WJEC 2014 Online Exam Review

GCSE Electronics Unit E2 4162-01

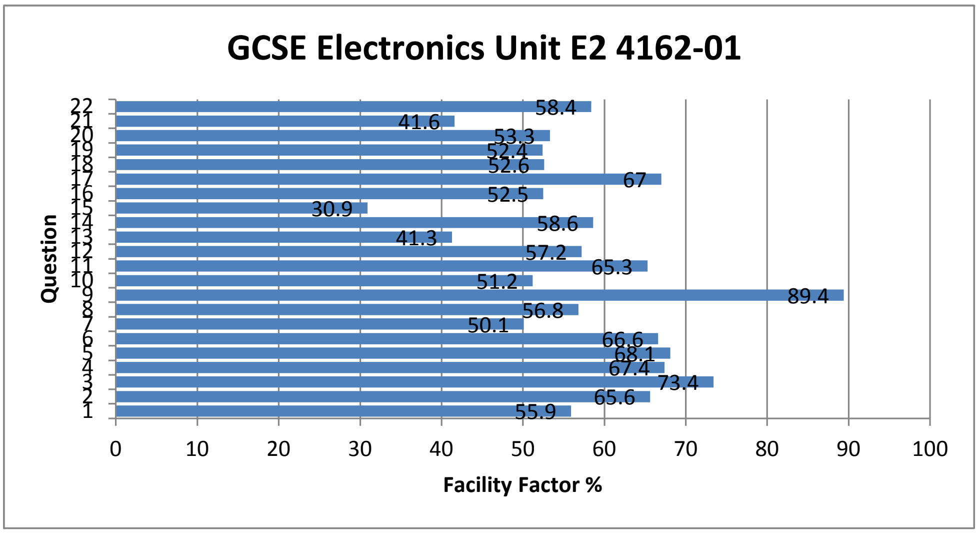
All Candidates' performance across questions

Question Title	N	Mean	S D	Max Mark	F F	Attempt %
1	499	0.6	0.5	1	55.9	100
2	499	1.3	0.7	2	65.6	100
3	499	2.2	0.9	3	73.4	100
4	499	2	1.1	3	67.4	100
5	499	0.7	0.5	1	68.1	100
6	499	2	1	3	66.6	100
7	499	0.5	0.5	1	50.1	100
8	499	1.1	0.8	2	56.8	100
9	499	2.7	0.8	3	89.4	100
10	499	1.5	1.2	3	51.2	100
11	499	2	1.2	3	65.3	100
12	499	1.7	0.9	3	57.2	100
13	499	1.7	1.1	4	41.3	100
14	499	2.3	1.5	4	58.6	100
15	499	0.9	1.2	3	30.9	100
16	499	2.1	1.5	4	52.5	100
17	499	1.3	0.8	2	67	100
18	499	1.6	1	3	52.6	100
19	499	1	0.8	2	52.4	100
20	499	1.6	1.3	3	53.3	100
21	499	2.1	1.6	5	41.6	100
22	499	1.2	1	2	58.4	100

10

18

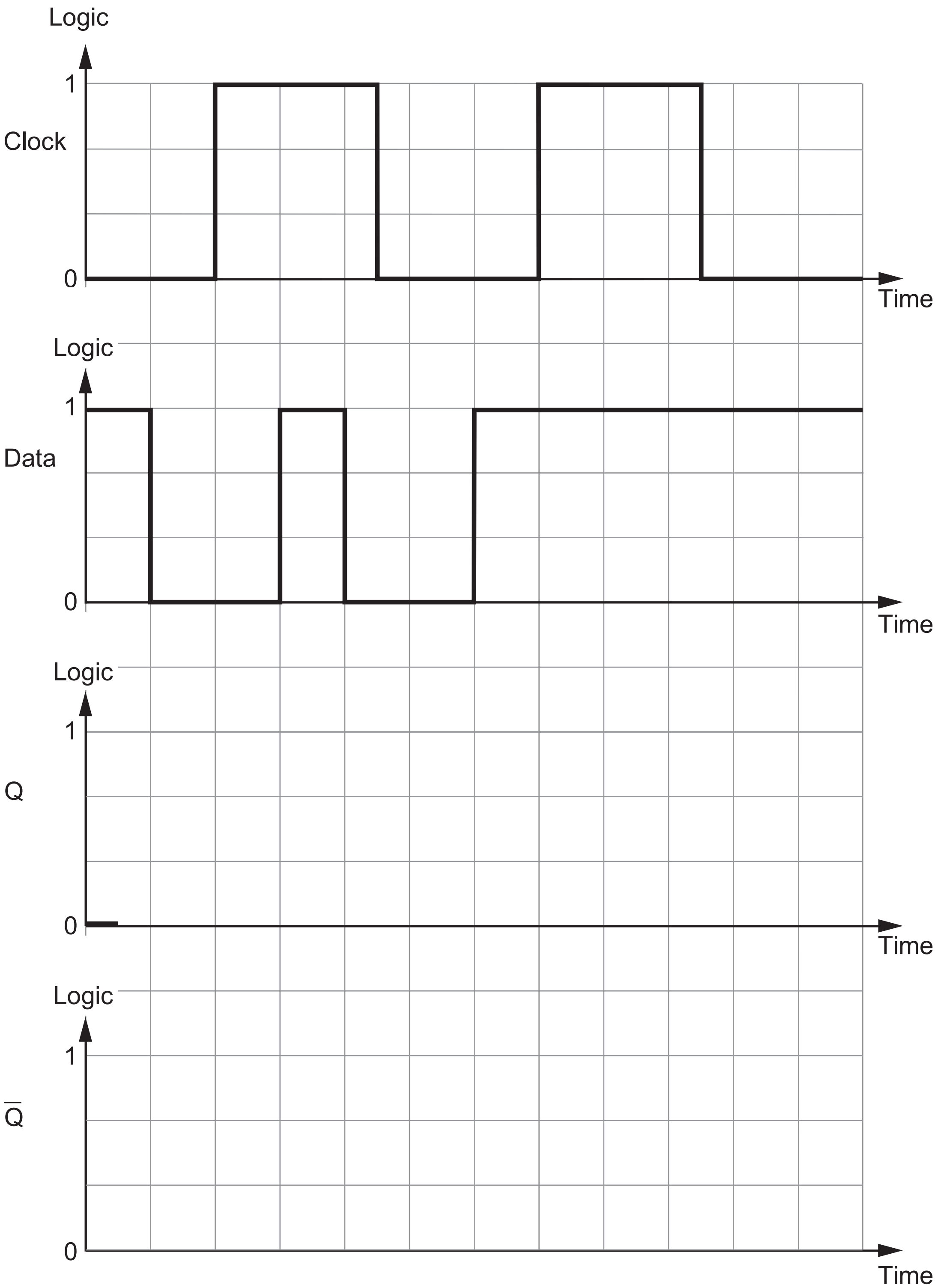
20



Examiner only

10. A *rising-edge triggered* D-type flip-flop is used for data transfer.

Complete the graphs to show the Q and $\overline{Q}$ outputs. [3]



