

A LEVEL DESIGN AND TECHNOLOGY (PRODUCT DESIGN) FOR TEACHING FROM 2017

2019 EXAMINATION

UNIT 3 OER MATERIAL (ANNOTATED)

*The interactive version of this exemplar is available on
our Online Exam Review website (oer.wjec.co.uk).*

Printing with/without comments and annotations

The exemplar in this booklet includes comments/annotations from the Principal Examiner.

If you are printing this exemplar, the printed version will by default include the Principal Examiner's comments/annotations:

✓ of all of the disadvantages. What do you think?
Are you going to get a tattoo or has this article...
~~then~~ changed your mind?

Secure awareness of intended audience.

Written with an easy, confident style.

8+5

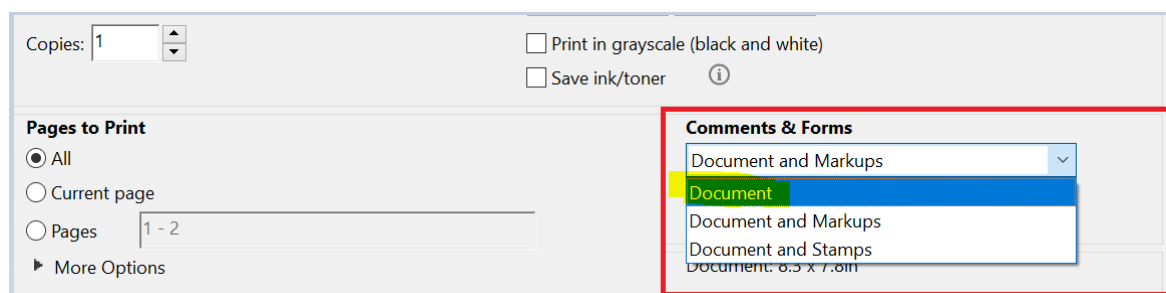
13

Shows clear shape and structure.

Some errors but a decent level of control.

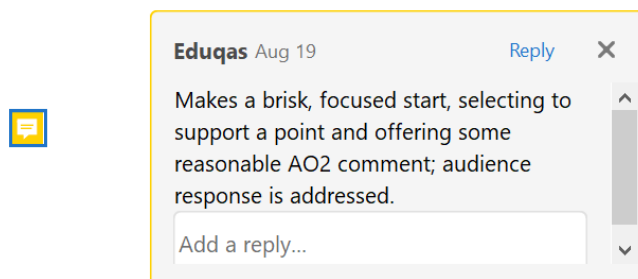
If you would like to print a 'clean' copy of the exemplar, this can be done by adjusting the print settings as follows:

After selecting *File > Print*, you will need to change the option in the dropdown menu under 'Comments and Forms' to 'Document'. This will then print the document without the Principal Examiners' comments.



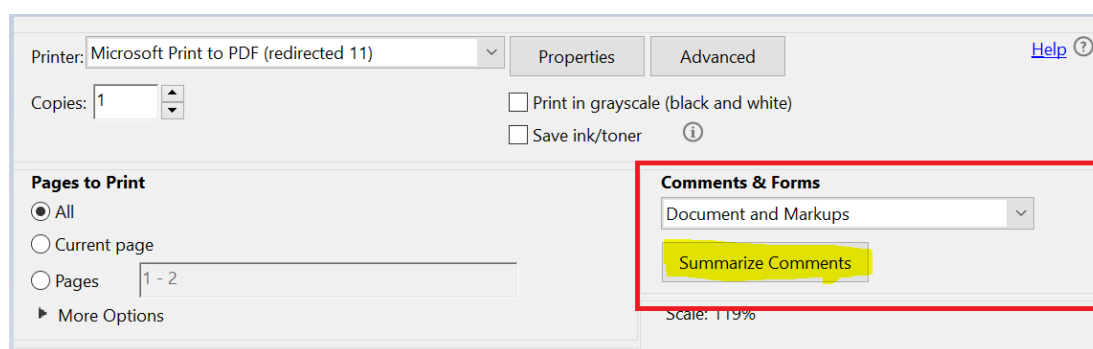
Printing comments with sticky notes

If you are printing the exemplar in this document, the Principal Examiner comments contained in the sticky notes will not automatically be printed.



If you would like your printed copy to include the Principal Examiner comments you will need to adjust the printer settings as follows:

After selecting *File > Print*, you will need to click 'Summarize Comments' in the 'Comments & Forms' area of the print settings.



