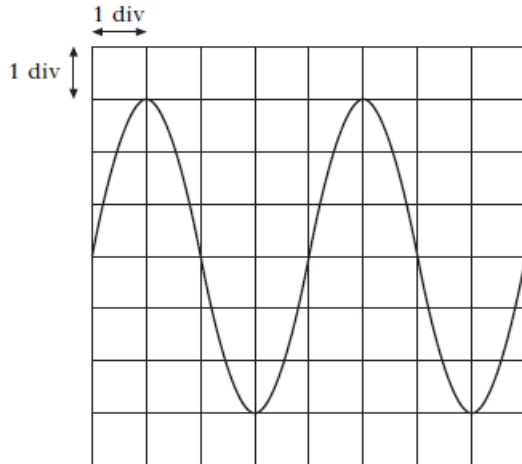


## Unit 3 – Electricity

### Section 1 – Monitoring & Measuring a.c.

- 2007** 10. A signal from a power supply is displayed on an oscilloscope.

The trace on the oscilloscope is shown.

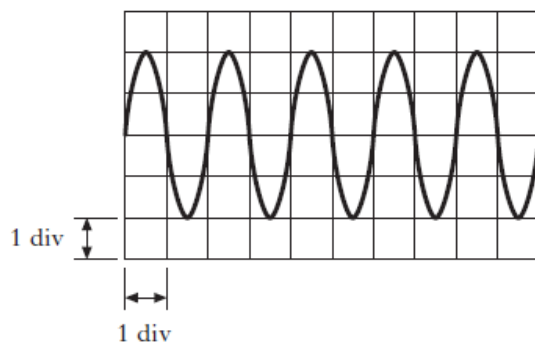


The time-base is set at  $0.01 \text{ s/div}$  and the Y-gain is set at  $4.0 \text{ V/div}$ .

Which row in the table shows the r.m.s. voltage and the frequency of the signal?

	r.m.s. voltage/V	frequency/Hz
A	8.5	25
B	12	25
C	24	25
D	8.5	50
E	12	50

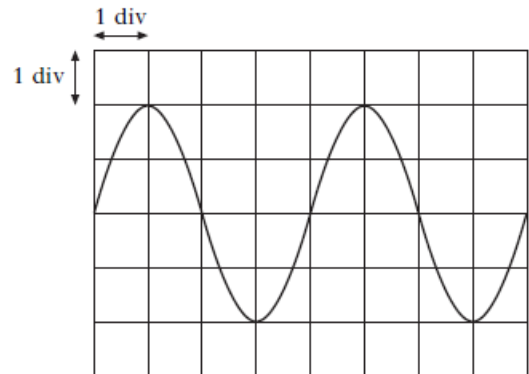
- 2011** 11. The output of a  $50 \text{ Hz}$  a.c. supply is connected to the input of an oscilloscope. The trace produced on the screen of the oscilloscope is shown.



The time-base control of the oscilloscope is set at

- A  $1 \text{ ms/div}$
- B  $10 \text{ ms/div}$
- C  $20 \text{ ms/div}$
- D  $100 \text{ ms/div}$
- E  $200 \text{ ms/div}$

- 2008** 10. The diagram shows the trace on an oscilloscope when an alternating voltage is applied to its input.

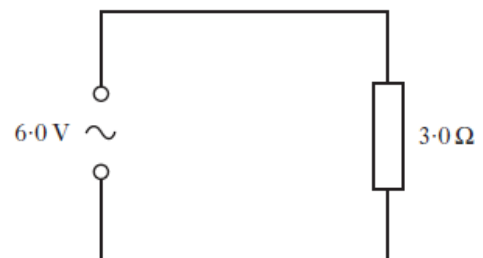


The timebase is set at  $5 \text{ ms/div}$  and the Y-gain is set at  $10 \text{ V/div}$ .

Which row in the table gives the peak voltage and the frequency of the signal?

