

GCSE Physics

Worksheet: Direct and alternating potential difference

TIME 30 min	TOTAL 30 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Direct and alternating potential difference

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

01

Electrical appliances can be powered by batteries or by the mains supply.

01.1

What type of potential difference does a battery provide?

Tick (✓) **one** box.

alternating	☐
direct	☐
mains	☐

[1 mark]

01.2

State the frequency of the mains electricity supply in the UK.

Frequency = Hz

[1 mark]

0 1 . 3

State the potential difference of the mains electricity supply in the UK.

.....

.....

.....

Potential difference = V

[1 mark]

0 1 . 4

Describe the difference between a direct potential difference and an alternating potential difference.

.....

.....

.....

.....

[2 marks]

0 2

0 2 . 1

State whether a torch battery provides a direct or an alternating potential difference.

.....

.....

.....

[1 mark]

0 2 . 2

A supply's potential difference reverses direction many times each second.

What type of supply is this?

Tick (✓) **one** box.

Direct

☐

Alternating

☐

[1 mark]

0 3

0 3 . 1

What is the frequency of the mains electricity supply in the UK?

Tick (✓) **one** box.

5 Hz

☐

50 Hz

☐

60 Hz

☐

230 Hz

☐

[1 mark]

0 3 . 2

A graph of potential difference against time for a supply is a horizontal straight line above the time axis.

What does this show about the supply?

Tick (✓) **one** box.

It is a constant, direct potential difference

☐

It is an alternating potential difference

☐

No potential difference is being supplied

☐

[1 mark]

0 4

The UK mains electricity supply is an alternating supply with a frequency of 50 Hz.

0 4 . 1

State what is meant by a frequency of 50 Hz for the mains supply.

.....

.....

[1 mark]

0 4 . 2

Calculate the time for one complete cycle of the mains supply.
Use the Physics Equations Sheet.

.....

.....

.....

.....

Time = s

[2 marks]

0 4 . 3

How many times each second does the direction of the current from the mains supply reverse?

Tick (✓) **one** box.

25	☐
50	☐
100	☐
230	☐

[1 mark]

0 5

The mains electricity supply in the UK is an alternating supply with a frequency of 50 Hz.

0 5 . 1

Explain what is meant by an alternating potential difference with a frequency of 50 Hz.

.....

.....

.....

.....

[2 marks]

0 5 . 2

Calculate the time taken for one complete cycle of the mains supply.
Give your answer in milliseconds.
Use the Physics Equations Sheet.

.....

.....

.....

.....

Time = ms

[2 marks]

0 5 . 3

Which **two** of these provide a direct potential difference?
Tick (✓) **two** boxes.

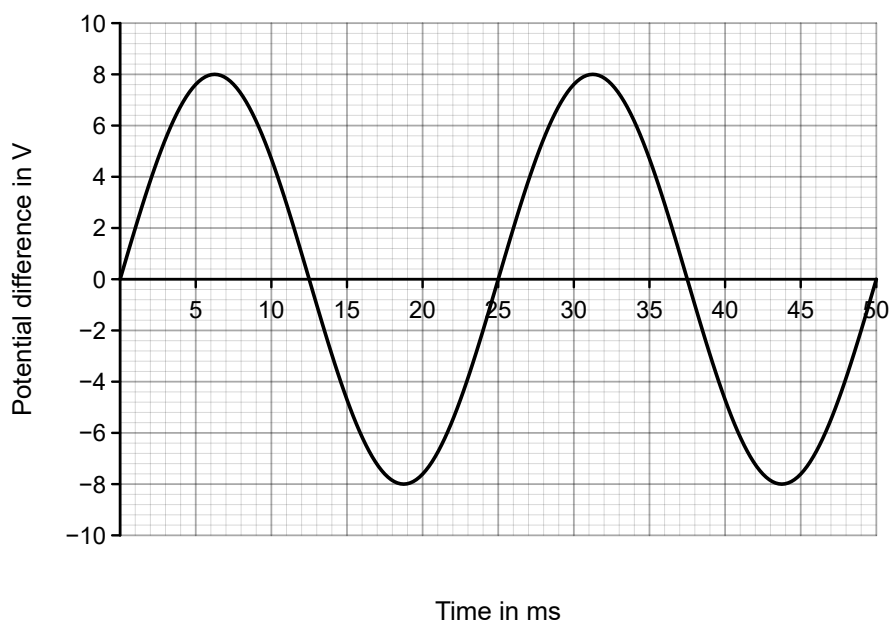
- | | |
|-------------------|--------------------------|
| a battery | ☐ |
| a mains socket | ☐ |
| a solar cell | ☐ |
| the National Grid | ☐ |

[2 marks]

0 6

Figure 1 shows how the potential difference of an alternating supply changes with time.

Figure 1



0 6 . 1

Determine the peak potential difference of the supply.

.....

.....

.....

Peak potential difference = V

[1 mark]

0 6 . 2

Determine the time taken for one complete cycle (the period) of the supply.

.....

.....

.....

Period = ms

[1 mark]

0 6 . 3

Calculate the frequency of the supply.
Use the Physics Equations Sheet.

.....

.....

.....

.....