The Principal Examiner comments will then be printed at the end of each page of exemplar:

Summary of Comments

Page: 1

Number: 1	Author: Eduqas	Subject: Sticky Note	Date: 19/08/2019 11:33:48
Makes a brisk, focused start, selecting to support a point and offering some reasonable AO2 comment; audience response is addressed.			
Number: 2	Author: Eduqas	Subject: Sticky Note	Date: 19/08/2019 11:33:48
The approach here is rather formulaic, but the focus is clear and each paragraph hits both assessment objectives.			
Number: 3	Author: Eduqas	Subject: Sticky Note	Date: 19/08/2019 11:33:48
Perhaps, but this point isn't fully explained.			

4. The chassis of the trailer shown below is manufactured from galvanised mild steel sections.



- (a) Explain what you understand by the term galvanising and state the advantages of using this process in the manufacture of the chassis. [4]

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Question 4

		AO3	AO4	Mark
(a)	Explain what you understand by the term galvanising and state the advantages of using this process in the manufacture of the chassis.		✓	4
<p><i>Answers that indicate an understanding of galvanising steel and its advantages can be awarded up to 4 marks based on:</i></p> <p><i>Hot-dip galvanizing is a common process of immersing steel in a bath of molten zinc to produce a corrosion resistant coating for the metal. While the steel is immersed in the zinc, a metallurgical reaction occurs between the iron in the steel and the molten zinc. The coating adheres to all surfaces creating a uniform thickness throughout the part.</i></p> <p>Advantages to the manufacturing process:</p> <ul style="list-style-type: none"> • Produces a high-quality anti rust protection for the steel. • Can be stored outside once manufactured – in preparation for assembling the body of the trailer. • It is a high-volume production process. • The trailer's product life extended greatly. • No maintenance is required once the process is completed. • It is excellent protection against the elements i.e. cold weather conditions, salty weather conditions or very hot conditions. • Aesthetics – many consumers like the fact that the galvanising finish is something that is appealing. <p>Guidance to markers:</p> <p>Incorrect/no answer 0</p> <p>Brief description with little detail or reference to galvanizing for example: <i>It is a basic coating for the mild steel, so it will not rust.</i> 1</p> <p>Some detail in description, with some understanding of galvanizing and its advantages for example: <i>It is a coating of zinc on to mild steel to provide a long-term coating to protect the steel from the elements.</i> 2</p> <p>A more detailed understanding with clear understanding of galvanizing and its advantage for example: <i>Galvanizing is using hot zinc in which steel is dipped into. This provides a permanent coat to protect the steel for the elements.</i> 3</p> <p>Fully detailed description with clear understanding of galvanizing and its advantage as a process for protection for example: <i>Hot dip galvanizing is used to coat mild steel and provide a permanent protective layer for the steel. The advantages during manufacture is that it is a quick process and in this case the trailer chassis can be left outside for storage until it is ready for the remainder of the assembly process.</i> 4</p>				

Question 4

		AO3	AO4	Mark
(b)	Describe how the manufacturer has incorporated a different surface finish to each of the labelled parts on the garden tools shown below and explain the benefits of both surface finishes to the user.		✓	8
<p><i>Answers that indicate an understanding of surface finishing processes can be awarded up to 8 marks based on:</i></p> <p><i>Using an Injection moulded handle</i></p> <ul style="list-style-type: none">• This allows for a variety of shaped handles and can be formed for easy grip.• Process: The polymer is injected into a prepared mould tool that defines the shape of the moulded part (handle).• Using this process allows the designer/manufacturer to design suitable not slip handles and considers good anthropometric features.• Benefits the user in form, grip and also provides colour variations. <p><i>Surface coating for steel</i></p> <ul style="list-style-type: none">• Primed and painted to protect the steel for rusting• Enamelled steel provides a more permanent coating to protect the fork from the elements• Benefits the user with not having to use a protective layer once purchased.• Enamelled or stove enamelled coating will be permanent and require very little or no maintenance. <p><i>Accept descriptions that could be related to wood/metal handles/rubber handles/rubber sleeves.</i></p>				
Guidance to markers:				
<ul style="list-style-type: none">• Candidate has a simplistic knowledge.• The use of terminology and technical language is basic.• The candidate has little understanding of surface finishes		0-2		
<ul style="list-style-type: none">• The candidate has a basic understanding of the issues associated with the question.• The use of terminology and technical language is variable.• The candidate understands some of the general elements of two areas of surface finishes and the benefits to the user.		3-4		
<ul style="list-style-type: none">• The candidate demonstrates a clear understanding of the issues associated with the question.• The use of terminology and technical language is reasonably accurate.• The candidate understands the general elements of surface finishes and the benefits to the user.		5-6		
<ul style="list-style-type: none">• The candidate demonstrates a clear understanding of the issues associated with the question.• Uses correct terminology and technical language.• The candidate clearly understands the main features of surface finishes and the benefits to the user.		7-8		
		Total		12

