Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Physics/Science

Unit P1: Universal Physics

Foundation Tier

Wednesday 24 May 2017 – Afternoon
Time: 1 hour

Paper Reference
5PH1F/01

You must have:
Calculator, ruler

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 4 8 8 0 0 A 0 1 2 0

Pearson

FORMULAE

You may find the following formulae useful.

wave speed = frequency × wavelength $v = f \times \lambda$

wave speed = $\frac{\text{distance}}{\text{time}}$ $v = \frac{x}{t}$

electrical power = current × potential difference $P = I \times V$

cost of electricity = power × time × cost of 1 kilowatt-hour

power = $\frac{\text{energy used}}{\text{time taken}}$ $P = \frac{E}{t}$

efficiency = $\frac{\text{(useful energy transferred by the device)}}{\text{(total energy supplied to the device)}} \times 100\%$

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Questions begin on next page.

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Waves

1 (a) (i) Waves on the surface of water are transverse waves.

State one other example of a transverse wave.

(1)

.....

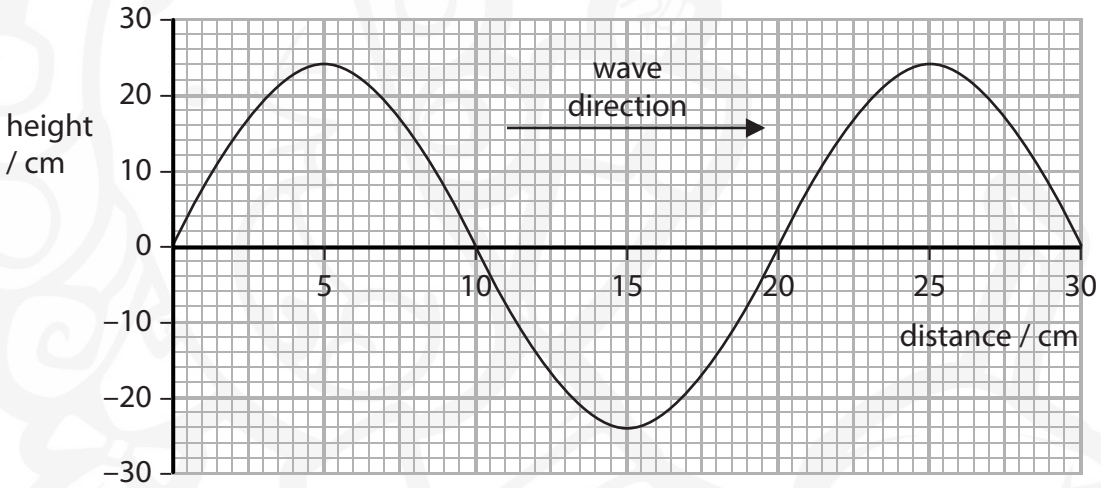
(ii) Sound waves are longitudinal waves.

State one other example of a longitudinal wave.

(1)

.....

(b) The graph shows a water wave.



Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

The amplitude of the wave is

☒ **A** 10 cm

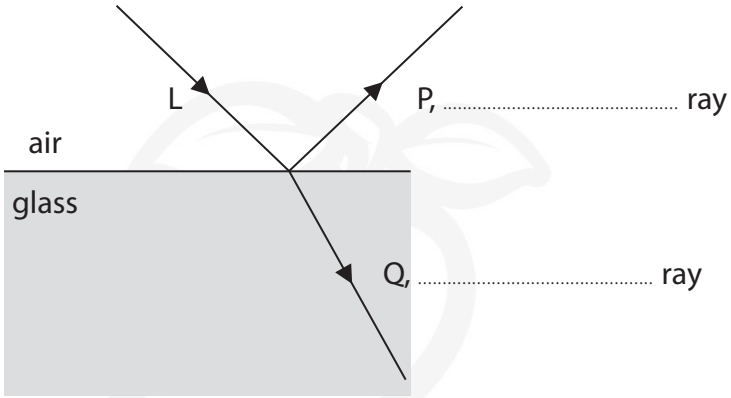
☒ **B** 20 cm

☒ **C** 24 cm

☒ **D** 48 cm

(c) The diagram shows a ray of light, L, incident on a boundary between air and glass.

