



Physics
Standard Grade

Unit 3
Health Physics
General & Credit Past Paper
Questions

Record Sheet

General - Section	Question	Attempted	RED	AMBER	GREEN
Multiple Choice	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
1. The Use of Thermometers	10				
	11				
	12				
2. Using Sound	13				
	14				
	15				
	16				
	17				
3. Light and Sight	18				
	19				
	20				
4. Using the Spectrum	21				
	22				
5. Nuclear Radiation - Humans & Medicines	23				
	24				
	25				
	26				



Credit - Section	Question	Attempted	RED	AMBER	GREEN
2. Using Sound	27				
	28				
3. Light and Sight	29				
	30				
	31				
	32				
	33				
	34				
	35				
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4. Using the Spectrum	37				
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5. Nuclear Radiation - Humans & Medicines	40				
	41				
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	43				
	44				
	45				
	46				



RED - I don't understand the question

I NEED HELP!

AMBER - I understand most of the question

I NEED TO REVISE A LITTLE MORE!

GREEN - I got the correct answer first time!!

I UNDERSTAND THIS TOPIC

General Level

Answer questions in your Homework Jotter.

Show working for each question.

KU	PS
1	
2	
3	
4	
5	
6	1
7	1
8	1
9	1
10	1

1.

Which of the following is a use for ultrasound in medicine?






- A Correcting eye defects such as a detached retina
- B Killing cancerous cells
- C Producing an image of an unborn baby
- D Removing "port wine" birth marks
- E Sterilising medical instruments

2.

A student is looking at a sheet of paper which has the letter F drawn on it as shown below.

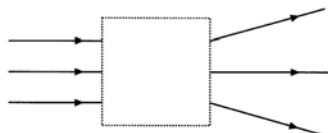
F

Which is the correct image of the letter formed on the student's retina?

- A 
- B 
- C 
- D 
- E 

3.

Three parallel rays of light are passed through a glass shape that is placed under a card. The effect of the glass shape on the rays is shown.



The glass shape is a

- A concave lens
- B convex lens
- C prism
- D rectangular block
- E semi-circular block.

4.

The instrument used to measure the temperature of a human body is called

- A an endoscope
- B an ohmmeter
- C an oscilloscope
- D a stethoscope
- E a thermometer.

5.

Which of the following radiations is used to detect broken bones?

- A Gamma rays
- B Infrared rays
- C Light rays
- D Ultraviolet rays
- E X-rays

6.

Which one of the following radiations is used in a laser?

- A Gamma rays
- B X-rays
- C Visible light
- D Microwaves
- E Radio waves

7.

Gamma radiation is used in hospitals to sterilise instruments.

This is because gamma radiation

- A makes the instruments radioactive
- B increases the temperature of the instruments
- C reduces the temperature of the instruments
- D destroys any living cells on the instruments
- E makes the instruments glow in the dark.

8.

The nucleus of a uranium atom contains

- A electrons only
- B neutrons only
- C electrons and protons only
- D protons and neutrons only
- E electrons, protons and neutrons.

9.

What is the unit of equivalent dose?

- A becquerel
- B joule
- C kilogram
- D sievert
- E watt

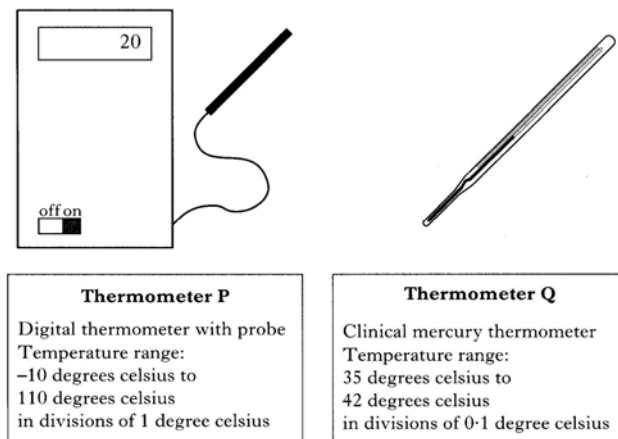
General Level

Answer questions in your Homework Jotter.