4. The chassis of the trailer shown below is manufactured from galvanised mild steel sections.



- (a) Explain what you understand by the term galvanising and state the advantages of using this process in the manufacture of the chassis. [4]

Galvanised Steel uses is a protection to prevent rust (zinc).
As the chassis is open to the elements is prone to rust/corrosion.
Galvanisation prevents this. Advantages - cheaper to
galvanise (cost effective) - Doesn't need to be re-galvanised after use.
Doesn't need an added protection layer once galvanised.

- (b) Describe how the manufacturer has incorporated a different surface finish to each of the labelled parts on the garden tools shown below and explain the benefits of both surface finishes to the user. [8]



(b)

The handle is made out plastic with a rubber grip which is ergonomic to aid the user. B The plastic is polished to give an overall shine and to protect the material including the company name. (prevent wear and tear)

C

(A)

Galvanised Shovels benefits the user because it increased the lifespan of the metal because its resistant to rust/corrosion and can be used in all weathers

The Surface won't show scratch marks

Surface looks appealing to customer



4. The chassis of the trailer shown below is manufactured from galvanised mild steel sections.



- (a) Explain what you understand by the term galvanising and state the advantages of using this process in the manufacture of the chassis. [4]

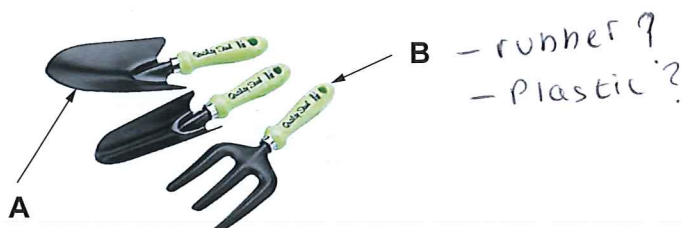
The term galvanizing is the coating of a metal with zinc that creates a protective layer.

Chassis will be open to rain, ~~water~~ dampness etc.

which can all cause rust. Galvanizing will stop the steel from rusting and will keep it in prime condition.

- (b) Describe how the manufacturer has incorporated a different surface finish to each of the labelled parts on the garden tools shown below and explain the benefits of both surface finishes to the user. [8]

A - steel.



A - The steel is finished with a galvanized coating to protect the steel from rusting. The steel is also spray painted black, this creates a contrast to the two parts to make the product more appealing.

B - The handles have been injection moulded out of plastic, this allows for the holes to be created at the top of ~~the~~ the handles for hanging. As well as the detailing on the plastic.

4. The chassis of the trailer shown below is manufactured from galvanised mild steel sections.

~~prevents corrosion~~
~~stronger~~




- (a) Explain what you understand by the term galvanising and state the advantages of using this process in the manufacture of the chassis. [4]

Galvanising is where they heat the steel and apply force to it ^(hit it) whilst cooling ^{the} metal slowly. The advantages are: it makes it ~~stronger~~ stronger, ~~and~~ tougher and more durable to withstand use on the roads and to carry heavy items. Also, galvanising helps to prevent corrosion, which is beneficial as the trailer is likely to be used / kept outdoors.



- (b) Describe how the manufacturer has incorporated a different surface finish to each of the labelled parts on the garden tools shown below and explain the benefits of both surface finishes to the user. [8]



Surface finish A is steel blackening. This enhances the aesthetics of the trowel and helps to avoid corrosion. It also makes the steel more durable and increases strength. Surface finish B is a plastic handle. This could either be dip-coated or manufactured by injection moulding as it is a process that allows metal inserts to be added to the mould. The advantages of this are; it helps improve aesthetics to make it more appealing to the target market. It may also add extra grip and therefore, safety to the tools. Rubber could also be added to enhance the grip. 

6. The image below shows a production line where both in-house and standardised bought-in components are used during manufacture.