This becomes two rays P and Q.



Use words from the box to complete the labels on the diagram.

incident	magnified	normal	reflected	refracted

(2)

(d) A sound wave in a solid has a frequency of 1100 Hz.

The wavelength of this sound wave is 3.0 m.

Calculate the speed of this sound wave.

State the unit.

(3)

speed = ... unit .....

(Total for Question 1 = 8 marks)

Earthquakes

2 (a) Which row of the table is correct for a seismic S-wave?

Put a cross (☒) in the box next to your answer.

(1)

	electromagnetic	transverse
☒ **A**	no	no
☒ **B**	yes	yes
☒ **C**	yes	no
☒ **D**	no	yes

(b) Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

Earthquakes occur between a plate in the crust and a second plate

☒ **A** in the crust

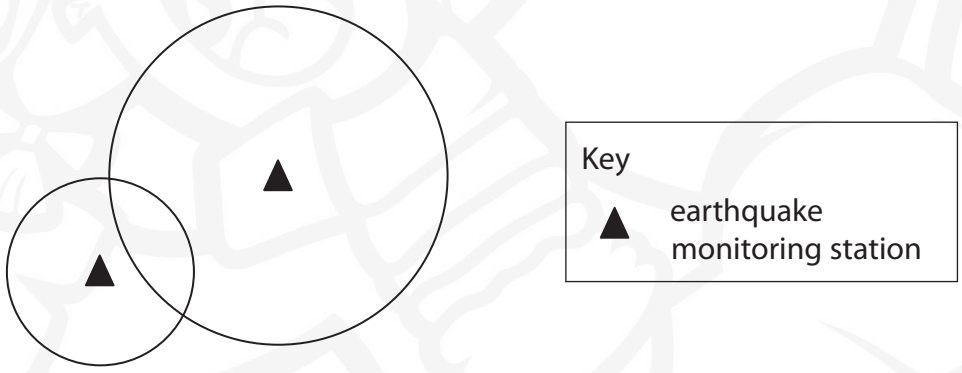
☒ **B** in the inner core

☒ **C** in the mantle

☒ **D** in the outer core

(c) The diagram shows circles drawn around two earthquake monitoring stations.

The circles indicate the distances of an earthquake from each station.



Explain why this is not enough to locate exactly the position of an earthquake.

(2)

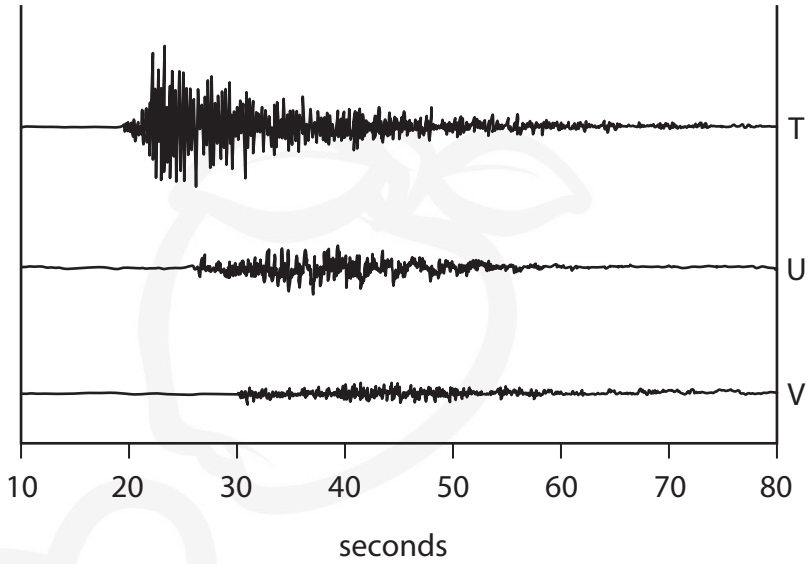
.....

