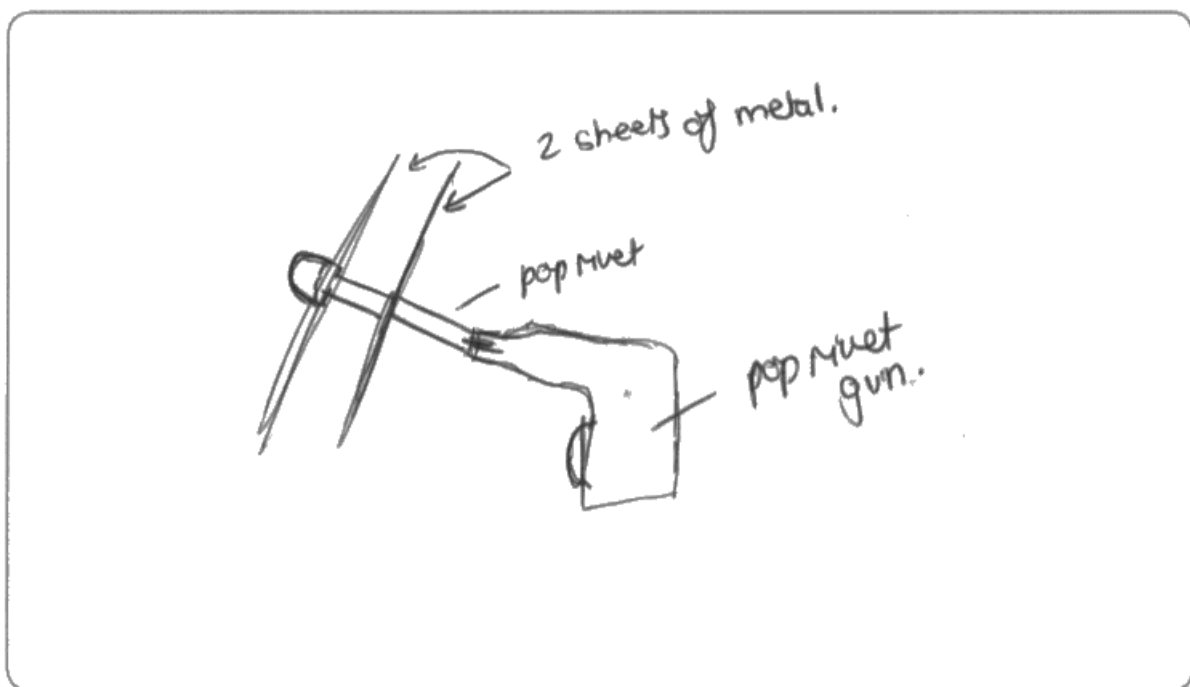


A clear answer with excellent quality diagrams. All 5 marks could have been awarded from either the diagrams or the text.

- (b) Pop rivets are used to join sheet metal together and require holes to be drilled prior to fitting.

Describe, using notes and/or sketches, the process of pop riveting. Your answer should show clearly how the pop rivet holds the pieces of sheet metal together.

(5)



The hole needs to be drilled within the metal prior to fitting to avoid any splintering. The hole can also be countersunk. The pop rivet gun shoots the pop rivet which penetrates through the 2 metal sheets. Moreover, the pressure of the 'pop' causes the ~~new~~ remaining rivet to snap off and the top rounded ~~new~~ head to pop off, leaving a flush ^{semi} permanent joint between 2 metal sheets.



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Examiner Comments

This quality of diagram was unfortunately more normal with details difficult to interpret. A mark is awarded for correctly labelling the pop rivet gun in the diagram, although the rivet shown is closer to a snap head rather than a pop rivet. The text also describes the use of a rivet gun and states that the remainder of the rivet snaps off. This gained a second mark.



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Examiner Tip

Carefully drawn diagrams where the details can be seen clearly are likely to score higher marks. There is sufficient time during the examination to allow for this.

Question 5 (a)

Most candidates were able to successfully access this question and picked up 2-4 marks, although the full spread of marks was frequently seen. Candidates' answers drew from all areas of the mark scheme. Many were able to explain the points they made, although a significant proportion either repeated their point using different words or diverged into different unrelated points missing the second mark.

It is still disappointing to see reasonably frequent responses that focussed on the strength of brass, when this is the example given in the stem. Common incorrect answers stated that brass was a good conductor, (which it is, but this is not relevant to the context) brass is cheap, and brass has a smooth finish. Quality of finish is more attributable to the quality of manufacturing rather than the material itself.