Show working for each question.

KU	PS
2	
2	
2	
2	
1	
2	

10. (a) Information on two types of thermometer, P and Q, is given below.



- (i) Which thermometer would be better for measuring the temperature of melting ice?

Explain your answer.

- (ii) Which thermometer would be better for measuring a patient's body temperature?

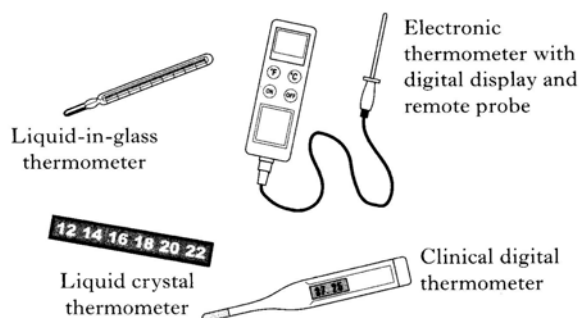
Explain your answer.

- (b) Describe how body temperature is measured using a clinical thermometer.

- (c) A doctor measures a patient's body temperature as 39 degrees celsius. Explain how this measurement assists the doctor in making a diagnosis.

11.

Several types of thermometers are shown below.



- (a) What is the purpose of a thermometer?
- (b) Clinical thermometers are designed for medical use. Other thermometers (sometimes called "ordinary" thermometers) are made for general laboratory use.

Describe **two** important differences between a clinical thermometer and an "ordinary" thermometer.

General Level

Answer questions in your Homework Jotter.
Show working for each question.

KU	PS
	1
	1
	1
3	
	1

12.

Read the following passage.

The temperature of the human body is maintained at about 37 degrees celsius. An increase or a decrease in body temperature of as little as 5 degrees celsius can be very serious.

Doctors often use ear thermometers to measure body temperature. Ear thermometers measure the infrared radiation emitted from the eardrum and surrounding tissue.

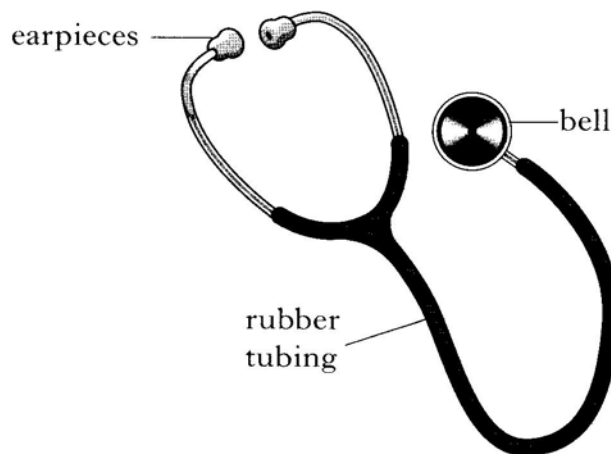
One type of ear thermometer has a scale that ranges from 32 degrees celsius to 42 degrees celsius. The temperature sensor used in this thermometer is a device that has a resistance which changes as the temperature changes.

Use information **given in the passage** to answer the following questions.

- (a) Name the type of radiation given out by the human body.
- (b) Give a reason why the scale of the ear thermometer ranges from 32 degrees celsius to 42 degrees celsius only.
- (c) Suggest a temperature sensor that could be used in the ear thermometer.

13.

A doctor uses a stethoscope like the one shown in the diagram to listen to the sounds of a patient’s heart.



- (a) Explain how the stethoscope acts as a “hearing aid” for the doctor.
Your explanation must give the purpose of each of the parts labelled in the diagram.
- (b) Why is it important that the bell makes firm contact with the patient’s body?

