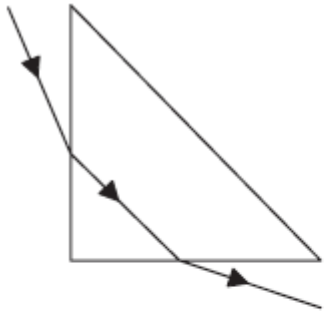
Surname	Initial(s)
Signature	

American Academy Larnaca
Year 4 Test
Double Science

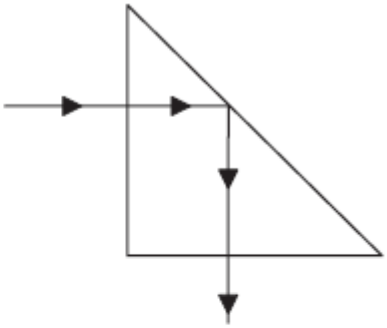
Physics
Topic P1a.11: *Now you see it, now you don't*
Date:
Time: 20 minutes

Optical fibres

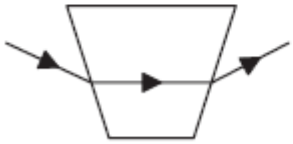
1. In which of these is the light changing direction for the same reason that it does in an optical fibre?



A



B



C

D

2. The name of the process that occurs in the optical fibre is

A total internal reflection

B total external reflection

C total internal refraction

D total external refraction

3. The wave passing down the optical fibre is

A seismic

B ultrasonic

C transverse

D longitudinal

4. Which row of the table is correct for optical fibres?

	the fibres	the light can transfer
A	must be kept in a straight line	energy and information over long distances
B	can be bent around a corner	mass and energy over long distances
C	must be kept in a straight line	mass and energy over long distances
D	can be bent around a corner	energy and information over long distances

5. A star emits waves of visible, infrared and ultraviolet radiation.
In what order would you expect the waves to arrive at the Earth?

A visible before the infrared

B infrared before ultraviolet

C ultraviolet before visible

D all at the same time

6.

$$\text{speed} = \text{frequency} \times \text{wavelength}$$

Dilys measures the wavelength λ of one frequency f of light from a star.
Which of these relationships should Dilys use to find the frequency of this wave?

A $v = \frac{f}{\lambda}$

B $v = \frac{\lambda}{f}$

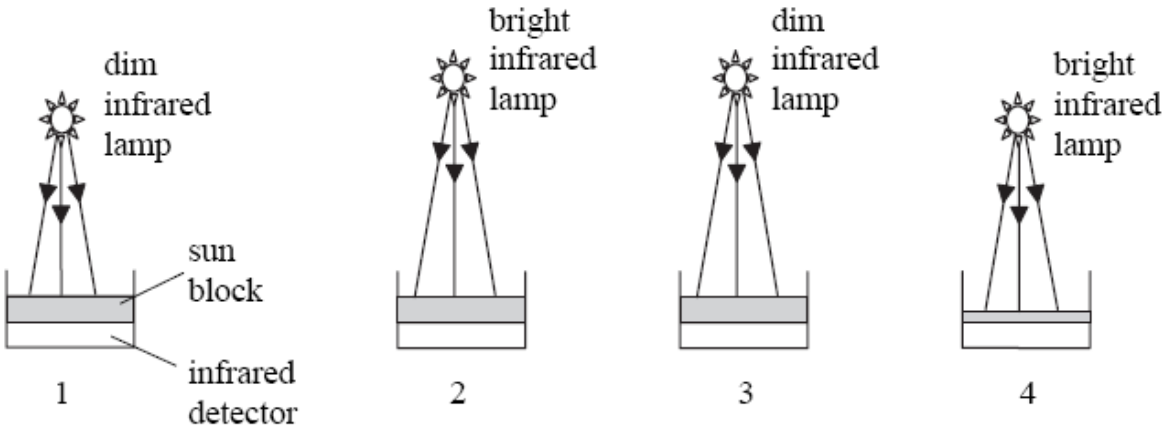
C $f = \frac{v}{\lambda}$

D $f = \frac{\lambda}{v}$

Testing sun block

Use this information to answer questions 7,8 and 9.