	Peak voltage/V	Frequency/Hz
A	7.1	20
B	14	50
C	20	20
D	20	50
E	40	50

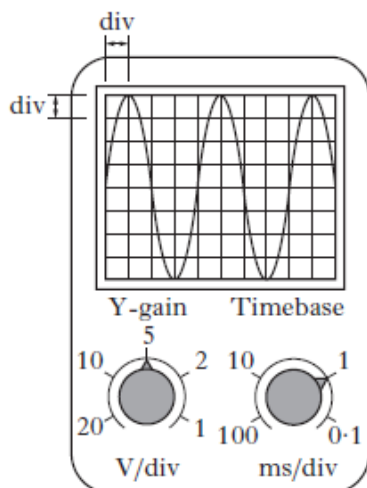
- 2011** 12. An a.c. supply with an output voltage of  $6.0 \text{ V r.m.s.}$  is connected to a  $3.0 \Omega$  resistor.



Which row in the table shows the peak voltage across the resistor and the peak current in the circuit?

	Peak voltage/V	Peak current/A
A	$6\sqrt{2}$	$2\sqrt{2}$
B	$6\sqrt{2}$	2
C	6	2
D	$\frac{6}{\sqrt{2}}$	$\frac{2}{\sqrt{2}}$
E	6	$2\sqrt{2}$

- 2012** 10. An alternating voltage is displayed on an oscilloscope screen. The Y-gain and the timebase settings are shown.

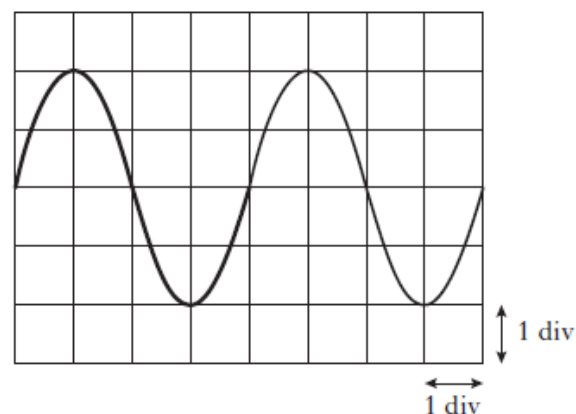


Which row in the table gives the values for the peak voltage and frequency of the signal?

	<i>Peak voltage/V</i>	<i>Frequency/Hz</i>
A	10	100
B	10	250
C	20	250
D	10	500
E	20	1000

- 2014** 10. An oscilloscope is connected to the output terminals of a signal generator.

The trace displayed on the screen is shown.



The timebase of the oscilloscope is set at 30 ms/div.

The frequency of the output signal from the signal generator is

- A  $4.2 \times 10^{-3}$  Hz
- B  $8.3 \times 10^{-3}$  Hz
- C 0.28 Hz
- D 4.2 Hz
- E 8.3 Hz.

- 2015** 10. The heating element of an electric kettle has a resistance of  $30 \Omega$ .

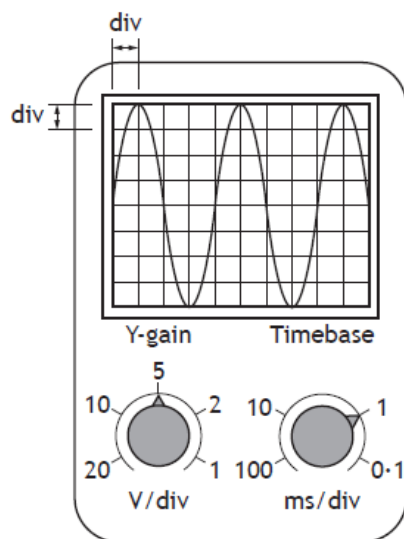
The kettle is connected to an a.c. power supply.

The r.m.s. voltage of the supply is 230 V.

The peak value of the current in the element is

- A 0.1 A
- B 0.2 A
- C 5.4 A
- D 7.7 A
- E 10.8 A.

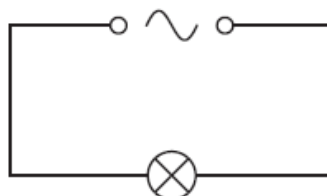
- 2015** 17. The output from a signal generator is connected to the input terminals of an oscilloscope. The trace observed on the oscilloscope screen, the Y-gain setting and the timebase setting are shown.



The frequency of the signal shown is calculated using the

- A timebase setting and the vertical height of the trace
- B timebase setting and the horizontal distance between the peaks of the trace
- C Y-gain setting and the vertical height of the trace
- D Y-gain setting and the horizontal distance between the peaks of the trace
- E Y-gain setting and the timebase setting.