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Examiner only

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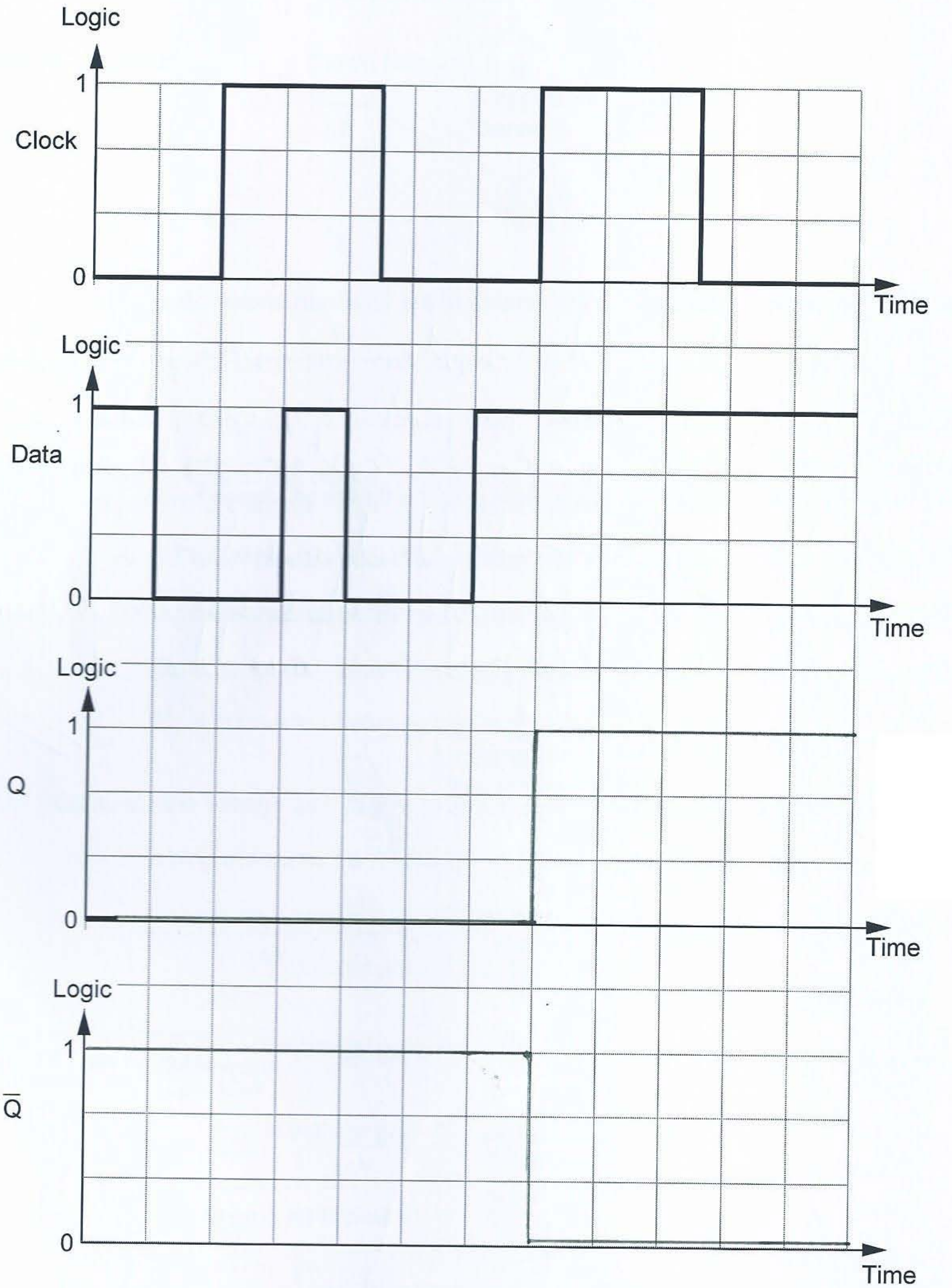

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010011

Examiner only

10. A *rising-edge triggered* D-type flip-flop is used for data transfer.

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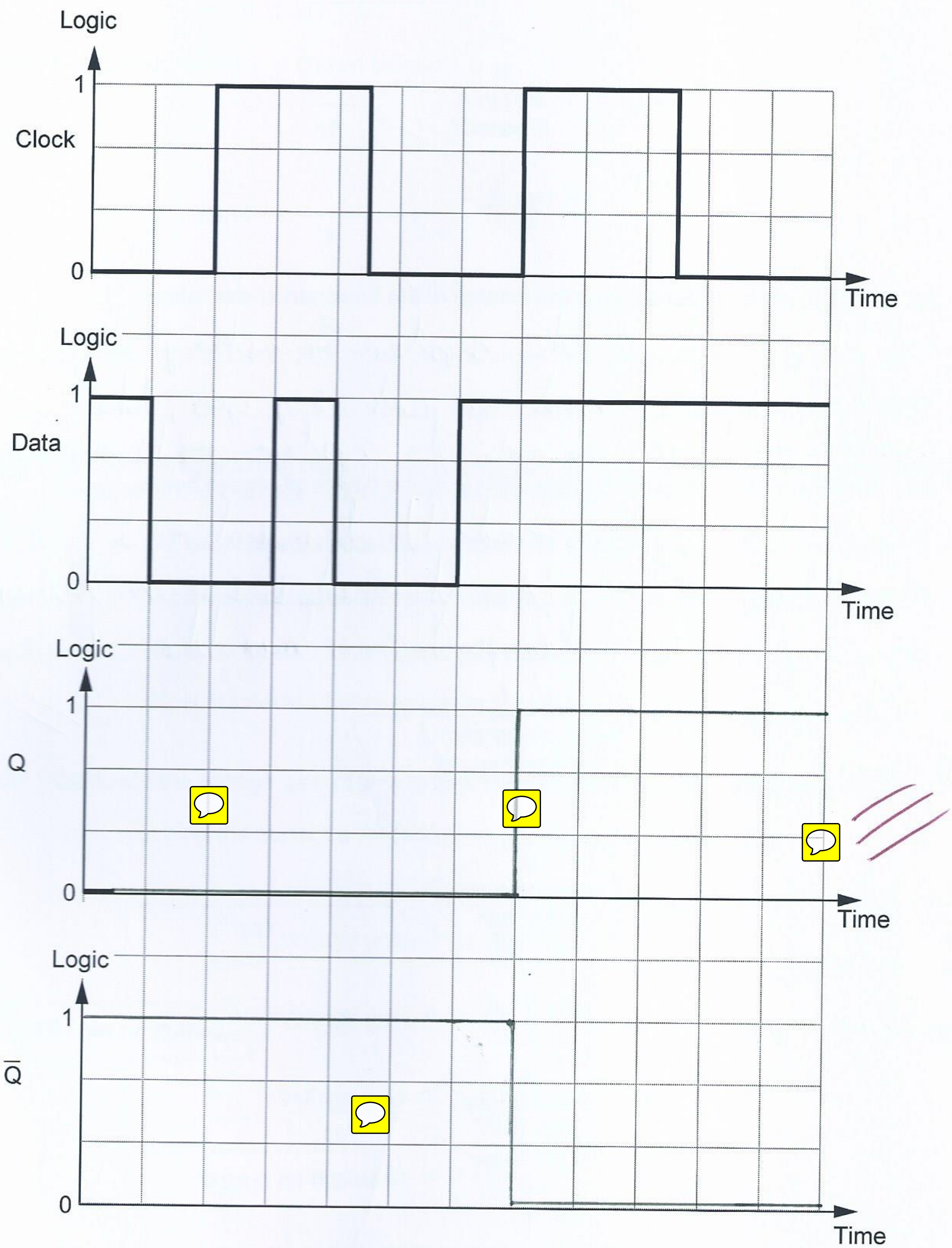

3

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Examiner only

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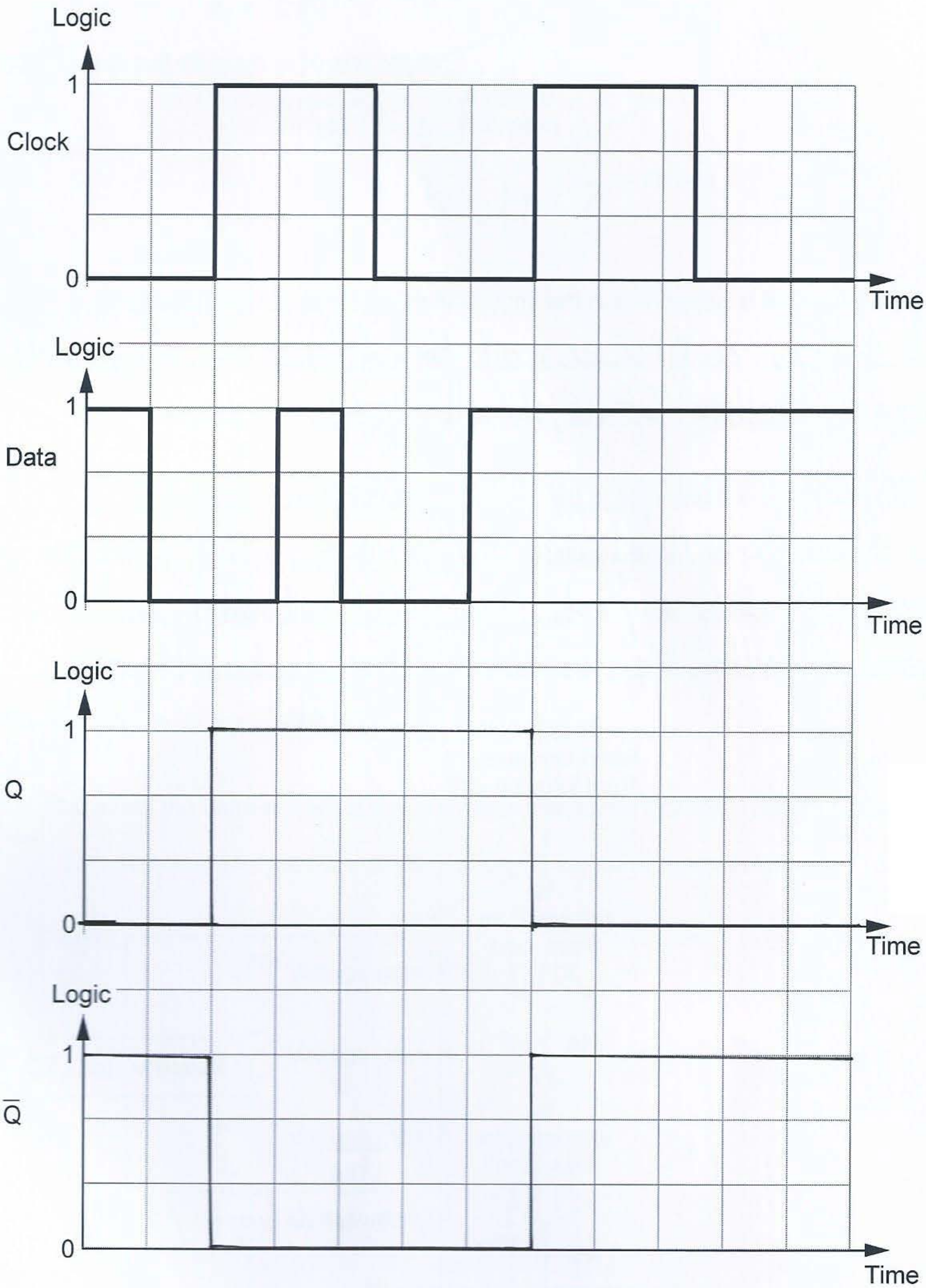