It was also noted that a large number of candidates gave answers which focussed incorrectly on the advantages of brass plain bearings over ball bearings. This may well have happened as a result of candidates starting at the back of the examination paper and working forwards leading to carrying over their thinking from question 5 (b) into the context of 5 (a). Candidates need to be very careful if they adopt this strategy.

5 Figure 5 shows a small electric motor with a plain brass bearing.

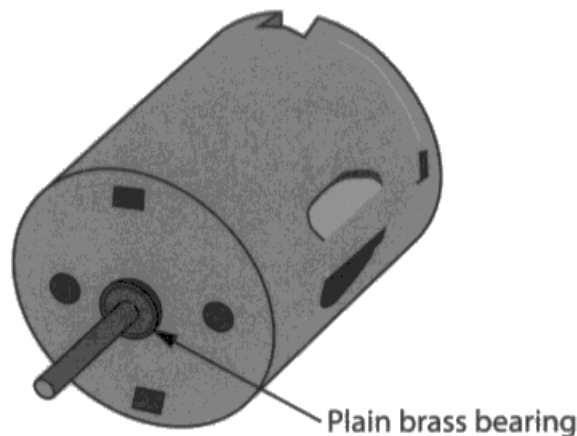


Figure 5

(a) Explain **three** reasons, apart from strength, why brass is used for the plain bearing.

(6)

1 Brass has a low surface friction and thus will spin relatively efficiently compared to other metals

2 Brass has a high melting point and thus won't deform due to high frictional heat from the motor

3 Brass is easily machined, making the manufacture of the plain bearing simpler.



ResultsPlus Examiner Comments

The first two responses in this sample contain both a correct point and a clear explanation. The final point states that 'Brass is easily machined'. This is another example of a vague response based on the word 'easy' and did not gain a mark (see the comment on the second example for Q 2 (a)). The total score for this answer was therefore 4 marks.

5 Figure 5 shows a small electric motor with a plain brass bearing.

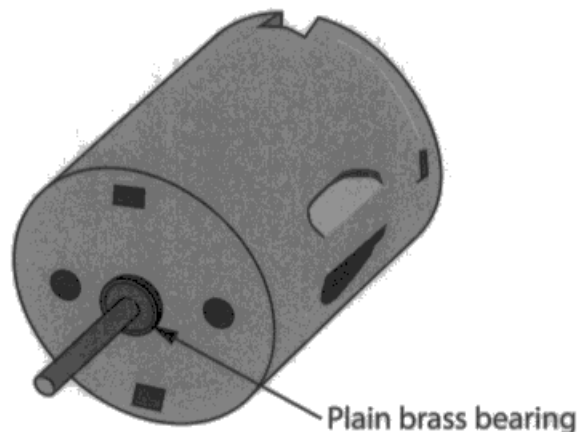


Figure 5

(a) Explain **three** reasons, apart from strength, why brass is used for the plain bearing.

(6)

1 ~~stated~~ brass is resistant to rusting
so it can be used for a long time

2 brass doesn't conduct electricity
so it won't interfere with motor

3 *has a high melting point*



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Examiner Comments

This answer contains a good first response with a correct point and relevant justification. The second response is incorrect. The final response is also correct but the reason has not been explained, so only gains 1 mark. This makes a total of 3 marks.



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Examiner Tip

Make sure you have explained points where a question asks you to.

Question 5 (b)

A challenging question asking candidates to compare ball bearings with plain bearings focussing on the disadvantages of the ball bearings. Almost all candidates were able to pick up some marks although few reached 5-6 marks.

(b) Some motors are fitted with ball bearings rather than plain bearings.

Explain **three** disadvantages of ball bearings over plain bearings.

(6)

- 1 ball bearings have a smaller contact area than a plain bearing and therefore cannot carry as much load.
- 2 ball bearings have multiple components and are therefore more complicated and more expensive than plain bearings.
- 3 ball bearings are more complex than plain bearings and could ~~break~~ therefore break or become damaged between the inner and outer race.



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Examiner Comments

A good answer which scored a total of 5 marks. The first response gives the explanation first 'small contact area', followed by the disadvantage 'cannot carry as much load', 2 marks. The second response makes the point of a ball bearing having 'multiple components', which is explained with 'more expensive', 2 marks. The final point starts with ball bearings are 'more complex', which is a repeat of 'multiple components' used in the previous response. This is explained with 'could therefore break', which gains the final mark.

(b) Some motors are fitted with ball bearings rather than plain bearings.

Explain **three** disadvantages of ball bearings over plain bearings.

(6)

- 1 Ball bearing are less consisidans / efficient
- 2 Plain bearings work better in the long run as they are stronger
- 3 Ball bearings are ~~less~~ more complex.