.....

.....

.....

(d) The diagram shows the different traces that the same earthquake produces on seismometers at three different towns T, U and V.



Suggest **two** pieces of evidence that show the towns are at different distances from where the earthquake happened.

(2)

1 .....

.....

2 .....

.....

(e) Explain why scientists find it difficult to predict when a tsunami wave will occur.

(2)

.....

.....

.....

.....

(Total for Question 2 = 8 marks)

Electricity

3 (a) Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

The unit of potential difference is the

☒ **A** amp

☒ **B** joule

☒ **C** volt

☒ **D** watt

(b) Choose words from the box to complete the sentence.

(3)

current	efficiency	gain	high	loss	low	resistance

Electrical energy is transmitted at ..... voltages,

because it improves the ..... by reducing

heat ..... in the transmission lines.

(c) When a voltage of 12 V is applied to the input coil of a transformer, there is a current of 0.5 A in the input coil.

Calculate the input power of the transformer.

State the unit.

(3)

input power of the transformer = ... unit .....

(d) A student investigates induced voltage.

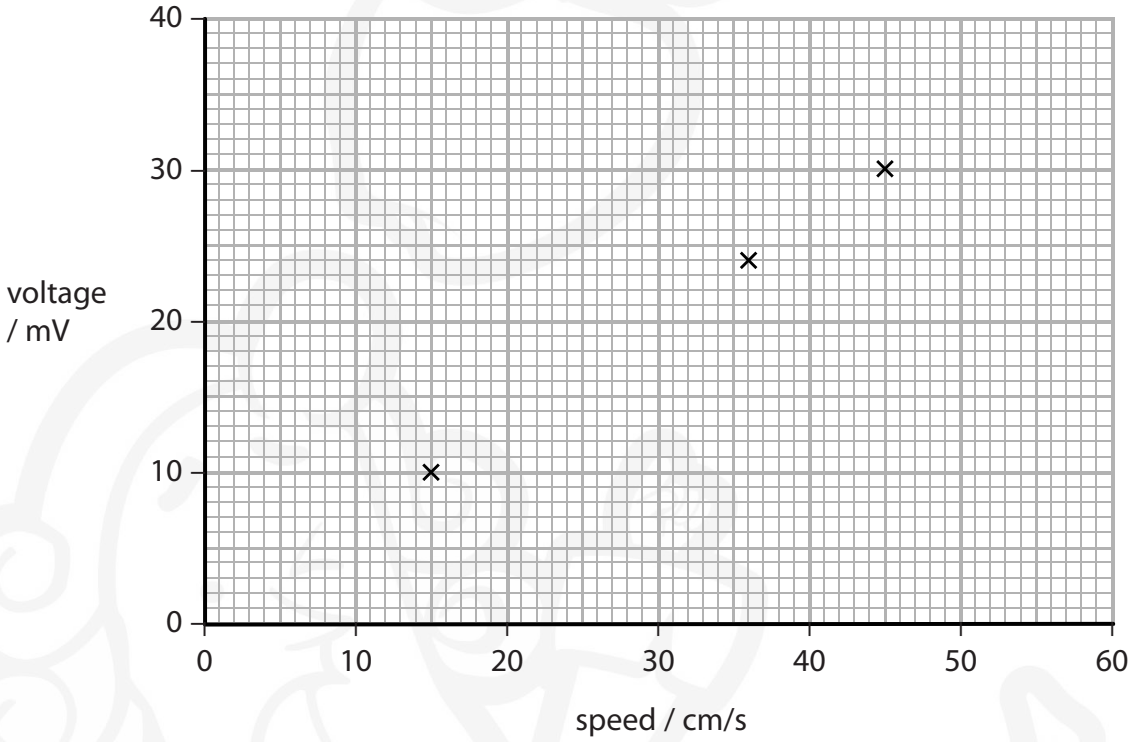
She pushes a magnet into a coil at different speeds.