Mike has been reading about skin cancer.
The book says that a thick layer of sun block cream (sunscreen) helps to prevent skin cancer.
He decides to investigate a sun block cream.
He sets up the four arrangements shown.



7. Which arrangement should give the biggest reading on the infrared detector?

A 1

B 2

C 3

D 4

8. Which pair of arrangements would give information about the effect of distance from the lamp?

A 1 and 2

B 1 and 3

C 2 and 4

D 3 and 4

9. Mike's investigation is not valid because

A he uses two different distances

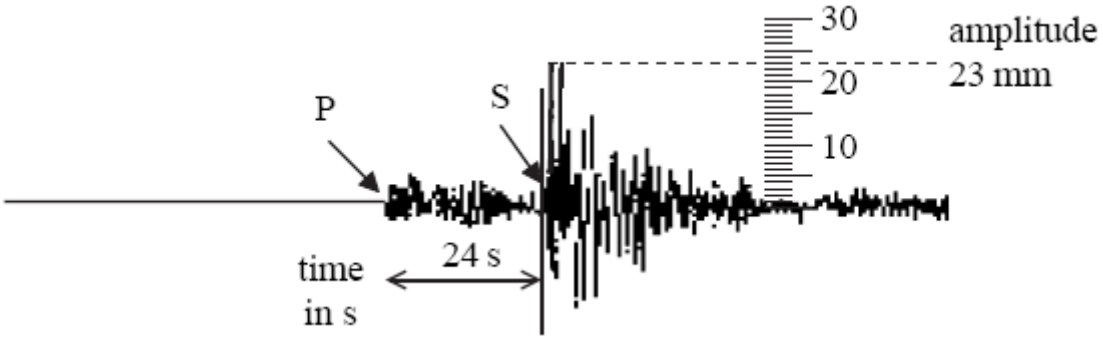
B he uses two different thicknesses

C the radiation from the lamps has the wrong frequency

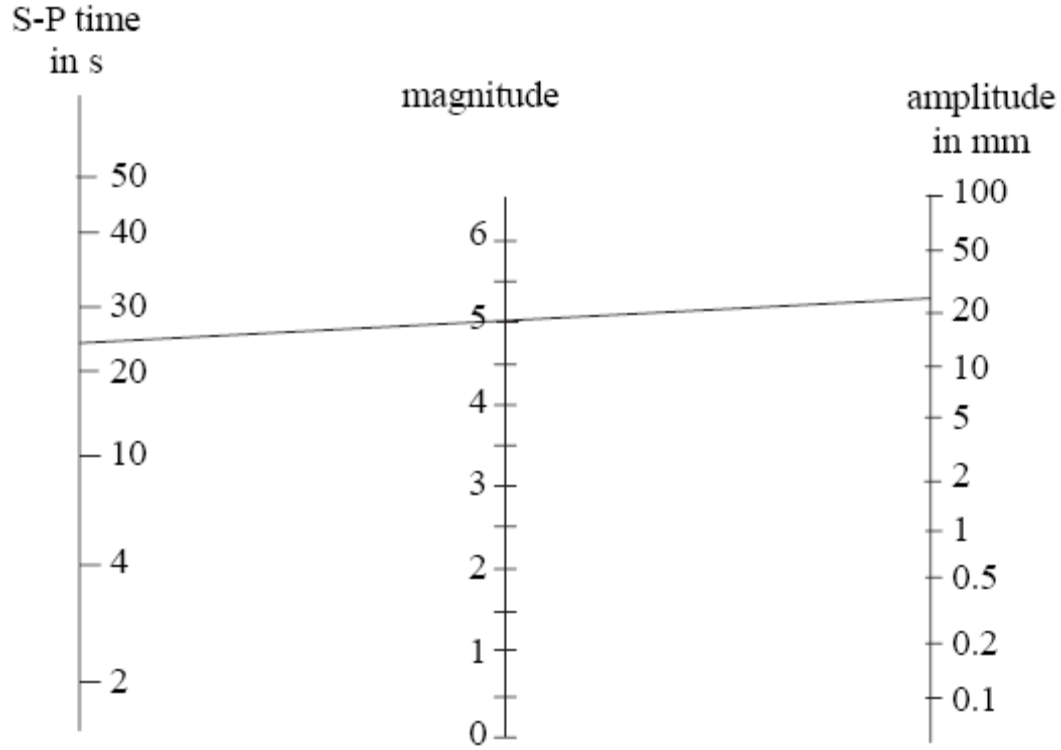
D too many variables are changed in the experiment

Magnitude of an earthquake

Use this information to answer questions 10, 11 and 12.



