6.2 Electromagnetic Waves

Question Paper

Course	AQA GCSE Physics
Section	6. Waves
Topic	6.2 Electromagnetic Waves
Difficulty	Medium

Time allowed: 40

Score: /29

Percentage: /100

Question 1a

Higher Only

Radio waves are detected using metal antennae.

(a)
What happens when an antenna absorbs radio waves?

[2 marks]

[2 marks]

Question 1b

(b)
Describe how radio waves are different from gamma rays.

[4 marks]

[4 marks]

Question 2a

Higher Only

Figure 1 below shows an X-ray image of a human skull.

Figure 1

(a)
When X-rays enter the body, what does the following do to the X-rays?

(i) Soft tissue
(ii) Bone

[2 marks]

[2 marks]

Question 2b

Higher Only

X-rays are used in hospitals for computed tomography (CT) scans.

(b)
Give **two** other medical uses for X-rays and state a property of X-rays that makes them useful for these.

[3 marks]

[3 marks]

Question 2c

Table 1 below shows the total dose of X-rays received by the human body when different parts are X-rayed.

Table 1

Part of body X-rayed	Dose of X-rays received by human body in arbitrary units
Chest	4
Pelvis	60
Head	3

(c)
Calculate the number of chest X-rays that are equal in dose to one pelvis X-ray.

[2 marks]

[2 marks]

Question 2d

Stars emit all types of electromagnetic waves. However, an X-ray telescope on Earth is unable to detect X-rays emitted from distant stars.

(d)
Explain why this is the case and give a solution to this problem.

[2 marks]

[2 marks]

Question 3a

Light changes direction as it passes from one medium to another.

(a)
State the name of this phenomena and explain why this happens.

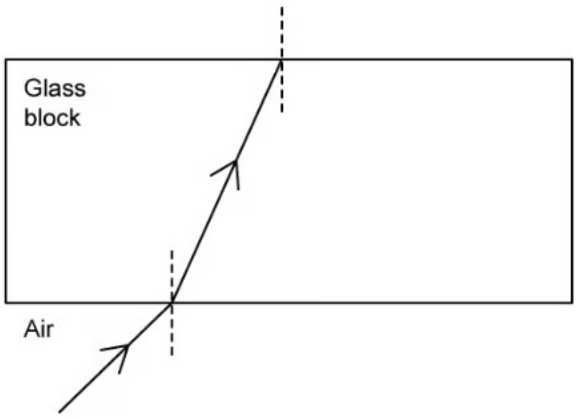
[2 marks]

[2 marks]

Question 3b

Figure 1 shows a light ray changing direction as it passes from air into a glass block.

Figure 1



(b)
Draw a light ray coming out of a glass block.

[2 marks]

[2 marks]

Question 3c

Higher Only

(c)

State the direction of the light ray in part (b) and why you have drawn it this way.

[2 marks]

[2 marks]

Question 3d

(d)

What property of the light **does not** change when it passes from the air to the glass block? Explain why this is the case.

[2 marks]

[2 marks]

Question 4a

A student carried out an experiment to test how the colour of an object affects the amount of blackbody radiation emitted by that object.

The student took two identical flasks and painted one of them black and the other silver, as shown in **Figure 5** below

Figure 5

The plan was to fill them both with hot water and then measure how their temperatures changed over time.

(a)
Suggest two other things that the student should have done in order to ensure a fair test.

[2 marks]

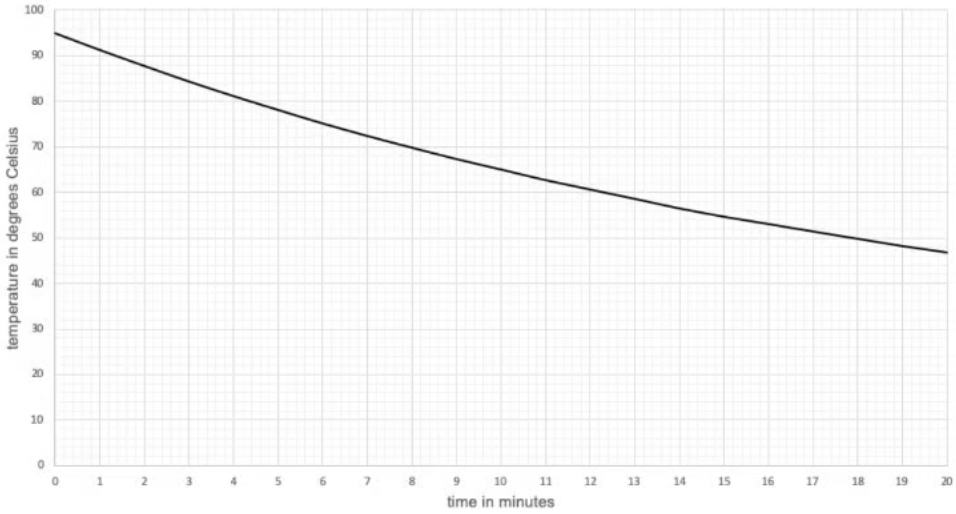
[2 marks]

Question 4b

(b)

The graph in **Figure 6** below shows the students results for the silver flask.

Figure 6



Add another line to the graph in Figure 6 showing the results you'd expect the student to get for the black beaker.

[2 marks]

[2 marks]

Question 4c

(c)

After leaving the silver flask for a long period of time, the temperature of the beaker finally settled at 20 degrees Celsius.

Explain what is significant about this temperature.

[1 mark]

[1 mark]

Question 4d

(d)

How would the final temperature of the black flask compare to the temperature of the silver flask?

[1 mark]

[1 mark]