Year 9

DESIGN AND TECHNOLOGY

TERM 1 LST / HOMEWORK

NAME:	TEACHER:

LST year 9 Unit 1 new and emerging technologies

This will be your starter activity in every lesson. You must revise the below as you will be tested.

question	answer
1. Which **one** of the following best describes Just In Time (JIT) production?	Ordering and manufacturing parts as they are needed
2. Which **one** of the following is **not** a consideration in the Life Cycle Assessment:	Worker's rights
3. Explain **one** advantage to the manufacturer of using robots for assembly.	Work 24/7 // take no breaks; therefore, production is non-stop / increased output levels unaffected by tiredness // consistent accuracy; therefore, fewer rejects as the inspection stage increases output / reliability faster assembly // greater throughput; therefore, increased levels of production
4. State **one** disadvantage of using robots to the manufacturer.	Expensive setup costs; need to train skilled workers to manage, maintain and reprogram the robots
5. Explain how current trends could influence a redesign in the design of the seat.	May not be constructed from environmentally friendly materials; unlikely to be recycled as many parents do not trust a used seat / parts may need to be more recyclable; safety standards may enforce a change to the strapping, fittings or restraints e.g. five point harnesses, Isofix or changes in height/age/weight restrictions. Aesthetic design may include colours or designs that date quickly, for example prints of the latest popular cartoon characters or colours associated with characters.
6. Explain how the manufacturer can use virtual marketing techniques to market a new design for the seat.	Social media campaign; viral online video; search engine optimisation to increase position in search results; email marketing.
7. Explain **two** benefits that just-in-time (JIT) manufacturing could have for the	They will have much less material in stock; therefore they have less money

manufacturer of the seat.	tied up/invested in materials they are not using. They do not have to employ staff on permanent contracts; therefore they can employ staff as and when required; reducing the wage bill. Once the seats have been manufactured they are shipped out; therefore no expensive storage/warehouse required.
8. The manufacturer suggests a recommended retail price of £78. Wholesalers are given a 40% reduction on retail price. Calculate the price that wholesalers will pay for one seat.	£46.80. 78 * 0.6 = 46.80
9. The total cost of making one seat is £35.10. Calculate the percentage profit made by the manufacturer.	25% profit; 46.80 – 35.10 = 11.70. 11.7 / 46.8 = 0.25 * 100. Award marks for calculating the margin on each unit based on their answer for part (i) and for calculating the percentage
10. Energy sources can be categorised as either finite or non-finite.	A resource that is in unlimited (or almost unlimited) supply.
11. State what is meant by a non-finite resource. Give **one** example of a finite energy source.	Answers include: oil; gas; or coal.
12. In 1916 the planet's population was just under 2 billion. In 2016 it had risen to 7.4 billion. Discuss how this has affected our use of finite resources?	Significant increase in the depletion of finite resources; Global effort to reduce the level of consumption and increase in renewable energy sources to meet government targets; and increase in the use of products that contain recycled parts or recyclable parts to avoid using finite resources.
13. Burning fossil fuels releases Carbon Dioxide into the Earth's atmosphere which is linked to Global Warming. Give **two** effects of global warming.	Answers include: Rising sea levels, more extreme weather phenomenon, more frequent extreme weather, rising air and sea temperatures, melting of the polar ice caps.
14. 'Technology push' and 'market pull' are	Product ideas are realised in response

forces that bring new products to market. State what is meant by 'technology push'.	to new technologies.
15. Give one example of a technology push force.	The invention of a new technology, the miniaturisation of an existing technology or the discovery of a new use for an existing technology.
16. Explain why designers might make an ethical decision to use • Recycled components • Biodegradable packaging • Fairtrade materials	**Recycled components** Components often contain valuable materials such as gold, copper, aluminium; which are difficult to extract and take a large amount of energy to extract and refine These materials are non-renewable and are becoming more difficult and costly to find Many components contain harmful materials that should not be left in landfill; saves landfill space. **Biodegradable packaging** Does not use up as many finite resources such as oil; is not as harmful to the environment when extracted They are easier to recycle/use less energy to recycle; they decompose much more quickly so that less waste is left in landfill; they are non-toxic when they break down They require less energy to process into a useable material Biopolymers reduce our reliance on imported oil. **Fairtrade materials** Farmers are paid a living wage which allows them to survive and earn enough money to feed their families Ensures workers / farmers get a fair price for their labour / products; it gives small scale farmers access to global markets Communities are often given help in setting up local amenities such as schools or wells
17. Define what is meant by the term '*planned obsolescence'*.	The design of products with a *deliberately limited lifespan*.

