

Design & Technology

Edexcel GCSE

Cranks and Sliders

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 change in motion takes place in a crank and slider mechanism when the crank handle is turned?

- A** Linear to reciprocating
- B** Oscillating to rotary
- C** Rotary to reciprocating

Q2. In a crank and slider, which part joins the crank to the slider?

- A** The guide
- B** The connecting rod
- C** The follower

Q3. Which product uses a crank and slider mechanism?

- A** A car engine
- B** A bicycle brake
- C** A record player turntable

Q4. The crank arm of a crank and slider is 30 mm long. How far does the slider travel in one stroke?

- A** 15 mm
- B** 30 mm
- C** 60 mm

Q5. What does the guide do in a crank and slider mechanism?

- A** Turns the crank
- B** Keeps the slider moving in a straight line
- C** Stores energy

Q6. Which statement about a crank and slider is true?

- A** It can only convert reciprocating motion to rotary motion
- B** It needs a spring to keep the slider in contact
- C** It can convert rotary motion to reciprocating motion and back again

Q7. An electric toothbrush uses a crank and slider linkage to transfer motion and give a back-and-forth brushing action.

Complete the sentences to show the types of motion. **(2 marks)**

The slider uses motion.

The crank uses motion.

Q8. The rider of a bicycle turns the pedal crank 36 times in 30 seconds.

Calculate the speed of the pedal crank in rpm (revolutions per minute). Show all workings. **(2 marks)**

Answers

Q1. C

Q2. B

Q3. A

Q4. C

Q5. B

Q6. C

Q7.

One mark for each correct answer (2 marks):

- The slider uses reciprocating motion (1)
- The crank uses rotary motion (1); accept rotation, rotational or rotating.
Do not accept circular or round

Q8.

- Rotation speed = number of revolutions $\div$ time taken: $36 \div 30 = 1.2$ revolutions per second (1)
- There are 60 seconds in a minute, so $1.2 \times 60 = 72$ rpm (1)

Note: the published mark scheme labels the first step "1.2 rpm"; the 1.2 is per second, and the final answer of 72 rpm is the same.