She puts some of her results on a graph.

(i) When the speed of the magnet is 6 cm/s, the induced voltage is 4 mV.

Plot this value on the graph, marking it with a cross, ×.

(1)



(ii) Draw the line of best fit.

(1)

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

When the speed of the magnet is 20 cm/s, the induced voltage is about

☒ **A** 6.5 mV

☒ **B** 13 mV

☒ **C** 26 mV

☒ **D** 30 mV

(Total for Question 3 = 10 marks)

Earth, Pluto and the Sun

4 The table gives some information about the Earth and about Pluto.

	distance from the Sun measured in units of distance
Earth	15.0
Pluto	591

(a) Calculate the shortest distance between Earth and Pluto.

(2)

distance = ... units of distance

(b) In fact the distance between Earth and Pluto is always changing.

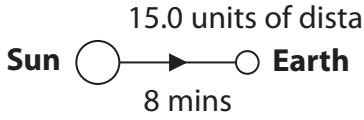
Explain why the distance between Earth and Pluto is always changing.

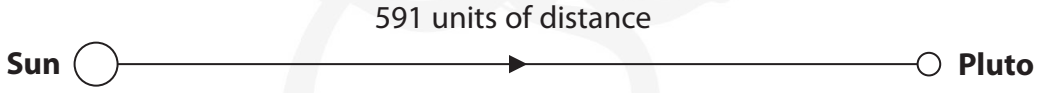
You may draw a diagram to help your answer.

(2)

(c) Light takes 8 minutes to get from the Sun to Earth.

not drawn to scale





Calculate the time it takes for light to get from the Sun to Pluto.

(3)

time taken = ... minutes

(d) The Sun is our nearest star.

Use words from the box to complete the following sentences.

black hole	main sequence star	nebula	red giant
supernova	white dwarf		

(3)

Our Sun was formed from a collapsing .....

The next stage in the evolution of our Sun is .....

Our Sun will end up as a .....

(Total for Question 4 = 10 marks)

Electromagnetic waves

5 Visible light and microwaves are both electromagnetic waves.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

(1)

Electromagnetic waves

☒ **A** all have the same wavelength in a vacuum

☒ **B** all have the same wavelength in glass

☒ **C** all travel at the same speed in a vacuum

☒ **D** all travel at the same speed in glass

(ii) Visible light can be split into colours.

The diagram shows the colours arranged in order of frequency.

Complete the diagram by writing in the four missing colours.

(3)

.....	.....	yellow	.....	blue	indigo	.....

low frequency — high frequency

(iii) Microwaves have many uses.

State **two** uses for microwaves.

(2)

1 .....

.....

2 .....

.....

*(b) The potential danger of electromagnetic waves increases as the frequency of the waves increases.

Compare the harmful effects of two types of electromagnetic waves on people.

Choose one wave with a lower frequency than visible light and one wave with a higher frequency than visible light.

(6)

(Total for Question 5 = 12 marks)

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Energy transfers

6 (a) (i) A student has a battery-powered torch.

When the lamp in the torch is lit for 10 s, 9 J of energy is transferred in a useful way and 61 J is wasted.

Complete the table to show the amount of each form of energy linked with this torch in 10 s.

(2)

form of energy	amount of energy in 10 s / J
thermal (heat)	
light	
electrical	

(ii) Soon after the torch is switched on, the temperature of the filament in the lamp reaches a steady high temperature.

The filament stays at this high temperature even though electricity is still being supplied to it.

Explain why the temperature of the filament in the lamp remains the same.

(2)

.....

.....

.....

(b) The energy supplied to a machine is 2500 J.

The machine has an efficiency of 20%.

The equation for finding the useful energy transferred by a machine is

$$\textit{useful energy transferred by the machine} = \textit{total energy supplied to the machine} \times \frac{\textit{efficiency of machine}}{100}$$

Calculate the useful energy transferred by this machine.