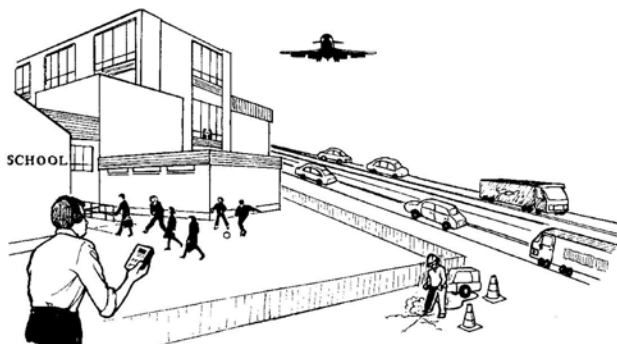
General Level

Answer questions in your Homework Jotter.

Show working for each question.

14.

An Environmental Health Officer is measuring the level of noise pollution near a school.



- (a) From the picture, identify **two** sources of noise pollution.
- (b) Humans can only hear sounds above a certain **sound level**.
What is the value of this sound level?
- (c) The Environmental Health Officer measures a sound level of 100 dB when a large lorry passes the school.
- (i) Why must the Environmental Health Officer wear ear protectors to reduce the sound level at his ears to below 80 dB?
- (ii) A student in a classroom measures the sound level at the same time as the Environmental Health Officer.

Explain whether the sound level measured by the student is higher or lower than the level measured by the Environmental Health Officer.

15.

Read the following passage about sound.

Sound with a frequency below 20 hertz is called infrasound. Sound with a frequency above the range of human hearing is called ultrasound.

Elephants communicate using infrasound. Elephants can detect low level infrasound through their feet.

Bats use ultrasound to navigate. They send out ultrasound pulses that reflect off objects. The bats note how long it takes the pulses to return.

Ultrasound is also used in medicine.

- (a) Suggest a frequency that could be detected by an elephant through its feet.
- (b) State the highest frequency that humans can hear.

KU	PS
	2
1	
	2
	2
	1
	1

General Level

Answer questions in your Homework Jotter.

Show working for each question.

15. continued

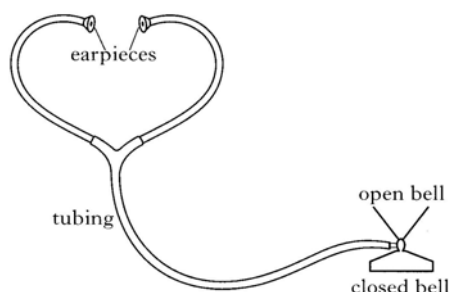
- (c) State the unit of sound level.
- (d) A bat sends out an ultrasound pulse of frequency 45 000 hertz. The pulse is reflected and returns to the bat after 0.2 second.

Calculate the total distance that the pulse travels.
[The speed of sound in air is 340 metres per second.]

- (e) Give an example of a use of ultrasound in medicine.

16.

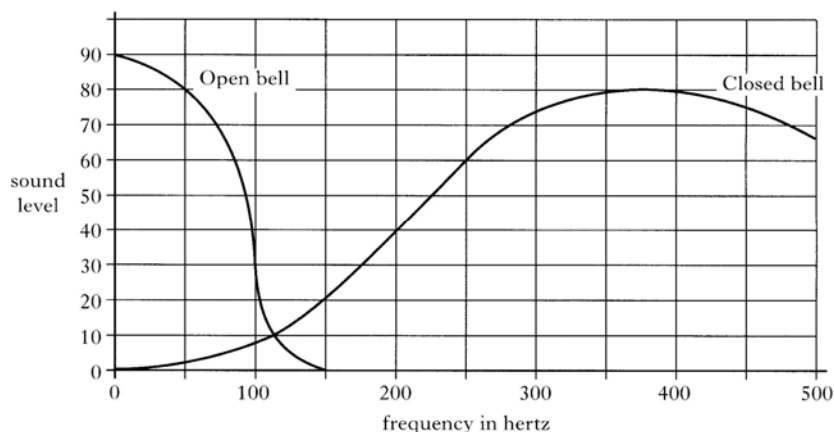
A stethoscope is used to listen to sounds made inside a body. The diagram below shows the main parts of a stethoscope.



The open or closed bell is placed on the body to detect sounds.

The open bell is used for listening to heart sounds.

The graph shows how the sound level varies with the frequency of the sound detected by the bell.