The chart below shows how to find the magnitude of the earthquake on the Richter scale. The S-P time value and the maximum S wave amplitude are joined. Then the magnitude is read from the middle scale. In this example, the magnitude is 5.



10. The time between the arrival of the first P wave and the first S wave at the detector depends on

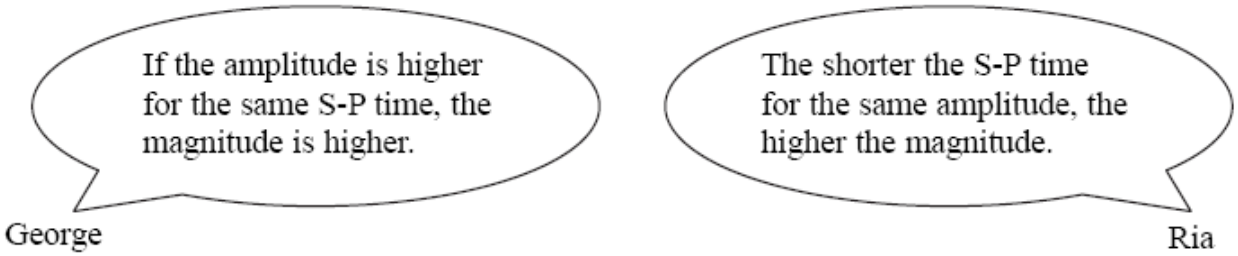
A the time between the P and S waves being sent out

B the distance between the places where the P and S waves are sent out

C the distance between the earthquake and the detector

D the time it takes the scientists to travel from detector to the earthquake

11. The seismologists were discussing this.



Who is correct?

A George only

B Ria only

C both George and Ria

D neither

12. The magnitude of an earthquake which has an S-P time of 30 s and an amplitude of 5 mm is about

A 3.8

B 4.5

C 5.2

D 5.5

13. Which row of the table correctly compares digital signals with analogue signals?

	digital signals	analogue signals
A	travel faster than analogue signals	are less affected by noise
B	travel faster than analogue signals	are more affected by noise
C	travel at the same speed as analogue signals	are more affected by noise
D	travel at the same speed as analogue signals	are less affected by noise

14. Which of these shows a digital signal?

A

B

C

D

Waves in action

Many of our activities depend on waves.
There are many different waves.

15. Mobile phones use

A ultrasound waves

B ultraviolet waves

C microwaves

D gamma waves

16. Ultraviolet waves are used to

A detect forged bank notes

B scan pregnant women

C cook food

D communicate with satellites

17. Sonar uses

A ultraviolet waves

B ultrasound waves

C infrared waves

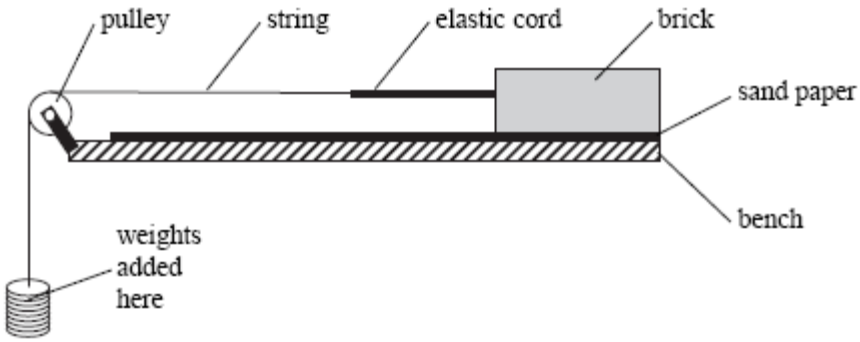
D microwaves

18. Humans in space can suffer from the effects of harmful waves.
Which row of the table is correct for the most dangerous waves?

	frequency	energy
A	lowest	lowest
B	highest	lowest
C	lowest	highest
D	highest	highest