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010011

Examiner only

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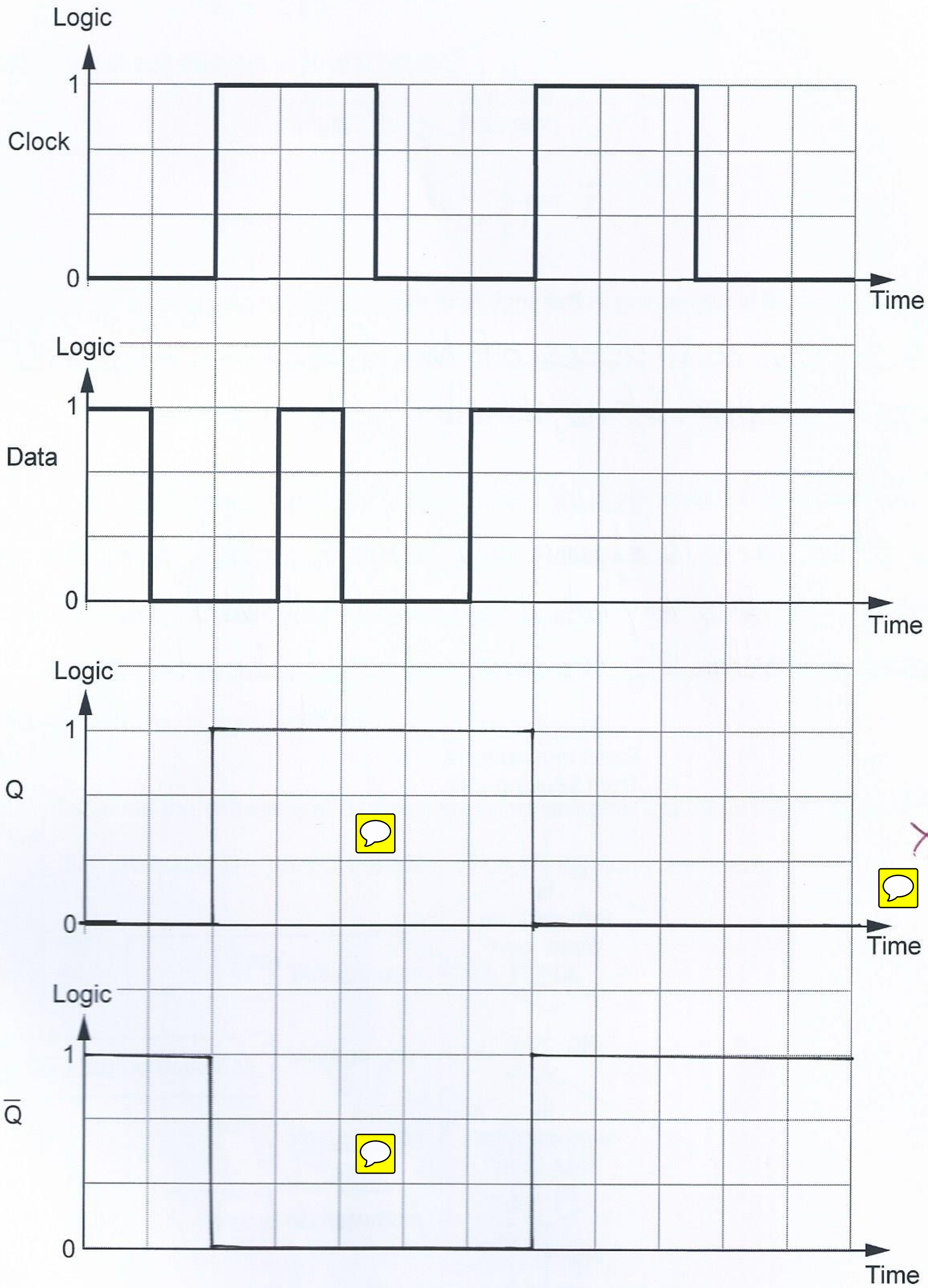

1

1

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Examiner only

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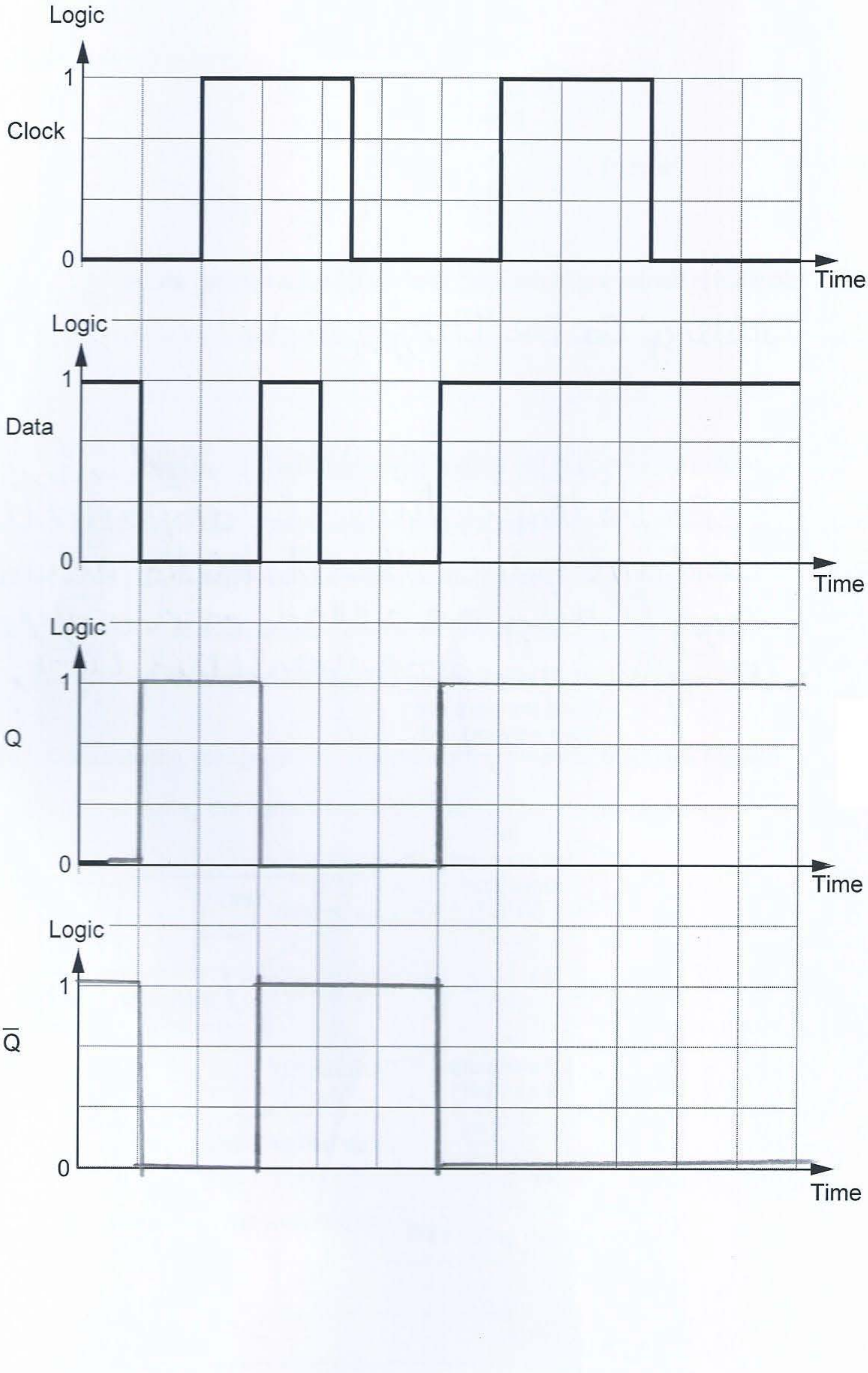
Complete the graphs to show the Q and $\overline{Q}$ outputs. [3]