Evaluate how the use of standardised bought-in components benefits the manufacturer when assembling products on the production line. [8]

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Question 6

		AO3	AO4	Mark										
	Evaluate how the use of standardised bought-in components benefits the manufacturer when assembling products on the production line.	✓		8										
	<p><i>Answers that indicate an understanding of the bought in components on a production line can be awarded up to 8 marks based on:</i></p> <p>Note: Reference could be made to: nuts and bolts, washers and small-scale fittings Benefits would include:</p> <ul style="list-style-type: none">• The quality of the bought in components is the responsibility of the external supplier.• There is less factory space required in the main manufacturing area.• All the components arrive 'JIT' – directly to the cell or production line.• Bought in parts ensures consistency on terms of material, quality.• Less skill is required by staff, so they will be able to concentrate on the main assembly/manufacturing processes.• There will be less specialist equipment needed to produce the bought in components.• This will reduce costs as less staff and equipment are required.• All the components may be bought in bulk – but delivered at a time which is suitable for the manufacturer. <table><tr><th colspan="2">Guidance to markers:</th></tr><tr><td><ul style="list-style-type: none">• Candidate has a simplistic knowledge.• The use of terminology and technical language is basic.• The candidate has little understanding of the benefits of using bought in components.</td><td>0-2</td></tr><tr><td><ul style="list-style-type: none">• The candidate has a basic understanding of the issues associated with the question.• The use of terminology and technical language is variable.• The candidate understands some of the general benefits of using bought in components.</td><td>3-4</td></tr><tr><td><ul style="list-style-type: none">• The candidate demonstrates a clear understanding of the issues associated with the question.• The use of terminology and technical language is reasonably accurate.• The candidate understands the general benefits of using bought in components to the manufacturer.</td><td>5-6</td></tr><tr><td><ul style="list-style-type: none">• The candidate demonstrates a clear understanding of the issues associated with the question.• Uses correct terminology and technical language.• The candidate clearly understands the how the use of standardised bought-in components benefits the manufacturer when assembling products on the production line.</td><td>7-8</td></tr></table>			Guidance to markers:		<ul style="list-style-type: none">• Candidate has a simplistic knowledge.• The use of terminology and technical language is basic.• The candidate has little understanding of the benefits of using bought in components.	0-2	<ul style="list-style-type: none">• The candidate has a basic understanding of the issues associated with the question.• The use of terminology and technical language is variable.• The candidate understands some of the general benefits of using bought in components.	3-4	<ul style="list-style-type: none">• The candidate demonstrates a clear understanding of the issues associated with the question.• The use of terminology and technical language is reasonably accurate.• The candidate understands the general benefits of using bought in components to the manufacturer.	5-6	<ul style="list-style-type: none">• The candidate demonstrates a clear understanding of the issues associated with the question.• Uses correct terminology and technical language.• The candidate clearly understands the how the use of standardised bought-in components benefits the manufacturer when assembling products on the production line.	7-8	
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		Total		8										

6. The image below shows a production line where both in-house and standardised bought-in components are used during manufacture.

trained in making specific part



can be used for a range of different components on the car.

can buy in bulk.

saves money.

— all the same / constant supply / no need to ^{your self} manufacture
Evaluate how the use of standardised bought-in components benefits the manufacturer when assembling products on the production line. [8]

Standardised brought-in components ~~are~~ are all the same and can be used ^{on a} ~~for a~~ range of car components. The manufacturer is able to buy in bulk and have a constant supply of high quality components (component manufacturers specifically makes standardised parts). This helps the manufacturer because he doesn't need to manufacture parts himself which saves money and time.

Standardised brought-in components speed up the production line because there isn't a range of ~~manif~~ all the same part. (Example Bolt → Need only one size rather than lots, and can be used to screw the chassis to door, bonnet, wheels etc..)

6. The image below shows a production line where both in-house and standardised bought-in components are used during manufacture.



know what
you're getting.
Quality of parts
is very high.

Parts tend to
be very easy to
assemble - instructions

Parts already
have a nice finish

Evaluate how the use of standardised bought-in components benefits the manufacturer when assembling products on the production line. [8]

Standardised bought-in components allow the manufacturer to know what they're getting. The quality of the materials in the parts is very high as it has to meet a certain specification. The parts tend to be easy to assemble, the manufacturer doesn't have to waste time creating a concept or idea on how to make the parts and assemble them, instead he can follow instructions and assemble the bought-in parts. All the parts will come in with a very aesthetically pleasing finish, manufacturer won't have to paint parts or apply a finish as it's already done. In conclusion, standardised bought-in components save the manufacturer a big amount of time and thinking in regard to their product.



6. The image below shows a production line where both in-house and standardised bought-in components are used during manufacture.



