

Retired Onscreen Test Version 6 Unit 1: The Engineered World

BTEC Firsts Level 1/2 in Engineering

Introduction



This retired onscreen test has been made available to centres to help you prepare your learners for their BTEC Firsts Level 1/2 external assessments.

We recommend that you use this test as a written assessment which is then either teacher marked or peer assessed.

This retired test should be used in conjunction with the Mark Scheme and the Lead Examiner's Report to clearly identify the assessment requirements. These documents are available at:

<http://www.edexcel.com/quals/firsts2012/engineering/Pages/default.aspx>

Retired Test Development



We are currently working towards a simulation test where mock onscreen tests can be taken in a real environment. However as this is being developed, we have temporarily created these PowerPoint based tests to support you.

How can I view the videos in the test?

This document has been produced using screen captures of the retired onscreen test. As such, videos are not available in this PowerPoint document. This document should be used in conjunction with the retired onscreen test which is available on the website:

<http://www.edexcel.com/quals/firsts2012/engineering/Pages/default.aspx>

How can I see the drop down menus in the test?

Where a drop down menu may obscure information the learner requires to answer a question, we have instead supplied a text box containing the options from the drop down menu. To view drop down menus please use the retired onscreen test.

Question 1/19

The video shows a conventional machine tool being used to carry out an engineering process.

(a) Which engineering process is shown in the video? (1)

Click on **one** of the boxes.

Welding

Milling

Boring

Turning



(b) Which modern production method can be used to automate a conventional machine tool? (1)

Click on **one** of the boxes.

PCB

GRP

CNC

SMA

The video shows a conventional machine tool that is cutting from the centre down a length of material. The cutting tool is spinning but stationary whilst the material is moved along.

© iStockphoto

Question 2/19

Different engineering sectors produce different products.

Match the **two** products to the most appropriate engineering sector. (2)

Click on each product and then the correct engineering sector.

Product

Engineer's vice



Multimeter



Engineering sector

Electrical/Electronic

Mechanical

Agricultural

Chemical

Civil aerospace

Question 3/19



Safety glasses are commonly used in workshops.

They are worn by engineers when carrying out machining operations to protect their eyes from hazards.

(a) State **two** hazards that require an engineer to wear safety glasses when carrying out machining operations. (2)

Type your answers in the boxes.

Safety shields are different to safety glasses and are worn when carrying out casting operations.

(b) Give **one** reason why engineers wear a safety shield instead of safety glasses when carrying out casting operations. (1)

Type your answer in the box.

Question 4/19



Engineers use lean manufacturing techniques at the production stage of a manufacturing process.

Complete the sentences about lean manufacturing. (2)

Select the correct words from the drop down menus to complete the sentences.

Just-in-Time (JIT) minimises in an engineering process.

Poka-yoke prevents in an engineering process.

Question 5/19

The video shows an industrial robot moving a car windscreen.

Identify **two** disadvantages of using robots for this type of application. (2)

Click on the **two** correct disadvantages.

Cannot work quickly and continuously

Cannot learn from recurring mistakes

Cannot carry out repetitive operations

Cannot adapt quickly to changing circumstances

Cannot work in hazardous environments

The video shows an industrial robot which picks up and moves a car windscreen to a different part of the manufacturing process.



Play

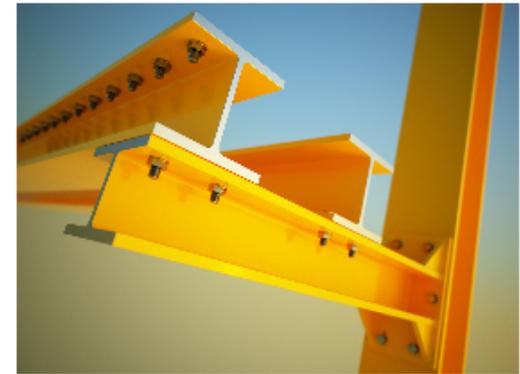


Question 6/19

The image shows assembled bridge girders manufactured from recycled plastic bottles.

Explain **one** advantage of using recycled plastic material in this application. (2)

Type your answer in the box.



Question 7/19

The image shows metal tongs.
Metal tongs are used for a variety of operations when sand casting steel components.

(a) Give **two** reasons why metal tongs are used during the sand casting process. (2)

Type your answers in the boxes.



(b) Give **one** reason why sand casting would be used to manufacture steel components. (1)

Type your answer in the box.

Question 8/19



Rechargeable batteries can be recharged using mains electricity.

Give **two** advantages of recharging batteries when attempting to minimise waste production. (2)

Type your answers in the boxes.