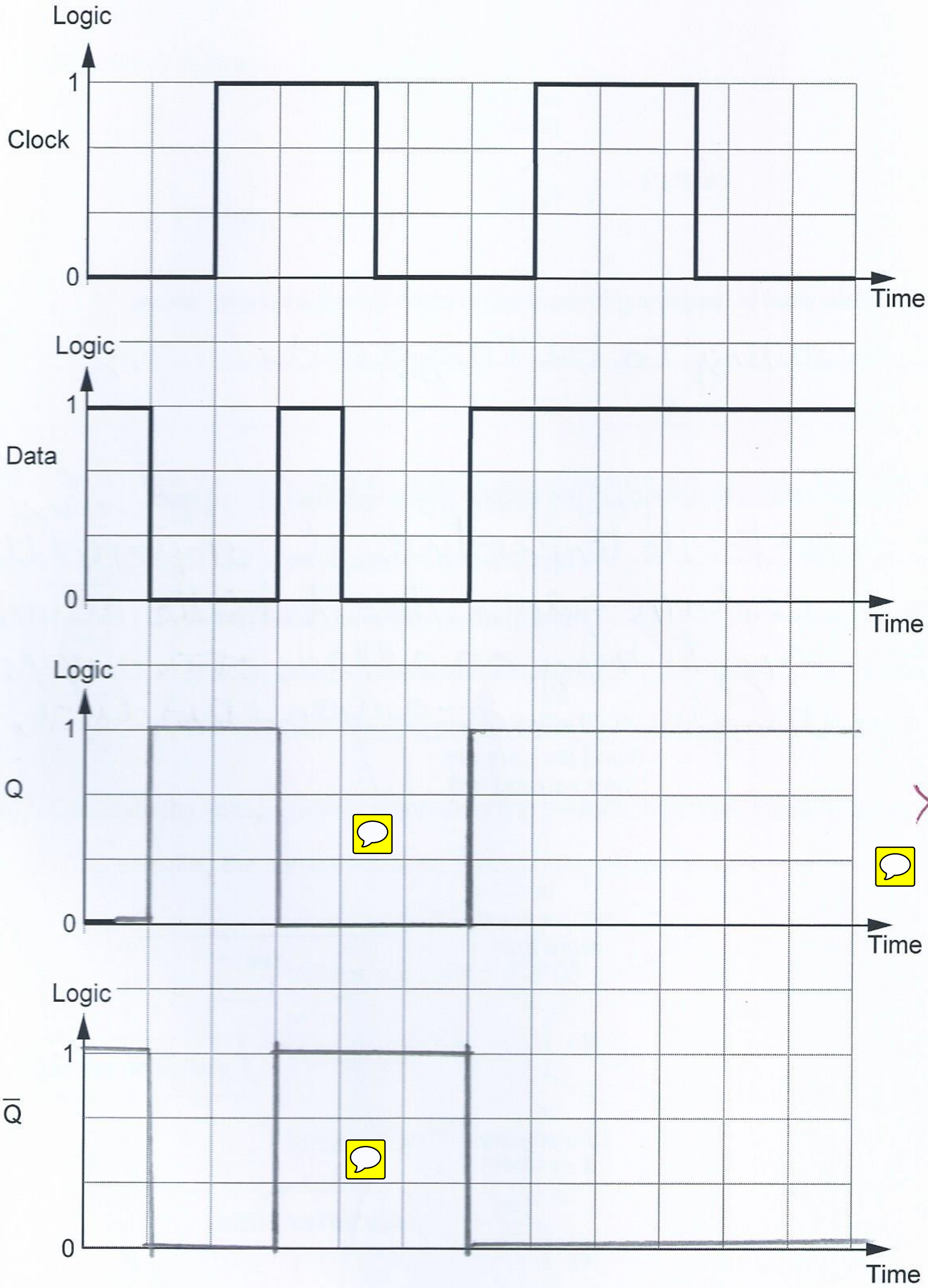
4162
010011

Turn over.

Examiner only

10. A *rising-edge triggered* D-type flip-flop is used for data transfer.

Complete the graphs to show the Q and $\overline{Q}$ outputs. [3] 1



1

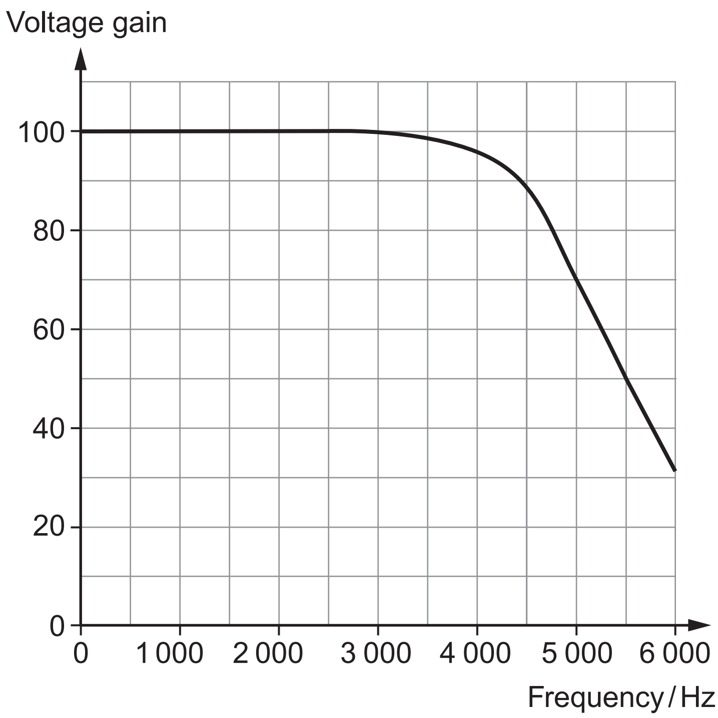
4162
010011

Turn over.

Examiner only

18. *(a)* Which **one** of the following is the best description of the term *bandwidth*?
(Tick (✓) the correct answer.) [1]

- [ ] The maximum frequency of the input signal.
- [ ] The input voltage range that can be amplified successfully.
- [ ] The range of frequencies that produces more than a specified voltage gain.
- [ ] The power supply voltage that produces optimum output voltage for a given signal.



(b) Use the graph to find: [2]

(i) the voltage gain at which the bandwidth should be measured;

Voltage gain = ...

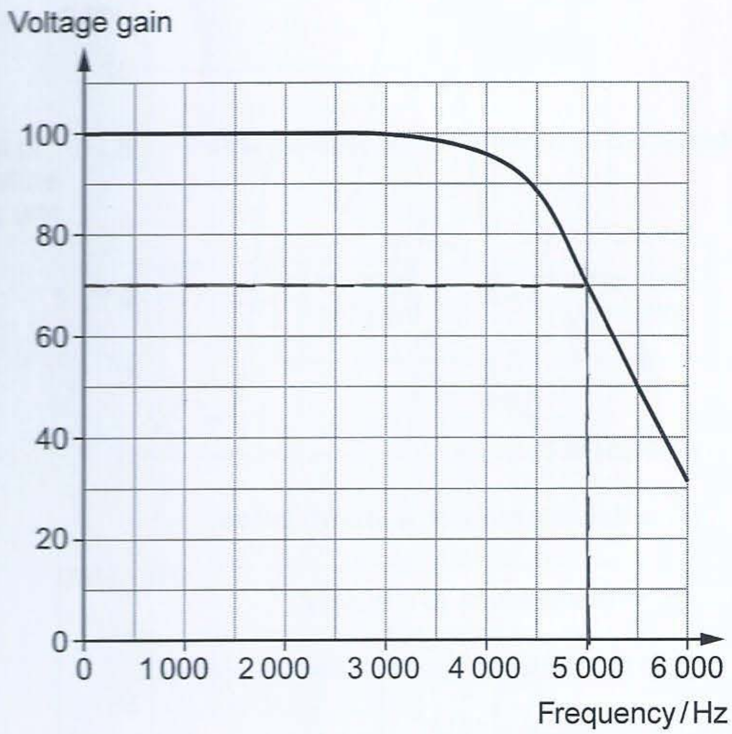
(ii) the bandwidth.