- (a) The unit used to measure sound level has been omitted from the graph.
What is the unit of sound level?
- (b) **Using information given**, explain whether heart sounds are high or low frequency sounds.
- (c) Why is it important that the earpieces of the stethoscope fit tightly in the ears?

KU	PS
1	2
1	1
1	1

General Level

Answer questions in your Homework Jotter.

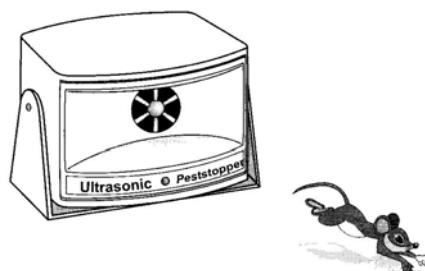
Show working for each question.

17

The table below lists the upper and lower frequency limits that apply to the hearing range of different animals.

<i>Animal</i>	<i>Frequency of lower limit of hearing (hertz)</i>	<i>Frequency of upper limit of hearing (hertz)</i>
bat	16 000	120 000
mouse	500	60 000
cat	500	30 000
human	20	20 000

- (a) What is the highest frequency that can be heard by a mouse?
- (b) Which animal **mentioned in the table** can hear the greatest range of frequencies?
- (c) Animals are annoyed by loud sounds within their hearing range. A householder wants to get rid of mice using an ultrasound emitter.



- (i) What is meant by ultrasound?
- (ii) The householder does not want to annoy cats.

Suggest a frequency that the ultrasound emitter could operate at.

18.

Lasers have several uses in medicine.

One type of laser is used in surgery to replace a scalpel. This laser allows a doctor to cut through tissue and seal blood vessels immediately.

Another type of laser is used to treat tumours. In this case the laser light is directed at the tumour using an endoscope. The laser supplies energy that vaporises the tumour.

Some lasers give out red light, while others produce blue or green light. A coloured laser beam is used as a pointer to line up X-rays in an X-ray machine.

- (a) Describe how a laser can be used to provide “bloodless surgery”.

KU	PS
	1
	1
1	1
	1

General Level

Answer questions in your Homework Jotter.

Show working for each question.

18. continued

(b) A section of an optical fibre used in an endoscope is shown below.



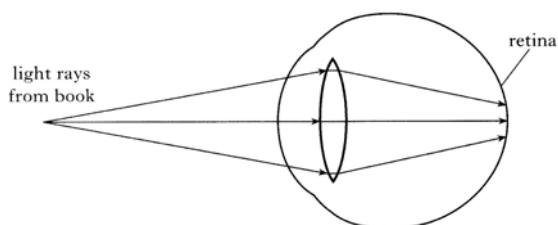
Complete the diagram to show how the laser light is transmitted along the optical fibre.

- (c) What energy transformation takes place when a laser is used to vaporise a tumour?
- (d) Arrange the laser colours red, blue and green in order of increasing wavelength.
- (e) Describe **one** use of X-rays in medicine.

19.

A student has a sight defect and is unable to see near objects clearly.

(a) The following diagram shows what happens to light rays when the student is reading a book.



- (i) By referring to the diagram, explain why the student sees a blurred image.
- (ii) Name this sight defect.
- (iii) In the space below, draw the shape of the lens that would correct this sight defect.
- (iv) When this sight defect has been corrected, the picture printed in the book.

Which statement describes the image on the retina compared to the actual picture?

- A The image is the same way up and larger.
- B The image is upside down and larger.
- C The image is the same way up and smaller.
- D The image is upside down and smaller.