Question 9/19

Modern manufacturing organisations use kaizen activities as an integral part of their production operations.

Identify **two** characteristics of a kaizen activity. (2)

Click on the **two** correct characteristics.

Continuous improvement

Small changes to processes

Large-scale changes to production

Use of recycled materials

Using robots to automate processes

Question 10/19

The image shows the mass production of trucks on an assembly line.

Explain **two** disadvantages of using mass production when manufacturing trucks. (4)

Type your answer in the box.



Question 11/19

Machining processes are normally used for material removal.

Match the **two** cutting tools to the processes they are used for. (2)

Click on each cutting tool and then the correct process.

Cutting tool



Process

Producing taper forms

Producing external threads

Producing counter bores

Producing reamed holes

Producing knurled finishes

Question 12/19



Many communication networks use optical fibres to transmit data.

Complete the sentence about optical fibres. (1)

Select the correct word from the drop down menu to complete the sentence.

Optical fibres are manufactured using as the material that transmits data.

copper
glass
cobalt
titanium

Question 13/19

Engineers use different processes to assemble products.

Which **one** of these products is installed using surface mount technology? (1)

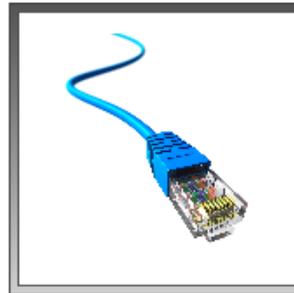
Click on the correct image.



Computer chip



Nut and bolt



Network connector



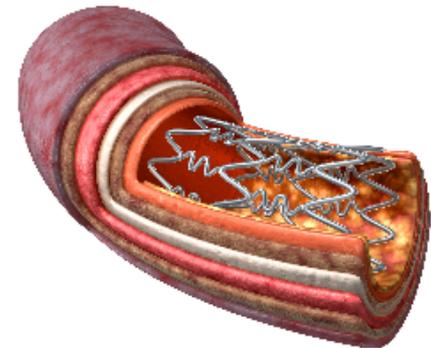
Bearing race

Question 14/19

Arteries carry blood around the body and can get blocked over time.
The image shows a surgical stent that is used to open narrow arteries.
Surgical stents can be manufactured using shape memory alloys (SMAs).

Explain **two** advantages of using shape memory alloys for surgical stents. (4)

Type your answer in the box.



Question 15/19

Life Cycle Assessment (LCA) can be used to measure the sustainability of engineered products.

Identify the **two** correct Life Cycle Assessment stages. (2)

Click on the **two** correct stages.

Use

Reduction

Assembly

Dispatch

Forming

Question 16/19



Wave power can be used to generate hydro energy.

Explain **one** advantage of using wave power to generate hydro energy. (2)

Type your answer in the box.

Question 17/19

The image shows an operator preparing metal powder as part of the powder metallurgy process. One part of the powder metallurgy process is mixing/blending powders.

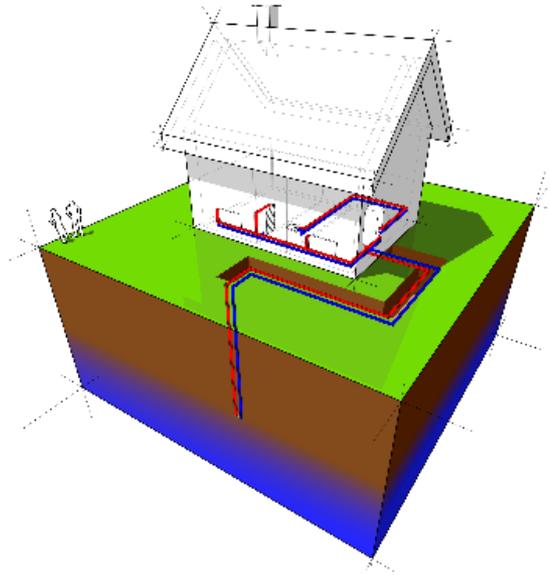
Explain **two** reasons why powders are mixed/blended as part of the powder metallurgy process. (4)

Type your answer in the box.



Question 18/19

The image shows a sustainable domestic heating system, which includes a heat pump.



Explain **one** advantage of using a heat pump in a sustainable domestic heating system. (2)

Type your answer in the box.

Question 19/19



LQR Automotive is a large-scale manufacturer of motorcycles.
It is considering manufacturing a range of new motorcycles powered by hydrogen fuel cells.

Evaluate the use of hydrogen fuel cells as a power source for a new range of motorcycles manufactured by LQR Automotive. (8)

Type your answer in the box.