Bandwidth = ... Hz

Examiner only

18. *(a)* Which **one** of the following is the best description of the term *bandwidth*?
(Tick (✓) the correct answer.) [1]

- [ ] The maximum frequency of the input signal.
- [ ] The input voltage range that can be amplified successfully.
- [x] The range of frequencies that produces more than a specified voltage gain.
- [ ] The power supply voltage that produces optimum output voltage for a given signal.



(b) Use the graph to find: [2]

(i) the voltage gain at which the bandwidth should be measured;

Voltage gain = 70

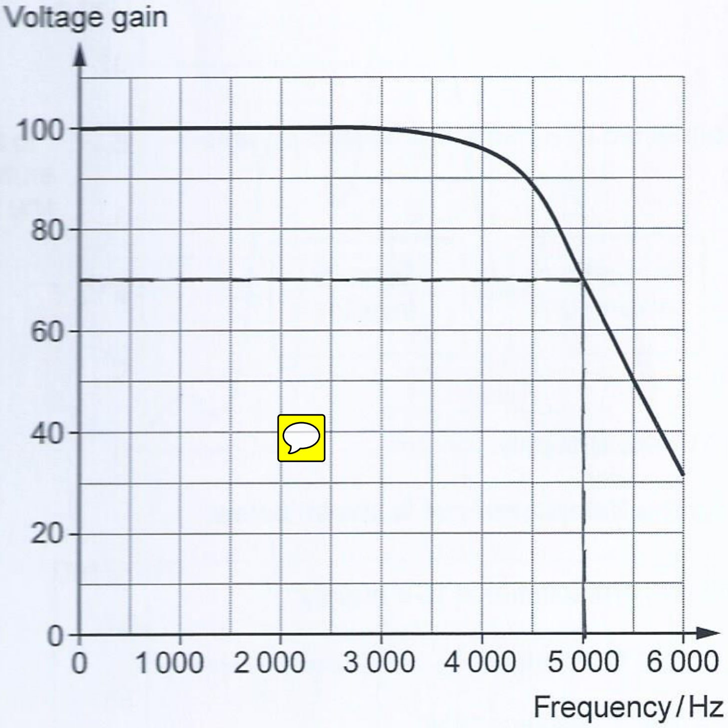
(ii) the bandwidth.

Bandwidth = 5000 Hz

Examiner only

18. *(a)* Which **one** of the following is the best description of the term *bandwidth*? (Tick (✓) the correct answer.) [1] 1

- [ ] The maximum frequency of the input signal.
- [ ] The input voltage range that can be amplified successfully.
- [x] The range of frequencies that produces more than a specified voltage gain.
- [ ] The power supply voltage that produces optimum output voltage for a given signal.



(b) Use the graph to find: [2] 2

(i) the voltage gain at which the bandwidth should be measured;

Voltage gain = 70

(ii) the bandwidth.

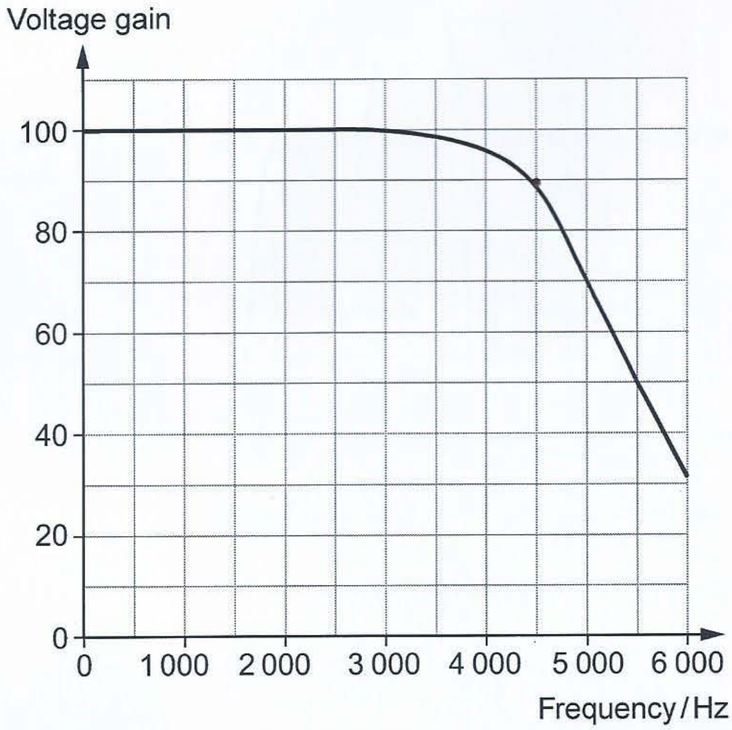
Bandwidth = 5000 Hz

3

Examiner only

18. *(a)* Which one of the following is the best description of the term *bandwidth*?
(Tick (✓) the correct answer.) [1]

- [ ] The maximum frequency of the input signal.
- [ ] The input voltage range that can be amplified successfully.
- [✓] The range of frequencies that produces more than a specified voltage gain.
- [ ] The power supply voltage that produces optimum output voltage for a given signal.



(b) Use the graph to find: [2]

(i) the voltage gain at which the bandwidth should be measured;

90

Voltage gain = ~~80~~

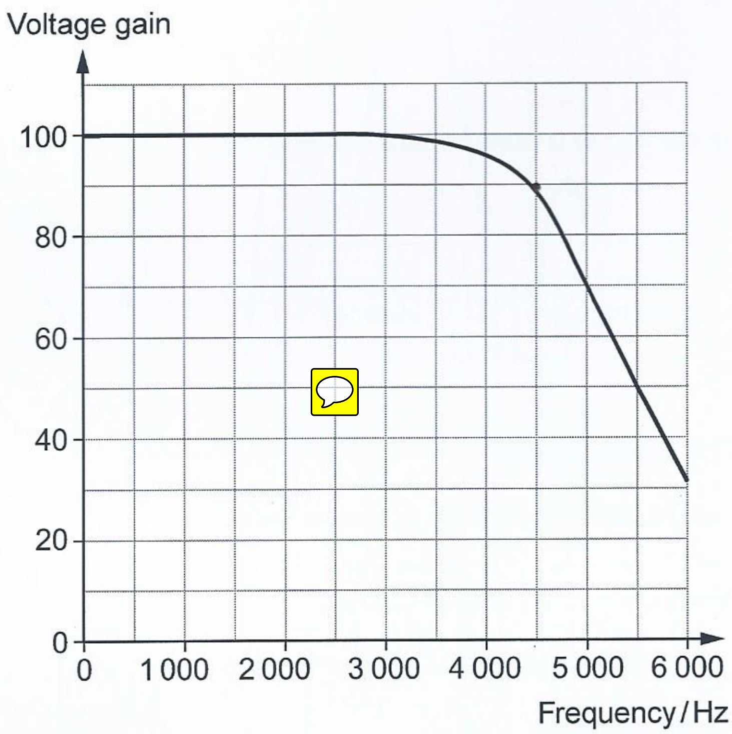
(ii) the bandwidth.

Bandwidth = 4500 Hz

Examiner only

18. *(a)* Which one of the following is the best description of the term *bandwidth*? (Tick (✓) the correct answer.) [1]

- [ ] The maximum frequency of the input signal.
- [ ] The input voltage range that can be amplified successfully.
- [x] The range of frequencies that produces more than a specified voltage gain.
- [ ] The power supply voltage that produces optimum output voltage for a given signal.



(b) Use the graph to find: [2]

(i) the voltage gain at which the bandwidth should be measured;

Voltage gain = 90 ~~50~~

(ii) the bandwidth.