~~+ less production~~
~~↳ saves time~~
~~+ economies of scale~~
~~+ less machinery needed~~
~~+ less space needed~~
~~+ easy replace/repair~~

Evaluate how the use of standardised bought-in components benefits the manufacturer when assembling products on the production line. [8]

Using standardised bought-in components is useful because if buying in bulk, such as for ~~car~~^{car} production where many are made, the manufacturer may benefit from economies of scale, lowering their cost per unit. ^{Another advantage is,} it also means less production for the manufacturer as they don't have to produce those parts themselves, saving them time and money. Not producing these parts also means less machinery/equipment is needed by the manufacturer, which helps to save space, meaning a smaller space/factory is sufficient, helping to reduce overheads/rent. ~~reducing~~. Lastly, if there was a fault/mistake with a product, eg. car, ~~or~~ if buying standardised parts in bulk, these faults could be easily repaired/replaced as standardised components are ~~easy~~ readily available, which is cheaper ^{and faster} than if the manufacturer was producing the parts themselves.

9. Understanding the target market is critical to the success of a new product.

Describe what you understand by the term 'market segmentation' and explain its importance in the development of new products. [8]

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Question 9

		AO3	AO4	Mark
(a)	Describe what you understand by the term 'market segmentation' and explain its importance in the development of new products.		✓	8
<p><i>Answers that indicate an understanding of the term market segmentation can be awarded up to 8 marks based on:</i></p> <ul style="list-style-type: none"><i>Market segmentation is the term to describe the division of a market of potential customers into groups, or segments, based on different characteristics.</i><i>The segments created are composed of consumers who will respond similarly to marketing strategies.</i><i>The segments share traits such as similar interests, needs, or locations.</i><i>Its objective of market segmentation is to design a marketing mix that precisely matches the expectations of customers in the targeted segment.</i><i>They are important to the design of new products as segments may be targeted to suit the product – providing vital information to its future success.</i><i>Manufacturers or companies will not survive if the marketing strategy is dependent upon targeting an entire mass market - the importance of market segmentation is that it allows a business to precisely reach a consumer with specific needs and wants</i>				
Guidance to markers:				
<ul style="list-style-type: none">Candidate has a simplistic knowledge.The use of terminology and technical language is basic.The candidate has little understanding of the term market segmentation and does not explain its importance in the development of new products.		0-2		
<ul style="list-style-type: none">The candidate has a basic understanding of the issues associated with the question.The use of terminology and technical language is variable.The candidate understands some of the general benefits of the term market segmentation and explain its importance in the development of new products.		3-4		
<ul style="list-style-type: none">The candidate demonstrates a clear understanding of the issues associated with the question.The use of terminology and technical language is reasonably accurate.The candidate understands the term market segmentation and explains its importance in the development of new products.		5-6		
<ul style="list-style-type: none">The candidate demonstrates a clear understanding of the issues associated with the question.Uses correct terminology and technical language.The candidate clearly understands clearly the term market segmentation and explain its importance in the development of new products.		7-8		
		Total		
		8		

9. Understanding the target market is critical to the success of a new product.

Describe what you understand by the term 'market segmentation' and explain its importance in the development of new products. [8]

Market segmentation is a term which describes ~~creat~~ developing a product for a smaller section of the market which may not appeal as much to others (^{niche} ~~niche~~).

This is important in development of new products because it solves smaller design ~~prop~~ problems / design problems.

An example of this is the ~~child~~ Baby Spoon which uses the smart material thermochromic plastic - this changes colour when introduced to certain amounts of heat which allows parents to test how hot the food is before giving it to their child. Designers ~~can~~ find gaps in the market which products such as the ~~Spoon~~ innovative Spoon can thrive. For the manufacturer, this can turn over huge profits, they can produce in batch or mass production.



9. Understanding the target market is critical to the success of a new product.

Describe what you understand by the term 'market segmentation' and explain its importance in the development of new products. [8]

Market segmentation is the splitting of the target market into groups such as boys and girls, boys wouldn't tend to buy a fluffy pink bike. Market segmentation allows the development of new products to target each certain group. For example, if iPhone released their new phone in silver, black, pink and blue. This would reach all areas of the segmented market. Market segmentation also allows new products to focus on just one area of the market, this will allow the product to contain all specification points needed to meet this target market, when that product is then developed to meet other markets, small changes are required.



9. Understanding the target market is critical to the success of a new product.

Describe what you understand by the term 'market segmentation' and explain its importance in the development of new products. [8]

Market segmentation is where the market is split into smaller sections to help focus the product / develop products for different market's needs/wants. For example, the market is usually split ~~by~~ ^{into} geographical, psychological, demographical and behavioural segments. This may include: where the target market lives (rural / urban), their religion or personal views, their age / sex, and their lifestyle choices. This is important to designers when developing new products because it helps identify who their ~~spc~~ target market is and what their specific needs/wants are, to ensure they design the most suitable product to ensure demand/sales. This may include specific colours, materials used (sustainability etc.).