(2)

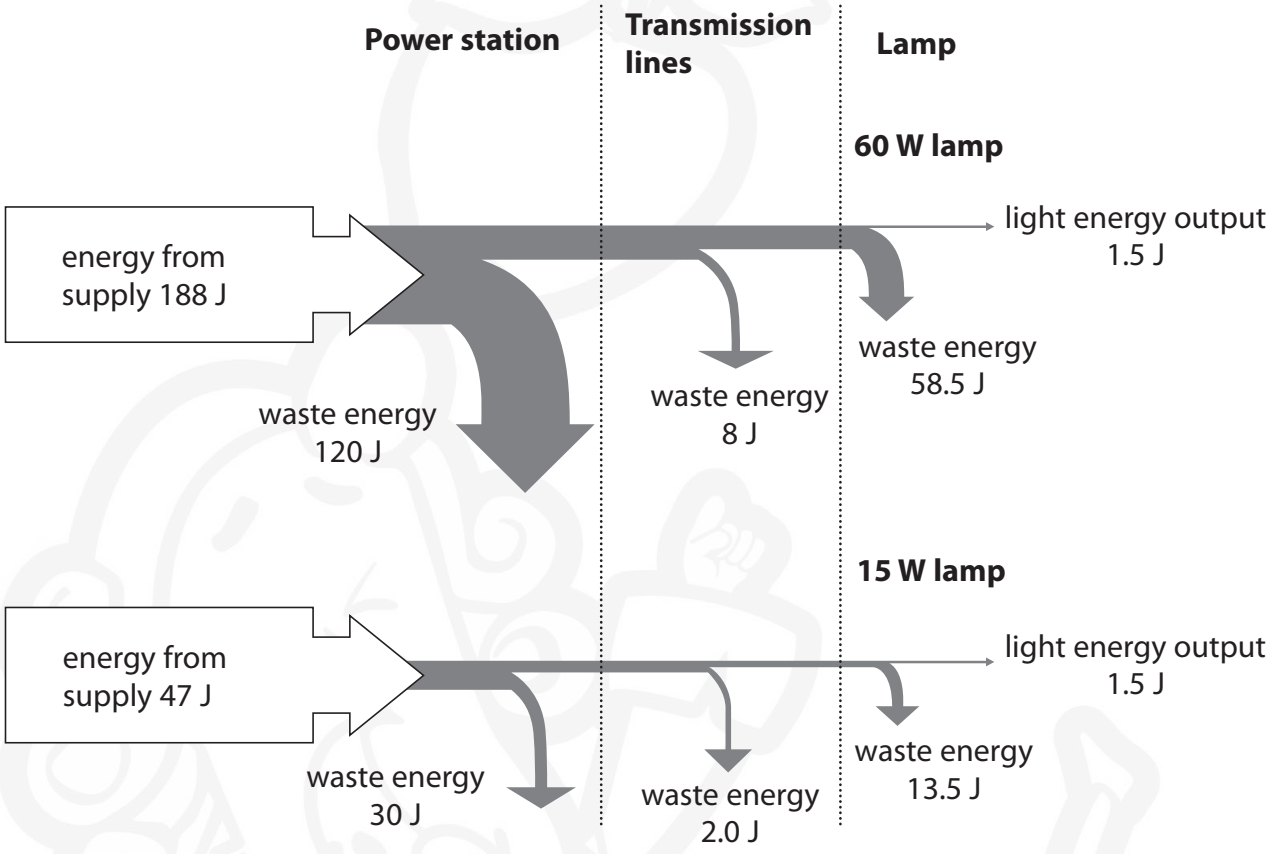
useful energy = ... J

*(c) A student investigates the energy chains for a 60 W lamp and a 15 W lamp.

The diagram shows the energy chains for each lamp.

Each energy chain starts with the amount of energy supplied to the power station in one second and ends with the light given out by the lamps in one second.

Some of the energy supplied is wasted in the chains.



One of the lamps is described as an energy-saving lamp.

Explain why using the energy-saving lamp saves energy.