Bandwidth = 4500 Hz

Examiner only

18. *(a)* Which **one** of the following is the best description of the term *bandwidth*? (Tick (✓) the correct answer.) [1]

- [ ] The maximum frequency of the input signal.
- [ ] The input voltage range that can be amplified successfully.
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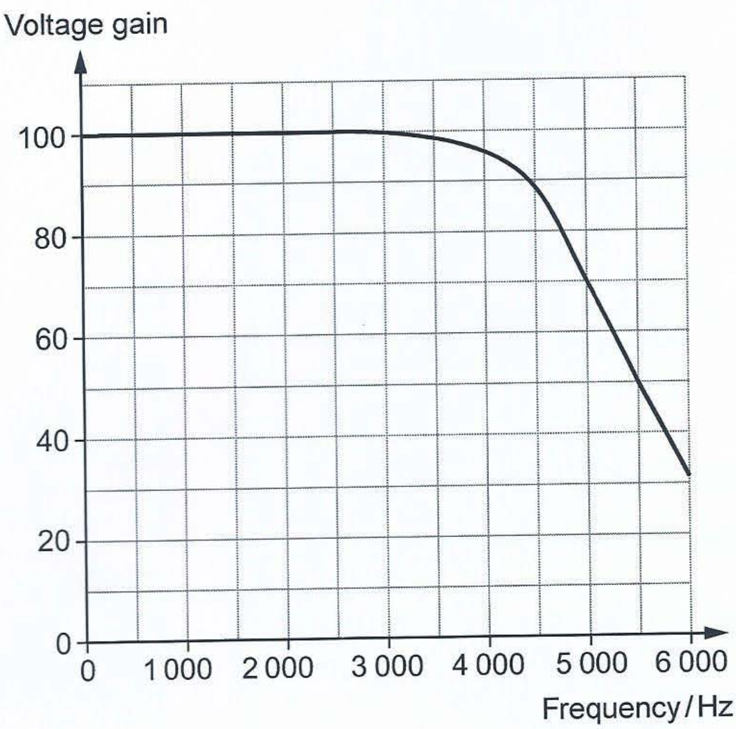


0.x

$\frac{Vot}{Vin}$.

(b) Use the graph to find: [2]

(i) the voltage gain at which the bandwidth should be measured;

6000÷100.

Voltage gain = 60.

(ii) the bandwidth.

0.7×100.

Bandwidth = 70 Hz

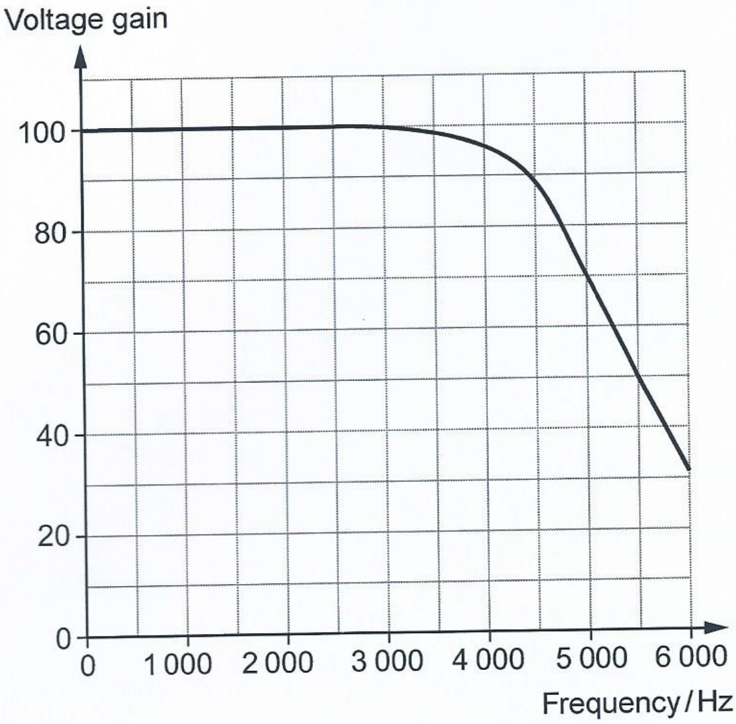
Turn over.

Examiner only

18. *(a)* Which **one** of the following is the best description of the term *bandwidth*? (Tick (✓) the correct answer.) [1]

1

- [ ] The maximum frequency of the input signal.
- [ ] The input voltage range that can be amplified successfully.
- [x] The range of frequencies that produces more than a specified voltage gain.
- [ ] The power supply voltage that produces optimum output voltage for a given signal.



0.7

$\frac{Vot}{Vin}$.

(b) Use the graph to find: [2]

0

(i) the voltage gain at which the bandwidth should be measured;

6000 ÷ 100.

Voltage gain = 60.

(ii) the bandwidth.

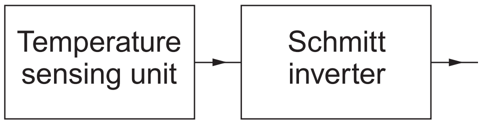
0.7×100

Bandwidth = ~~[illegible]~~ 70 Hz

1

Examiner only

20. A Schmitt inverter is connected to a temperature sensing unit.



The circuit runs on a 15 V power supply.

Part of the data sheet for the Schmitt inverter is shown below.

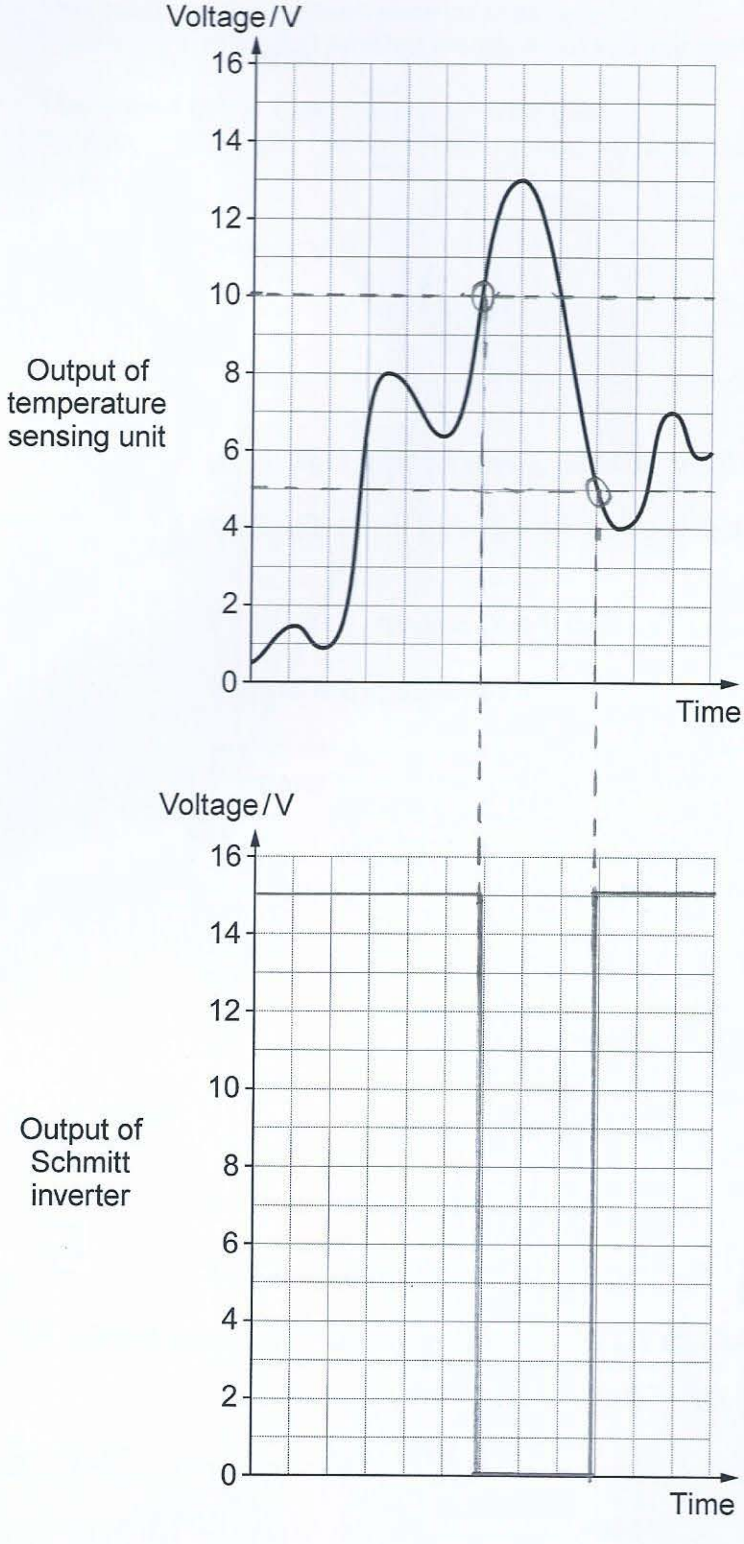
When connected to a 15 V supply:

- Logic 0 output = 0 V;
- Logic 1 output = 15 V;
- The output changes from logic 1 to logic 0 when a **rising** input voltage reaches 10 V;
- The output changes from logic 0 to logic 1 when a **falling** input voltage reaches 5 V.

Examiner only

The output of the temperature sensing unit is shown in the top graph.

