

Design & Technology

Effects of technological developments

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary
- For the multiple choice questions, circle your answer

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don't spend too much time on one question

Good luck!

Q1. What is the definition of a smart material?

- A** A material that has been engineered to have additional properties
- B** A material whose physical properties change in response to external stimuli
- C** A material that is available in large sheets

Q2. Smart materials have?

- A** Properties that can significantly change
- B** Good conducting properties
- C** Weak covalent bonds

Q3. Which of the following statements is false about mass production?

- A** Increased sales/profits
- B** consumers have less choice
- C** cheaper materials can be used

Q4. Which of the following statements about technology is false?

- A** Lithium-ion rechargeable batteries providing a lightweight means of storing a lot of energy resulting in thinner and fuel cells
- B** Computers have resulted in slow-turn Around jobs
- C** CIM systems incorporating CAD and CAM used in modern manufacturing

Q5. Outline the negative effects mass-production has had on employment **(4 marks)**

Q8. A new Tesla has been designed and is ready to enter the production phase. The company has two choices:

- Use a manufacturing facility in a first world country
- Use a manufacturing facility in a third world country

The facility will be the same regardless of its location. Discuss the factors that need to be considered when deciding where to manufacture the new car **(9 marks)**

Answers

Q1. B

Q2. A

Q3. B

Q4. B

Q5.

- Workers replaced by machines (1)
- Low job satisfaction/ morale/ self-pride in the work (1)
- Low wages (1)
- Poor quality living conditions/ poverty (1)
- Sweatshop employment/ long hours/ few breaks (women/children) (1)
- Poor/ unsafe/ bad working conditions (1)
- Uprisings/ strikes/ friction/ resentment (1)
- Unemployment/ less employment/ less demand for labour (1)

Q6.

1.

- Consumers buy up to date products/stay in fashion (1)
- Due to regular/frequent new releases (1)
- Increased customer satisfaction/pleasure (1)
- Consumers want to be seen with the latest product/one-upmanship (1)

2.

- Consumers have a wider selection (1)
- Due to increased competitiveness between businesses (1)
- Leading to competitive prices (1)
- Can plan/budget for replacement (1)
- Increased second hand market (1)

3.

- Drives innovation/new/improved features/multi-function products are developed (1)
- Which can improve consumers quality of life (1)
- Improved safety features/consumers are safer (1)

Q7.

- Creates more jobs (1) giving employees a regular income/higher pay (1) increasing their quality of life. (1)
- Employers need skills (1) so employees are trained up (1) leading to greater job satisfaction/promotion (1)
- Established a need for health and safety laws (1) which were brought in by the government (1) making the work environment a safer place (1)
- Trade unions established (1) increasing the influence/power of employees (1) bringing many employee benefits (sick pay, holidays, pensions etc.) (1)

Q8.

Students may refer to the following in their answer

- Available infrastructure
- Transportation costs/distance to market
- Availability of skilled workforce
- Workforce training
- Engineering expertise local/imported
- Cost benefits including low labour costs
- Public perception including ethics and exploitation
- Government incentives in host country
- Availability and price of development land
- Language barriers
- Exposure to volatile exchange rates
- Political instability of host nation
- Loss of jobs/skills
- Issues surrounding technical robotics expertise
- Labour related issues in host country
- Trade agreements and tariffs
- Availability/location of raw materials and components
- Benefits to the host nation
- Environmental considerations and regional legislation
- Health and safety legislation and employment law
- Just-in-time and issues surrounding border controls