

Exam practice 1 - Materials 1



Material	Advantages	Typical Uses
Wool		
Polyester		
Foil Lined Board		
Layout/Tracing paper		
Aluminium (Non-Ferrous Metal)		



Fill out the table in order to help you answer the questions for this practice sheet. Add as much detail as possible.

- 1) This jumper needs to be warm, soft and crease resistant which material should it be made from? (1)

- 2) Discuss why some sportswear is made from polyester and not wool. Give a reason and explain (2)



- 3) Which paper or board would an architect use to draw up his plans? (1)

- 4) Give one advantage to why this paper or board would be best. (1)



- 5) Which paper or board would be used to make this orange juice container? (1)

- 6) Describe a benefit of using this paper or board. (1)



Exam practice 1 - Materials 1

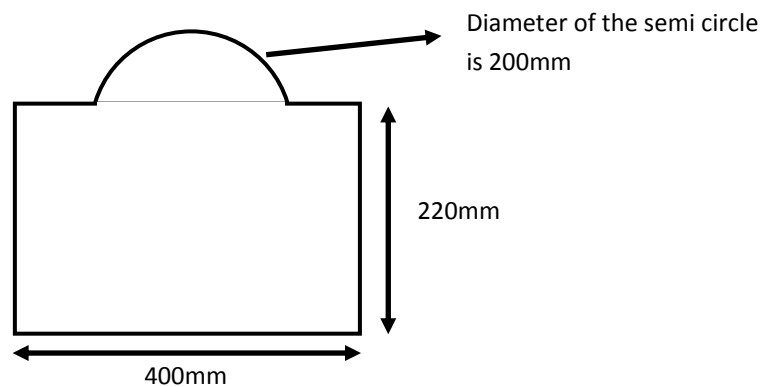


Below is pictured an Airbus A380 Aeroplane.



- 7) Give **two** reasons and explain why aluminium has been used for the body of this aeroplane. (4)

- 8) Details of a part made from aluminium for the aeroplane are shown below.



Calculate the area of the part. (show all workings) (4)

Exam practice 2 - Materials 2



Fill out the table in order to help you answer the questions for this practice sheet. Add as much detail as possible.

Material	Advantages	Disadvantages
Pine (Soft wood)		
Plywood (Manufactured)		
Acrylic (Thermoplastic)		
UF (Thermosetting plastic)		
Cast Iron (Ferrous Metal)		

1) Discuss the properties of pine which make it suitable for this chair. (3)



2) Why is plywood a better suited material for this chair? (2)



3) Discuss which plastic would be best for this plug.(3)



Exam practice 2 - Materials 2



Below is pictured a set of cast Iron dumb bells.



- 4) Give **one** reason and explain why cast iron has been used for the weights . (2)

- 5) The spinlock collars are made from Aluminium, some are made from Acrylic. Evaluate which material you think is best and give reasons why. (3)

- 6) Mr Mason needs to buy 60KG worth of standard cast iron disks for his home gym. How much will this cost him if he buys these sets for £34.99 off Amazon? -

Show your working in the box below. (2)



York Fitness 4 x 5kg Standard Cast Iron Disc Set

Get a £5 promo code with the Amazon App. [Learn more](#).

by York Fitness
★★★★★ 226 customer reviews | 10 answered questions

Amazon's Choice for "york weights"

Price: **£34.99** & **FREE Delivery** in the UK. [Delivery Details](#)

In stock.

Want it delivered by Tuesday, 23 Jan.? Order within **18 hrs 36 mins** and checkout. [Details](#)

Dispatched from and sold by Amazon.

Answer -

Exam practice 3 - Scales of manufacture



- Scale of manufacture is about the number of identical products to be made.
- As the quantity of products to be made increases, the type of process that needs to be carried out, such as removing or joining material, may be the same; however, the tools and equipment used to carry out these processes may be different.



Type	Characteristics	Example
One-off production		
Batch production		
Mass production		
Continuous Production		

1000 are manufactured

50 are manufactured

100,000 are manufactured



Choose a product from the left and tick the box. The following questions will relate to this product.

1) State the most suitable scale of production for your chosen product. (1) _____

2) Evaluate the suitability of this scale of production for your chosen product (3)

3) Analyse your chosen product in terms of its environmental impact (2)

Exam practice 3 - scales of manufacture



4) Evaluate your chosen product in terms of two safety considerations (4)

5) You have been asked to re-design your chosen product. Describe one benefit of using the design strategy of collaboration to carry out this task (2)

6) For your chosen product, identify a type of drawing that could be used to:

A) - Show your initial ideas for discussion _____ (1)

B) - Show your final proposal to a potential client _____ (1)

C) - Provide details for manufacture _____ (1)



Exam practice 4 - Electronic Systems and Programmable components



To find the information required to learn about Microcontrollers and Programmable components for this homework you must go on www.sohamdt.com and find it!