Use the axes provided to draw the corresponding output signal of the Schmitt inverter, when the signal from the temperature sensing unit is applied to its input. [3]



Examiner only

The output of the temperature sensing unit is shown in the top graph.

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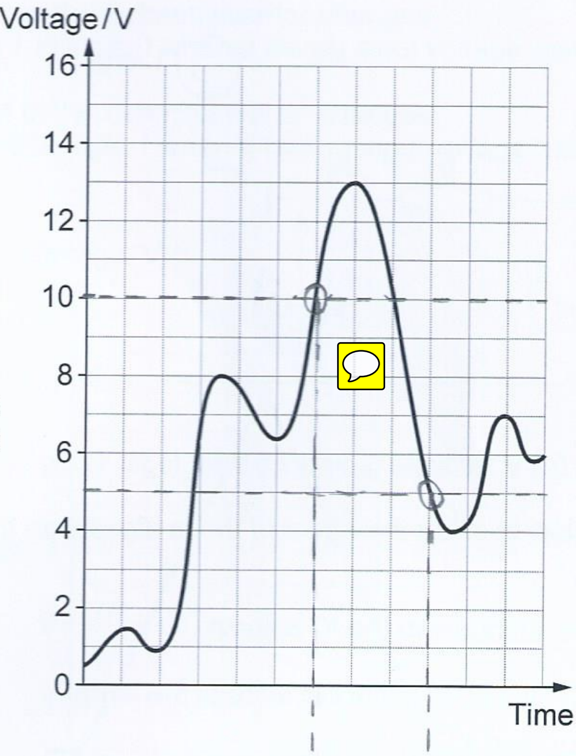
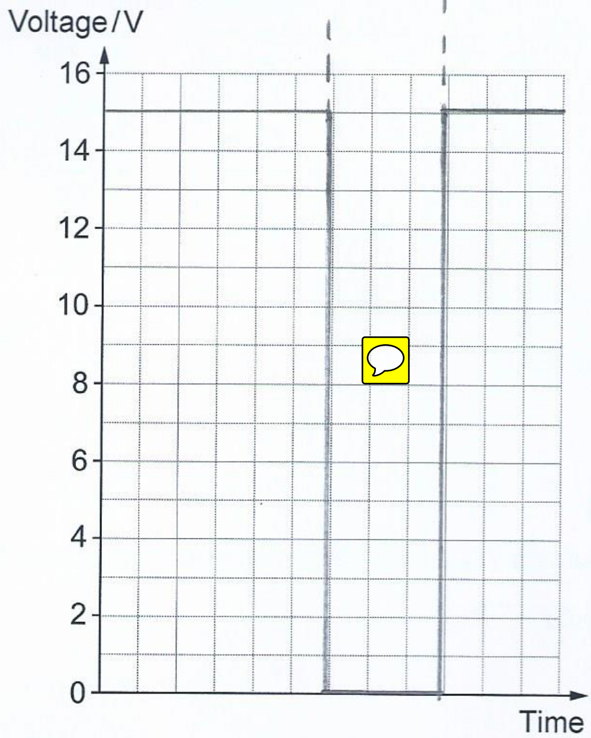
Output of temperature sensing unit



Output of Schmitt inverter

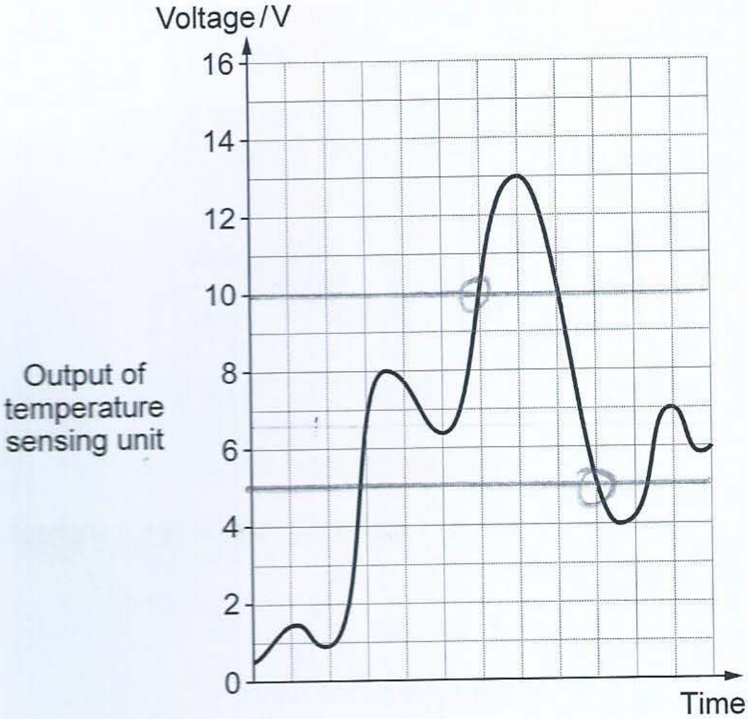


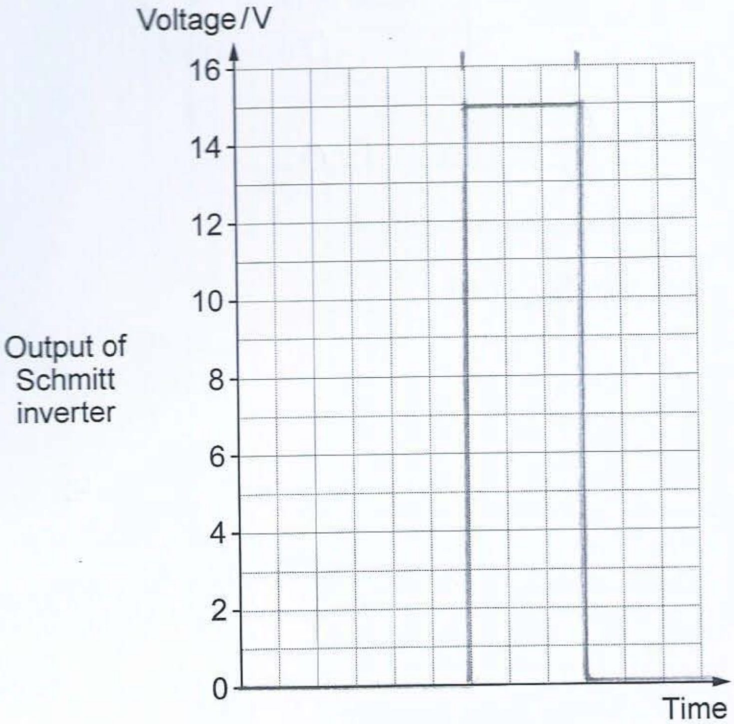
(3)

Examiner only

The output of the temperature sensing unit is shown in the top graph.

Use the axes provided to draw the corresponding output signal of the Schmitt inverter, when the signal from the temperature sensing unit is applied to its input. [3]



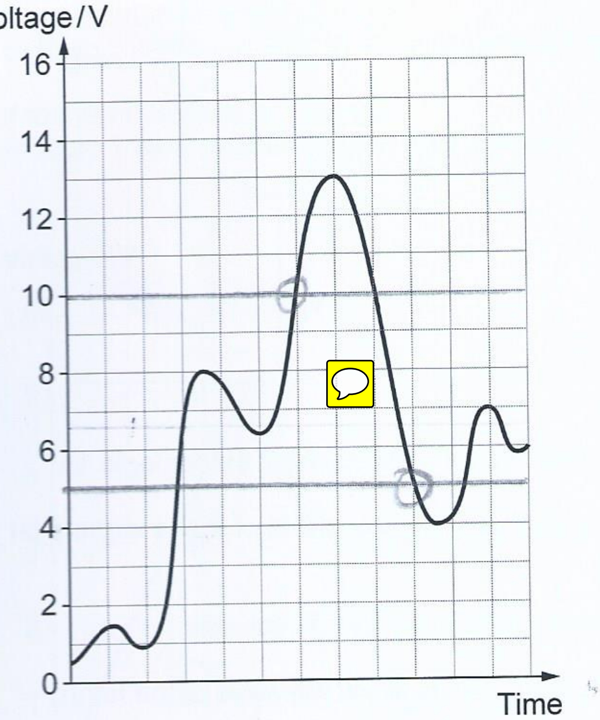


Examiner only

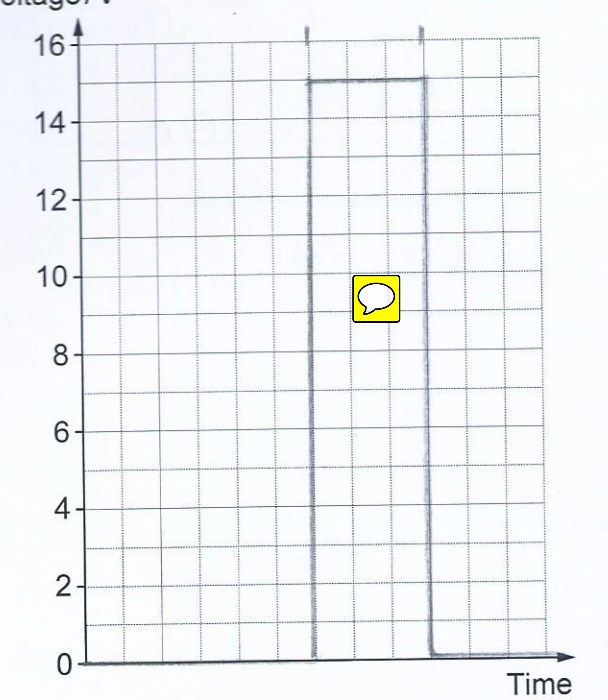
The output of the temperature sensing unit is shown in the top graph.