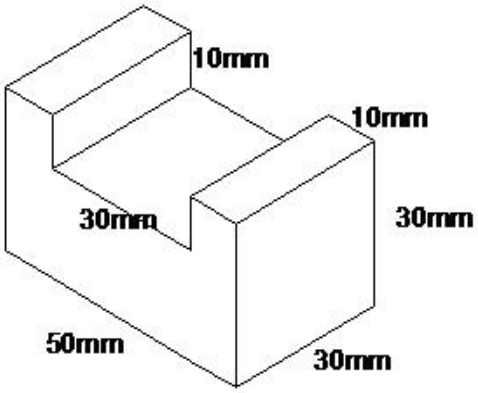
18. State **one** disadvantage and **one** advantage of a global market to the **manufacturer** and the **consumer**.	Manufacturer: Much larger possible market to sell goods to; parts can be sourced from a greater number of companies; can seek advantages in market price competition between parts suppliers. More competitors in the field. Consumer: Much greater choice of products; price competition means better prices. Too much choice; products may not always be designed to work with domestic power supplies, systems or cultures.
19. New products can be manufactured by hand or by computer aided manufacture (CAM). State **two** advantages of Computer Aided Manufacture (CAM).	Faster than traditional machines and tools; more accurate than traditional methods; high repetitive accuracy; machines can operate 24/7; can work directly from CAD files; machines can make items more complex than is possible by hand.
20. Explain why products are becoming more and more difficult or expensive to repair.	Use of specialist tools required; specialist knowledge required; outsourcing repairs can be labour intensive which is expensive; spare parts can be expensive and may need to be shipped from abroad; electrical components may be complex, or integrated into the product; materials are commonly bonded using permanent bonds rather than screws.

ISOMETRIC HOMEWORK

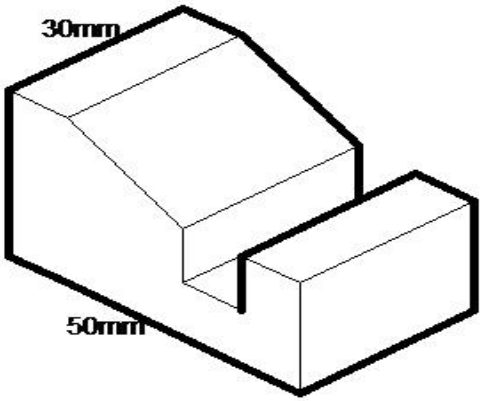
QUESTION 1

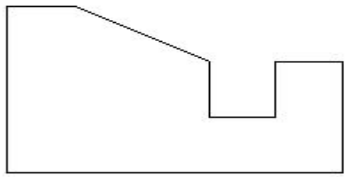
a) Produce an Isometric drawing of shape 1 above. [5]

b) Apply the thick and thin line technique to your drawing. [3]



ORTHOGRAPHICS HOMEWORK



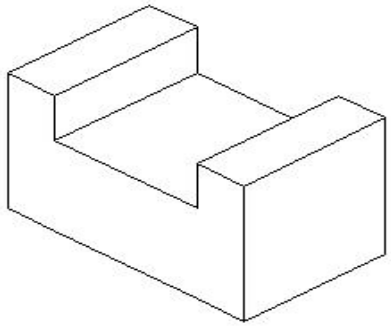


QUESTION 2

a) Construct an orthographic drawing of shape 2. [4]

b) Shade or render the 3D shape. [3]

PERSPECTIVES HOMEWORK



QUESTION 3. Construct a 2-point perspective drawing of SHAPE 1. [5]

Homework 1: Industry and enterprise

1. The automotive industry makes use of robotics in production line manufacturing.

   (a) Describe **two** factors that make the production of cars suitable for automated assembly line manufacture. [4]

   (b) The introduction of robotics and automation in industry has impacted the design of the workplace.

      (i) Explain **one** way in which automation may affect the physical layout of a parts warehouse. [2]

      (ii) Explain **one** way in which automation may have changed systems and procedures in picking and packing items from the warehouse. [2]

2. The invention of a new and emerging technology often requires significant investment for product development and advertising before it can become mainstream.

   Explain **one** method a small organisation might employ to increase funding or awareness of their new product. [2]

Total 10 marks

Homework 2: Sustainability

1. Energy sources can be categorised as either finite or non-finite.

   (a) State what is meant by a finite resource. [1]

   (b) Give **one** example of a non-finite energy source. [1]

   (c) Explain **one** benefit to the environment of using non-finite energy resources. [2]

2. Manufacturers frequently make choices about their suppliers of raw materials based on their impact on society and the environment.