What is a microcontroller (PIC)?

How do you programme a microcontroller? _____



- 1) Place a tick in the box to indicate the correct term for **each** of the statements. (3)

STATEMENT	INPUT	PROCESS	OUTPUT
Pressing the button on a computer mouse.			
The sound coming out of Mr Mason's new pioneer speakers.			
A microcontroller receiving a signal and telling a component what to do.			

- 2) Explain **Two** of the main benefits in detail of using a programmable microcontroller. (2)

- 3) A thermostat in a house relies on feedback to control the central heating. Explain what would happen if the thermostat didn't receive any feedback at all. (2)

Exam practice 4 - Electronic Systems and Programmable components



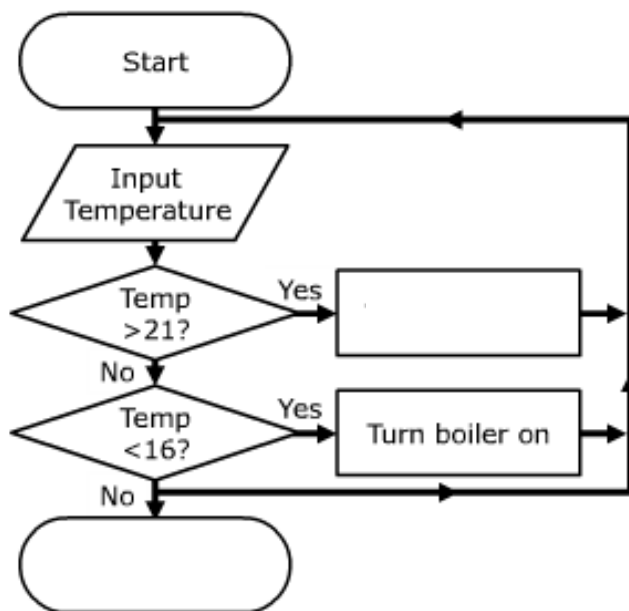
- 4) Describe in as much detail as possible the three stages of programming a microcontroller. (2)

Stage 1:

Stage 2:

Stage 3:

- 5) Complete the flow chart below for the thermostat. (2)



- 6) The cost of a resistor is £0.05 pence. The cost of a thermistor is £0.03 pence. For an electronics project, Miss Knight needs enough components for six classes of 23 students. Unfortunately, the price of resistors have just risen by 6%.

Show your working and work out how much it cost Miss Knight to purchase these components. (4)



Answer:

Exam practice 5 – Mechanisms / levers / pulleys



What are levers? _____

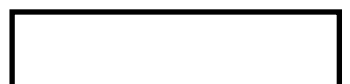
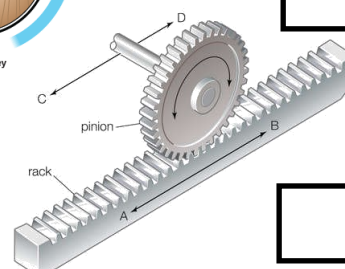
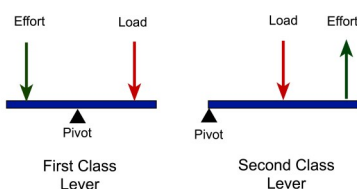
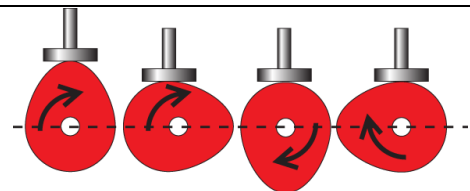
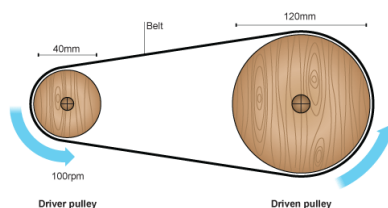
What are CAMS? _____

What are pulleys and belts? _____

What is a rack and Pinion? _____

Equation	Explanation	Calculation
Mechanical Advantage		
Velocity Ratio for Levers		
Velocity Ratio for a Pulley System		
Output speed of a Pulley System		

1) Name the different Mechanisms (4)