ResultsPlus Examiner Comments

This candidate has made little attempt to explain their points and has just given three simplistic statements. The first is superficial. The second response initially says that plain bearings will last longer, which is incorrect, but goes on to state that plain bearings are stronger. This is taken as the reverse point i.e. ball bearings are weaker. (Points are accepted when stated in reverse).

The final response is also an un-explained correct point. The total mark is therefore 2.

Question 6 (a)

Candidates generally showed a good understanding of the characteristics quantum tunnelling composite as the majority of responses scored 3 or 4 marks. Low scoring answers tended to just focus on the smart property of the material being pressure sensitive, rather than thinking about the materials wider characteristics such as flexibility and water resistance. A common misunderstanding seen was that QTC generates its own electricity and that it was likely to give the wearer an electric shock.

- 6 (a) Figure 6 shows a coat sleeve with integrated media player controls. The controls use quantum tunnelling composite (QTC) to operate a media player.



Figure 6

Outline the reasons why QTC is a suitable material for wearable controls.

(4)

- quantum tunnelling composites are lightweight so the clothes won't be heavy
- they are easy to manufacture
- they are easy to install
- they are highly responsive to pressure
- they are water resistant, so the clothes can be washed
- they are reliable and durable, so the clothes would last long
- they are relatively inexpensive



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Examiner Comments

This candidate successfully used bullet points to ensure they had given at least the minimum number of answers for the points available. Marks were awarded for 'lightweight', 'responsive to pressure', 'water resistant' and 'reliable'. The maximum 4 marks have now been reached although the additional answer of 'inexpensive' is also present.



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Examiner Tip

With open ended questions such as these try to give more points than there are marks available.

Question 6 (b)

The final question focussed on candidates evaluating the use of a solar panel to charge a mobile phone. The large majority of candidates were able to apply their knowledge of solar power to this context, and scores between 3 and 5 were consistently seen. However the higher scores needed candidates to be more insightful into the advantages and disadvantages posed by the situation. Candidates drew from the whole of the mark scheme although some frequent incorrect answers included solar chargers being expensive to purchase and that they only worked in direct sunlight.

*(b) Figure 7 shows a solar panel charger connected to a mobile phone.

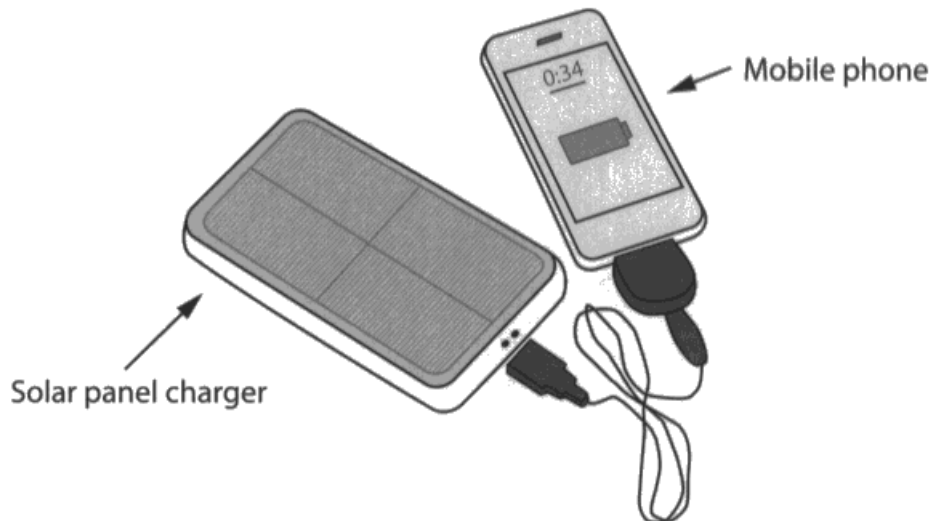


Figure 7

Evaluate the use of a solar panel charger to recharge a mobile phone.

(8)

Solar panels consist of photovoltaic cells, constructed from thin layers of silicon. When exposed to sunlight, one layer becomes electron rich, while the other layer becomes electron deficient. This causes a voltage to be produced. The voltage can be tapped using contacts; however, small amounts of current are produced, and so to achieve a reasonable amount of power, a lot of contacts must be used to tap the voltage. Another disadvantage is that solar panels have a high initial set-up cost.

As the solar panels work/charge in the presence of sunlight, the solar panel charger should be kept out of pockets, ~~in in and in~~ and exposed to sunlight.



