

Design & Technology

Edexcel GCSE

Linkages

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. Which linkage changes the direction of a movement through 90°?

- A** Push/pull linkage
- B** Bell crank linkage
- C** Parallel motion linkage

Q2. In a reverse motion linkage, the output moves

- A** in the opposite direction to the input
- B** in the same direction as the input
- C** at 90° to the input

Q3. What is a fixed pivot?

- A** A pivot that joins two links and moves with them
- B** A type of gear
- C** A pivot attached to a base that does not move

Q4. Which linkage converts rotary motion into oscillating motion?

- A** Treadle linkage
- B** Push/pull linkage
- C** Bell crank linkage

Q5. Which product uses a parallel motion linkage?

- A** A bicycle brake
- B** A toolbox with cantilever trays
- C** A door bolt

Q6. In a push/pull linkage, the input and output move

- A** in opposite directions
- B** through 90°
- C** in the same direction

Q7. A car has two windscreen wiper arms. A motor drives wiper arm 1, and a connecting linkage joins wiper arm 1 to wiper arm 2.

Q7a. State the type of motion in wiper arm 1. **(1 mark)**

Q7b. Explain the function of the connecting linkage. **(2 marks)**

Q8. A bicycle brake system uses a bell crank lever.

State the function of a bell crank lever. **(1 mark)**

Answers

Q1. B

Q2. A

Q3. C

Q4. A

Q5. B

Q6. C

Q7a.

Oscillating (1 mark).

Q7b.

2 marks: detailed understanding of the function of the connecting linkage clearly linked to the motion of the wiper arms. 1 mark: simple understanding, e.g. it moves the wipers. Indicative content:

- To ensure both wiper arms move in parallel
- Makes sure the wiper arms move together in unison
- Makes sure the wiper arms do not clash or bang into each other
- Ensures both wipers work at the same time to clear both sides of the windscreen
- Stability in the mechanism
- Only one motor is needed

Accept all other valid responses.

Q8.

A bell crank changes the direction of a motion, including around corners (1 mark). Credit any other appropriate response.