   Examples include the use of recyclable components, fair trade textiles and biodegradable packaging.

   Discuss how these choices may improve the ethical image of a company. [6]

3. The Japanese ‘Kaizen’ culture describes continuous improvement.

(a) Describe what is meant by ‘continuous improvement’. [2]

(b) State how employees are commonly involved in the continuous improvement process. [1]

4. State **one** way in which manufacturing and consumption affects:

   (a) pollution levels [1]

   (b) global warming [1]

Total 15 Marks

Homework 3: People, culture and society

1. 'Technology push' and 'market pull' are forces that bring new invention and discovery to the market place.

   (a) Give **two** reasons why a competitive advantage can be gained by a company in being the first to push a new technology onto the market. [2]

   (b) (i) State what is meant by 'market pull'. [1]

   (ii) Give one example of a market pull force. [1]

2. A supplier is discovered to be selling clothing items of a similar quality significantly cheaper than any of its competitors.

   (a) Discuss any ethical questions that retailers might ask before purchasing stock? [4]

(b) The supplier reports that its materials are produced in a factory that is entirely automated.

Explain **one** reason why automation might enable a factory to reduce production costs? [2]

(c) Suggest **one** cost that may increase with an increase in automation. [1]

3. A new supermarket is being built on the outskirts of a town.

Discuss how its design might incorporate features to avoid negative impact on minority groups including the disabled and the elderly. [4]

Total 15 Marks

Homework 4: Production techniques and systems

1. Which **one** of the following is a principle of ‘lean’ manufacturing: [1]

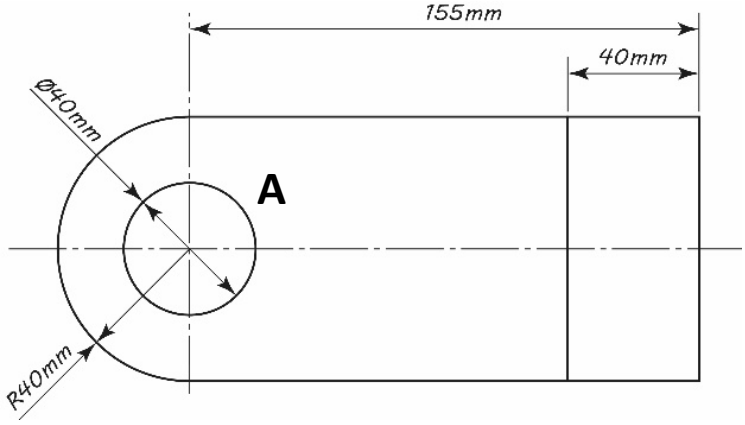
   - Increasing production speed
   - Eliminating waste
   - Reducing quality
   - Improving staff morale

2. Which **one** of the following statements is true? [1]

   - Flexible Manufacturing Systems are largely manual processes
   - Computer Aided Manufacture is slower than using traditional machines and tools
   - Computer Aided Design can only produce two-dimensional designs
   - Computer Numerical Control is used with automated milling machines

3. Describe **one** feature of Flexible Manufacturing Systems (FMS) that make them suitable for producing short runs of a particular part? [2]

4. A component is shown below.



(a) The part needs to be drawn to a scale of 1:4.
Calculate the diameter of hole **A** on the new scale drawing. [1]

(b) The part is currently being designed in the UK using a Computer Aided Design (CAD) software package before being manufactured by an automated machine.

(i) State **two** advantages of using CAD software to produce the drawing. [2]

(ii) Give **one** disadvantage of using CAD to produce the design. [1]

(c) Explain **two** benefits that just-in-time (JIT) manufacturing could have for the manufacturer of the part. [4]

Total 12 Marks

Homework 5: Informing design decisions

1. Planned obsolescence is used to create products with a deliberately limited lifespan. Which **one** of the following is not a factor in deciding the lifespan of a product: [1]

   - Fashion
   - Colour
   - Available material
   - Function

2. Manufacturers might consider using recycled material in the construction of a new product.

   (a) Identify **three** considerations when sourcing used parts. [3]

   (b) Describe **two** benefits to a manufacturer of designing and making a product from recycled parts. [4]

   The new product should be responsibly disposed of at the end of its life.

   (c) Give **two** ways a company can design a product to improve its recyclability? [2]

3. Manufacturers can design products so that can be easily repaired or maintained.

   (a) Give **one** design feature that makes a product easier to repair at home. [1]

(b) State **one** advantage and **one** disadvantage to a company of making their products easily repairable by professionals. [2]

(c) Why might it still be cheaper for consumers to purchase a new product rather than having it repaired by a third party? [1]

Total 14 Marks