ResultsPlus Examiner Comments

This candidate has initially described the function of the panel rather than evaluated its use. The response then begins to go in the right direction and marks were awarded for 'small amounts of current are produced' and 'charge in the presence of sunlight' or 'out of pockets'. The final mark being 2.



ResultsPlus Examiner Tip

Review the command words as part of your preparation for examinations, and ensure you understand how to respond to them.

*(b) Figure 7 shows a solar panel charger connected to a mobile phone.

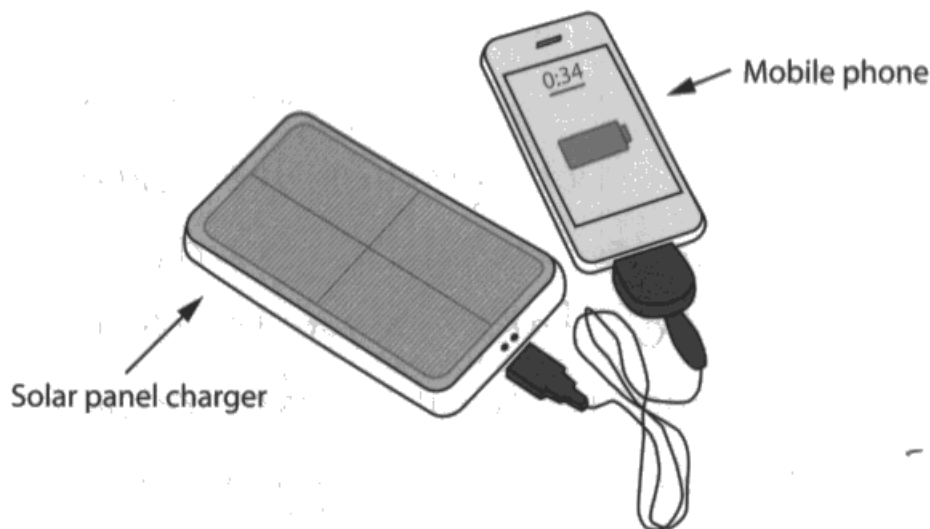


Figure 7

Evaluate the use of a solar panel charger to recharge a mobile phone.

- on the go
 - portable
 - lightweight
 - not at right
 - Small amount of power
 - carry
- (8)

The solar panel charger provides free charge for the mobile phone from converting sunlight into energy, so the other than the cost of buying the charger it is completely free to power. The solar panel charger provides green energy which does not harm the environment, unlike mains power which is created from coal, gas and oil burning. The

Solar panel charger is also portable so it allows the user to charge their phone on the go, from the power of the sunlight, and the solar panel charger is also fairly lightweight which also makes it easy to use to charge the phone whilst on the go. But the charger will not charge the phone at night as it requires sunlight to power it and also it will not work as well when in the user's pocket which means they have to carry it around. Another disadvantage of the solar panel charger is that solar energy does not provide the same amount of power as mains chargers, which means that it will have to take longer to charge the mobile phone than it would take a mains charger. Also the solar panel charger is larger than a phone so it may be difficult to store when walking and it requires a wire which also has to be carried around for the solar charger to function.



ResultsPlus Examiner Comments

This candidate has written a small plan next to the image consisting of the key points they want to make. They have then followed their plan and constructed a balanced argument which was given credit for the following points: free charge, does not harm the environment, portable, lightweight, will not charge at night, does not produce the same amount as a mains charger and is larger than a phone. 7 marks in total.



ResultsPlus Examiner Tip

Candidates who wrote a plan on these longer essay questions usually scored well.

Paper summary

Generally candidates responded well to this year's paper. Very few blank responses were seen indicating good coverage of the whole specification, and most candidates gained some, if not high marks on the extended writing questions. Many more response plans were also seen for these longer questions with strong, well structured responses following. A concerning feature of this paper was the frequent use of the word 'easy' as the focus of an answer, and examples have been used earlier in this report to explain why these responses were not creditworthy.

Based on their performance on this paper, candidates are offered the following advice:

- Some candidates will still benefit from reading questions more carefully and underlining important words.
- Candidates should have a clear understanding of the different command words so that they can focus their responses appropriately.
- Candidates should avoid using response examples given in the question stem.
- Candidates should practice producing large clear diagrams which convey clear detail and understand that they do have time during the examination to produce them.
- Candidates must be detailed in their answers and not use simple unsupported statements such as 'its easy'.
- When questions require multiple responses, candidates must ensure that each point made is different knowledge, not the same or similar knowledge in different words, which will be taken as a repeat.
- With the extended writing questions candidates are further encouraged to use the top few lines of the answer space to generate a small plan of the points they intend to make.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

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