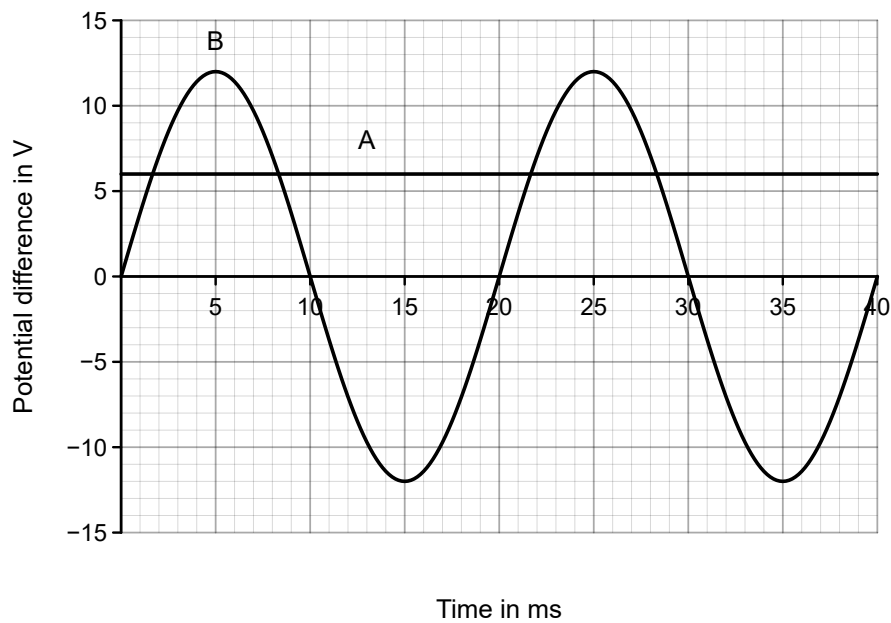
Frequency = Hz

[2 marks]

0 7

Figure 2 shows two oscilloscope traces, A and B. Each trace shows how the potential difference of a supply changes with time.

Figure 2



0 7 . 1

Which trace shows an alternating potential difference?
Give a reason for your answer.

.....

.....

.....

.....

[2 marks]

0 7 . 2

Determine the peak potential difference of trace B.

.....

.....

.....

Peak potential difference = V

[1 mark]

0 7 . 3

Determine the period of trace B.
Then calculate the frequency of supply B.
Use the Physics Equations Sheet.

.....

.....

.....

.....

.....

Frequency = Hz

[3 marks]

0 7 . 4

Suggest what type of supply produced trace A.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Physics · Worksheet: Direct and alternating potential difference · 30 marks

Question 1 (5 marks)

01.1 [1 mark]

Correct: direct

01.2 [1 mark]

Answer: 50 Hz

- 50 (Hz) (1)
-

01.3 [1 mark]

Answer: 230 V

- (about) 230 (V) (1)
-

01.4 [2 marks]

Answer: A direct pd is always in the same direction, so the current flows in one direction only; an alternating pd keeps reversing direction, so the current keeps changing direction.

- direct: (the pd / current is) in one direction only (1)
 - alternating: (the pd / current) changes direction / reverses repeatedly (1)
-
-

Question 2 (2 marks)

02.1 [1 mark]

Answer: Direct

- direct (1)
-

02.2 [1 mark]

Correct: Alternating

Question 3 (2 marks)

03.1 [1 mark]

Correct: 50 Hz

03.2 [1 mark]

Correct: It is a constant, direct potential difference

Question 4 (4 marks)

04.1 [1 mark]

Answer: The potential difference goes through 50 complete cycles every second.

- 50 complete cycles (of the alternating potential difference / current) every second (1)

04.2 [2 marks]

Answer: 0.020 s

- $T = 1 \div 50$ (1)
- $T = 0.020$ (s) (1)

04.3 [1 mark]

Correct: 100

Question 5 (6 marks)

05.1 [2 marks]

Answer: The potential difference goes through 50 complete cycles every second, reversing direction twice in each cycle (100 times per second).

- the potential difference completes 50 cycles every second (1)
- the potential difference / current reverses direction (twice every cycle / 100 times per second) (1)

05.2 [2 marks]

Answer: 20 ms

- $T = 1 \div 50$ ($= 0.020$ s) (1)
- $T = 20$ (ms) (1)

05.3 [2 marks]

Correct: a battery; a solar cell

Question 6 (4 marks)

06.1 [1 mark]

Answer: 8.0 V

- 8.0 (V) (1)
-

06.2 [1 mark]

Answer: 25 ms

- 25 (ms) (1)
-

06.3 [2 marks]

Answer: 40 Hz

- $f = 1 \div 0.025$ (1)
- $f = 40$ (Hz) (1)

Notes: An answer of 0.04 (Hz) (period used in ms) scores 1 mark. Allow ECF from the previous part.

Question 7 (7 marks)

07.1 [2 marks]

Answer: B — the potential difference keeps changing direction (from positive to negative).

- B (1)
- the potential difference changes direction / is positive then negative / reverses (repeatedly) (1)

Notes: The reason mark depends on B being chosen.

07.2 [1 mark]

Answer: 12 V

- 12 (V) (1)
-

07.3 [3 marks]

Answer: Period 20 ms; frequency 50 Hz

- period = 20 ms (1)
- $f = 1 \div 0.020$ (1)
- $f = 50$ (Hz) (1)

Notes: An answer of 0.05 (Hz) (period in ms) scores 2 marks.

07.4 [1 mark]

Answer: A battery (or cell).

- battery / cell / direct current (dc) supply (1)
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