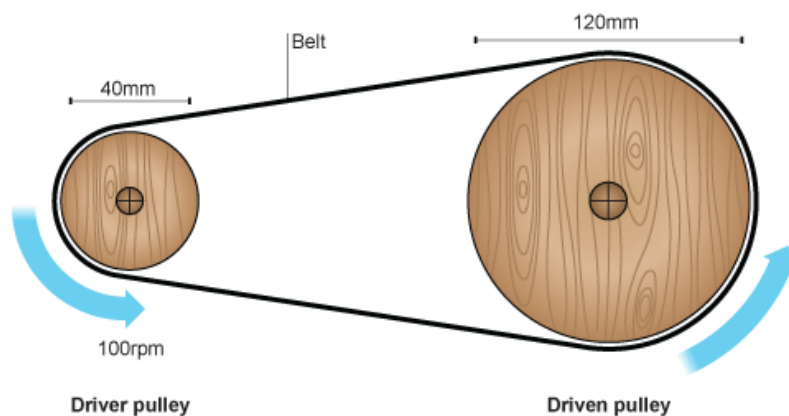


Exam practice 5 – Mechanisms / levers / pulleys



- 2) What type of lever is the wheelbarrow? (1) _____
- 3) Calculate the mechanical advantage of the wheelbarrow and show your working. (2)

- 3) Calculate the Velocity ratio for the pulley system and show your working. (3)



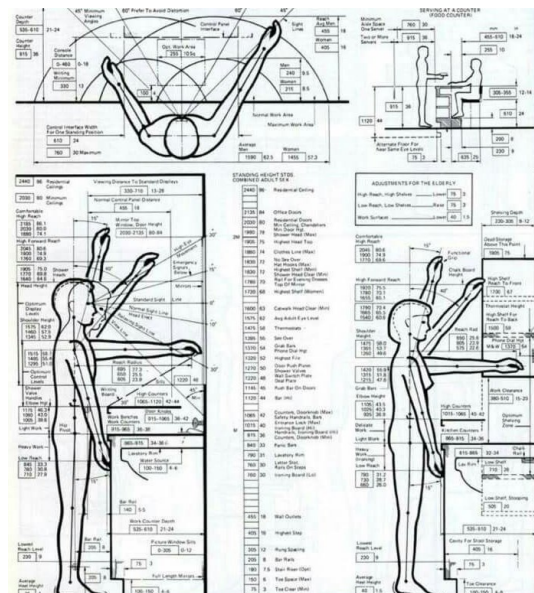
- 4) Calculate the output speed of the pulley system and show your working. (3)

- 5) State how the design of this pulley system could be changed to make wheels go faster. (2)

Exam practice 6 - ergonomics / anthropometrics



	Explanation
Ergonomics	
Anthropometrics	
5th to the 95th Percentile	



- 1) Why is it important that designers think carefully about ergonomics when designing an Xbox controller? (2)

- 2) The sheet above shows anthropometric measurements. Name a product that could be designed using this sheet. (1)

Exam practice 6 - ergonomics / anthropometrics



- 3) What pieces of anthropometric data (Measurements) would you need to collect to design the drivers seat, steering wheel and dashboard for this car? (4)

- _____
- _____
- _____
- _____



- 3) This is an ergonomic chair which has been designed with ergonomics at its heart. What benefits will a user have from using this chair? (4)



- 4) These earphones are a prototype in the iterative design process. Why is it so important that anthropometric data is used when developing this product? (3)

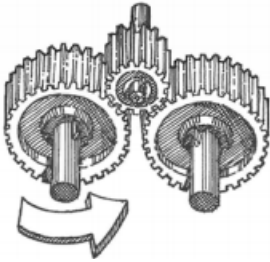
- 5) How could you test these earphones? (1)

Exam practice 7 - Gears

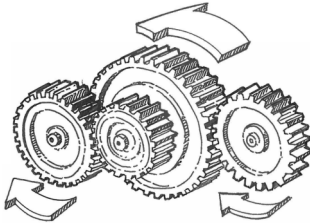


A gear is a toothed wheel fixed to a shaft that connects (meshes) with other gears to Change the speed or direction of rotation of a driving mechanism. Gears have an Advantage over pulley systems, because the meshing prevents slippage so that greater Forces can be applied.

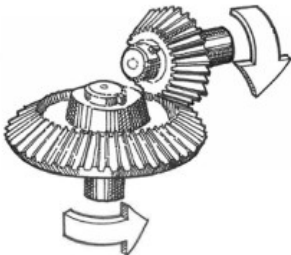
Explain in detail what types of gears these are:



Name: _____



Name: _____



Name: _____

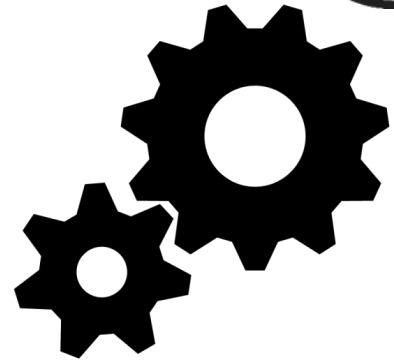
Equation	Explanation	Calculation
Velocity ratio of a simple gear system		
Velocity Ratio of a compound gear system		
Output speed for a gear system		



terms:

Torque: A measure of a system's turning power.

RPM: (Revolutions per minute) Is the number of times a device, such as a gear or wheel, rotates around a fixed axis in 1 minute.



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