- 2015** 18. A circuit is set up as shown.



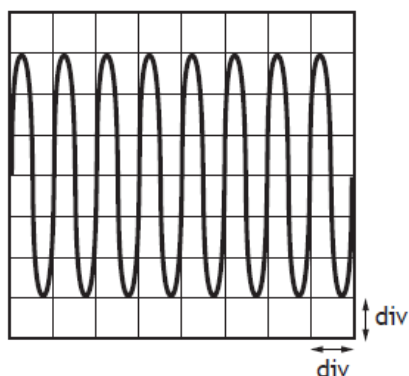
The r.m.s voltage across the lamp is 12 V.

The power produced by the lamp is 24 W.

The peak current in the lamp is

- A 0.71 A
- B 1.4 A
- C 2.0 A
- D 2.8 A
- E 17 A.

- 2016** 17. The output of a signal generator is connected to the input of an oscilloscope. The trace produced on the screen of the oscilloscope is shown.



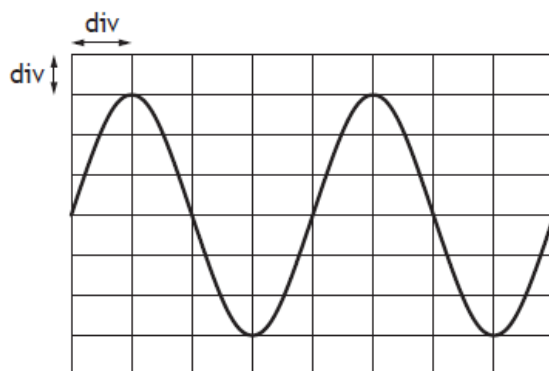
The timebase control of the oscilloscope is set at 2 ms/div.

The Y-gain control of the oscilloscope is set at 4 mV/div.

Which row in the table shows the frequency and peak voltage of the output of the signal generator?

	frequency (Hz)	peak voltage (mV)
A	0.5	12
B	0.5	6
C	250	6
D	500	12
E	500	24

- 2017** 16. The output from an a.c. power supply is connected to an oscilloscope. The trace seen on the oscilloscope screen is shown.

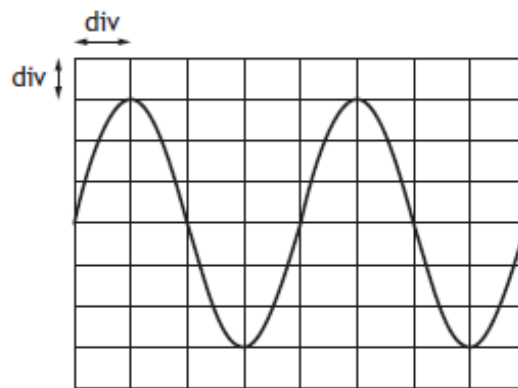


The Y-gain setting on the oscilloscope is 1.0 V/div.

The r.m.s. voltage of the power supply is

- A 2.1 V
- B 3.0 V
- C 4.0 V
- D 4.2 V
- E 6.0 V.

- 2019** 20. The output from an AC power supply is connected to an oscilloscope. The trace seen on the oscilloscope screen is shown.

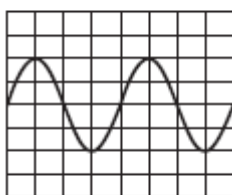


The Y-gain setting on the oscilloscope is  $1.0\text{ V/div}$ .

The rms voltage of the power supply is

- A  $2.1\text{ V}$
- B  $3.0\text{ V}$
- C  $4.0\text{ V}$
- D  $4.2\text{ V}$
- E  $6.0\text{ V}$

- 2019** 21. The output from a signal generator is connected to an oscilloscope. The trace observed on the oscilloscope screen is as shown in the diagram.



The frequency of the signal from the signal generator is now doubled.

The amplitude of the signal is unchanged.

The Y-gain setting on the oscilloscope is unchanged.

The timebase setting on the oscilloscope is changed from 1.0 ms/division to 0.5 ms/division.

Which of the following diagrams shows the trace that is now observed on the oscilloscope screen?