Use the axes provided to draw the corresponding output signal of the Schmitt inverter, when the signal from the temperature sensing unit is applied to its input. [3] 2

Output of temperature sensing unit



Output of Schmitt inverter

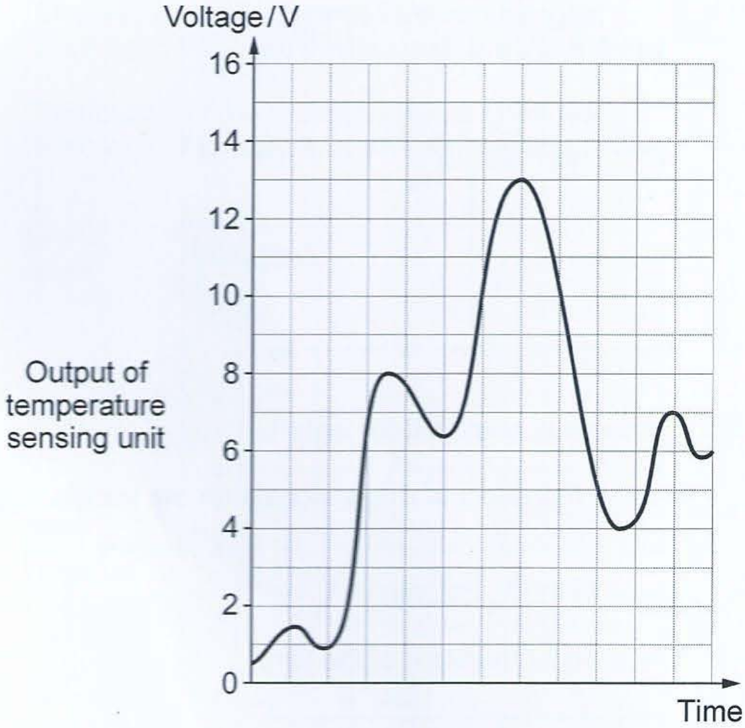


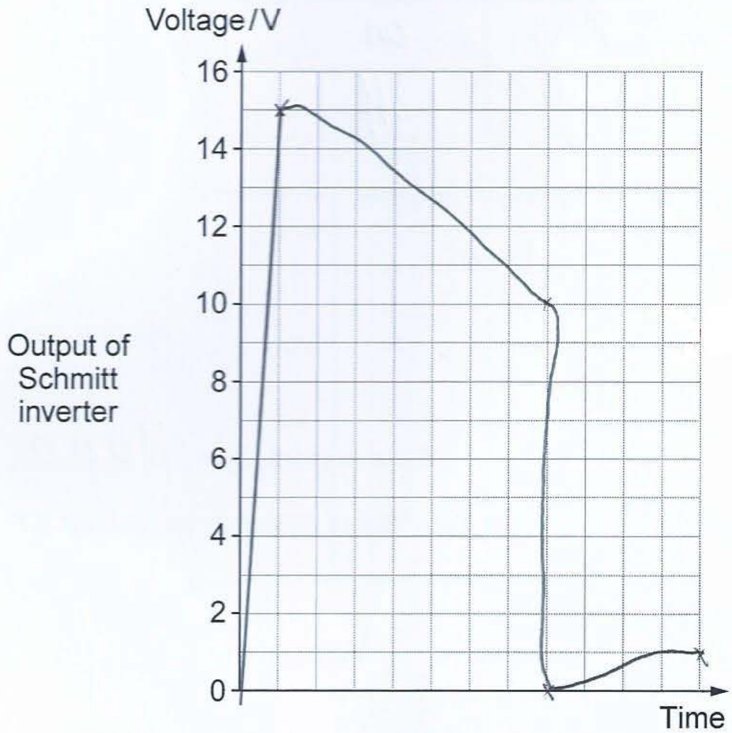
(2)

Examiner only

The output of the temperature sensing unit is shown in the top graph.

Use the axes provided to draw the corresponding output signal of the Schmitt inverter, when the signal from the temperature sensing unit is applied to its input. [3]





Examiner only

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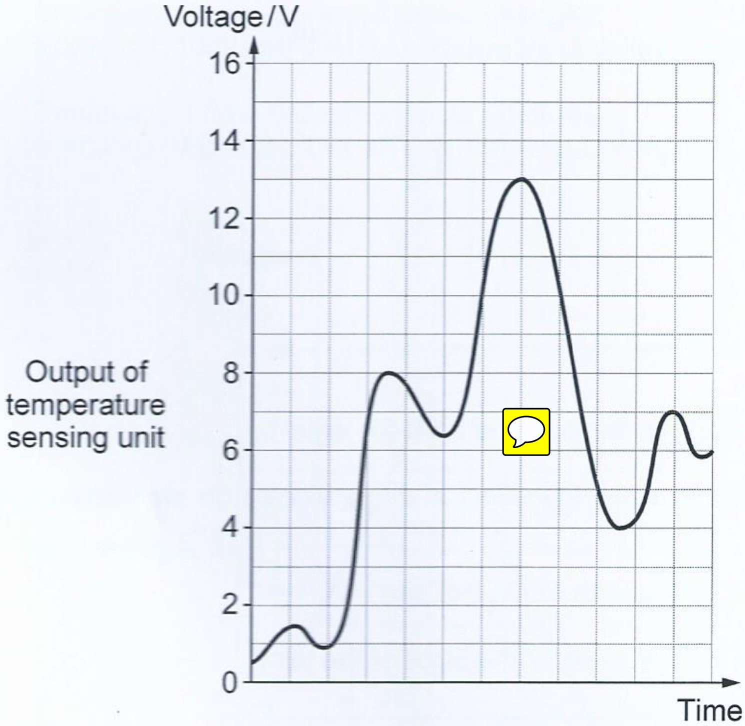
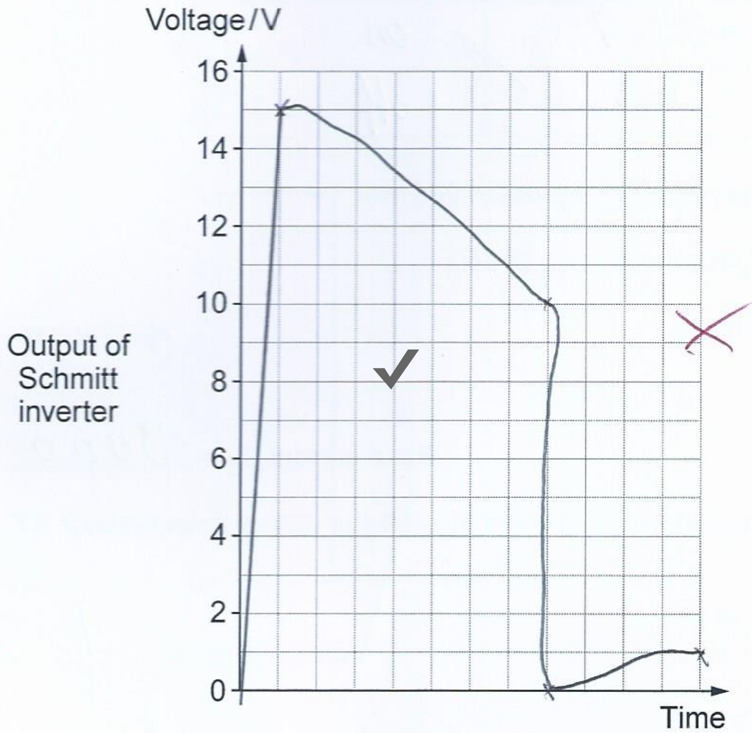
0





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