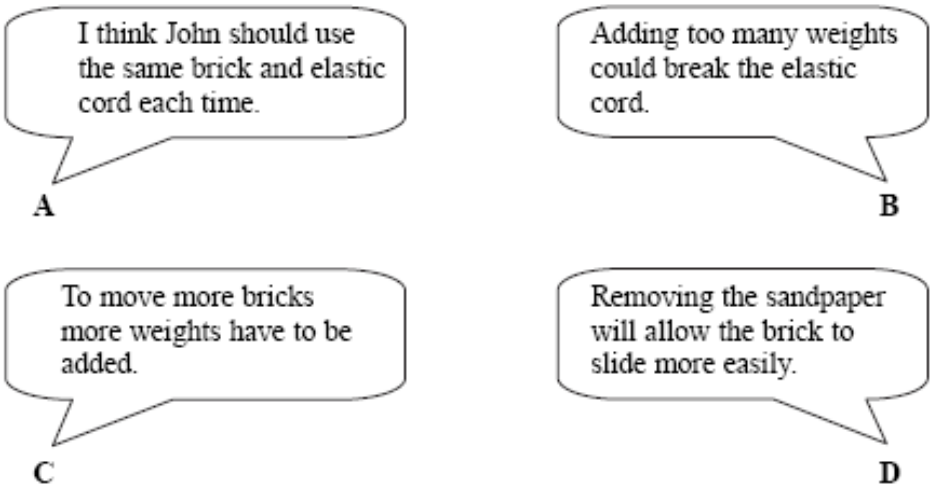
Use this information to answer questions 19 and 20.

Earthquakes happen when pieces of the Earth's crust slide against each other.
John wanted to investigate how sliding works.
The diagram shows an experiment he tried.



The weights are added carefully.
Suddenly the brick jerks to the left.
When a second brick is placed on top of the first, John needs to add more weights before the bricks move.

19. John and his friends had watched this initial experiment. John's friends made these statements.



Who has drawn a conclusion?

20. John repeats the experiment several times with a single brick.
He finds that he has to add different numbers of weights to make the brick slide each time.
This experimental model of an earthquake suggests why scientists **cannot**

A measure the size of an earthquake

B predict when an earthquake will happen

C detect transverse waves from earthquakes

D detect exactly where an earthquake has happened

21. Longitudinal waves from an earthquake follow curved paths inside the Earth.
This shows that longitudinal waves

A travel at different speeds at different depths

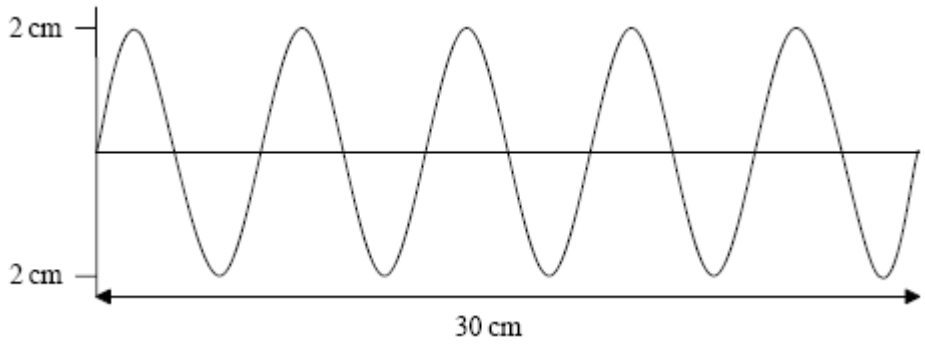
B are repelled by the Earth's core

C arrive before transverse waves

D pass through the Earth's core

Use this information to answer questions 22 to 24.

Paul found this diagram which shows the waves sent out by a source in a time of 0.1s.



22. Paul correctly stated that the amplitude of the wave was
Who is correct?

A 2 cm

B 4 cm

C 5 cm

D 6 cm

23. Paul used the diagram to find the wavelength of the wave. The wavelength is

A 2 cm

B 2.5 cm

C 6 cm

D 30 cm

24.

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Paul used the information to find the speed of the wave.
The speed is

A 3 cm/s

B 5 cm/s

C 30 cm/s

D 300 cm/s

TOTAL FOR MULTIPLE CHOICE PAPER: 24 MARKS

END