Quote values from the diagram to help your answer.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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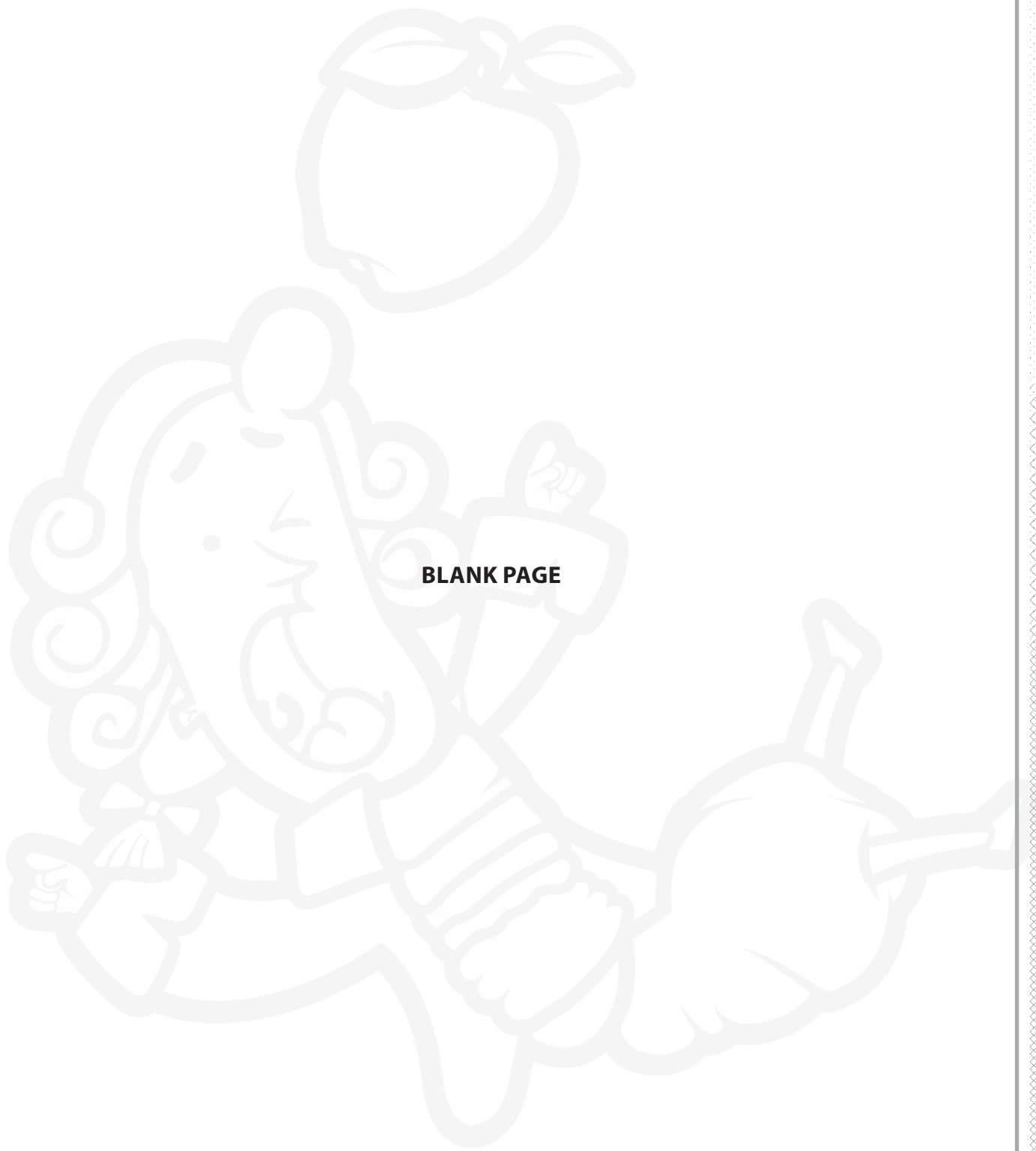

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