KU	PS
2	
	2
2	
	1
1	
	1
	1

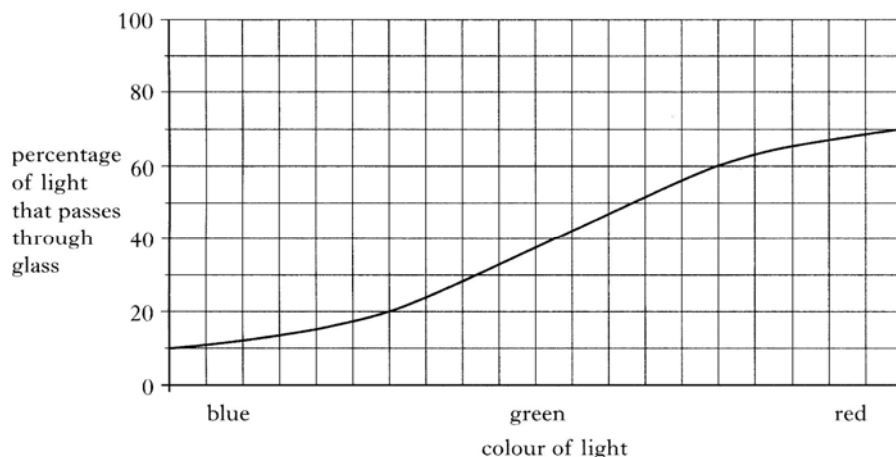
Credit Level

Answer questions in your Homework Jotter.

Show working for each question.

19. continued

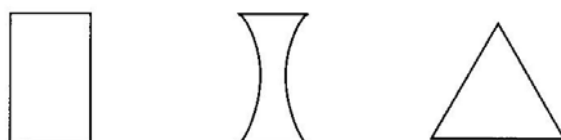
- (b) Another student has a different eye defect. This student is prescribed spectacles that have red tinted glass. The graph below shows the percentage of light of different colours that passes through this glass.



- (i) Which colour of light is blocked most by the tinted glass?
- (ii) List the three colours given on the graph in order of **decreasing** wavelength.

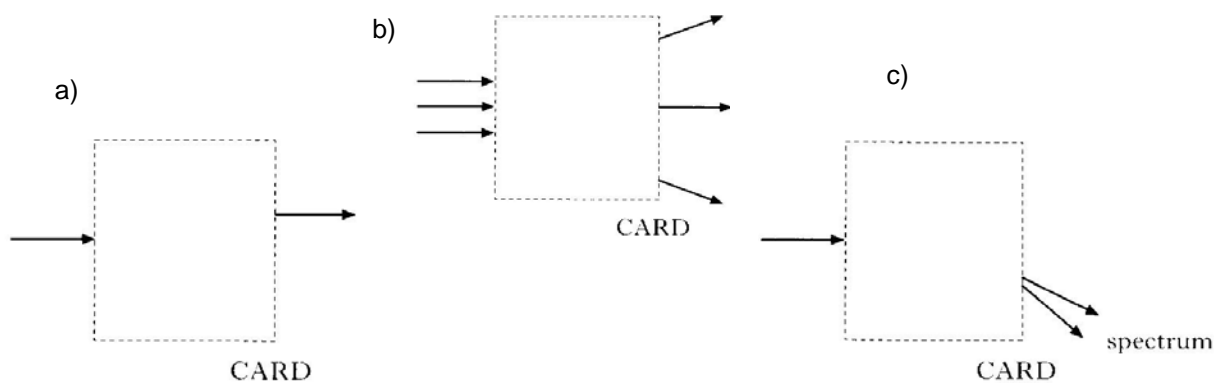
20.

A class investigates the effects of the following shapes of glass on rays of white light.



The teacher sets up three experiments, covering the glass shape with card. The paths of the light rays entering and leaving the different shapes of glass are shown.

For each of the three experiments, draw the **shape** and **position** of the glass block that was used.



Physics (Standard Grade)

Health Physics

Page10

KU	PS
1	1
1	1
2	2
2	2
2	2

General Level

Answer questions in your Homework Jotter.
Show working for each question.

KU	PS
	1
	1
	1
	1
	1
	1
	1

21.

Different types of radiation are used in the detection and treatment of illnesses and injuries.

Four of these radiations are

infrared laser light ultraviolet X-rays

Which of the above radiations is used for each of the following?

- (a) In optical surgery to repair small tears in the retina.
- (b) To treat a skin condition such as acne or eczema.
- (c) To detect a broken bone in an arm.

22.

Different types of radiation are used to detect and treat illnesses and injuries.
Four of these radiations are

infrared laser light ultraviolet X-rays

(a) What type of radiation is used to treat skin conditions such as acne?

(b)



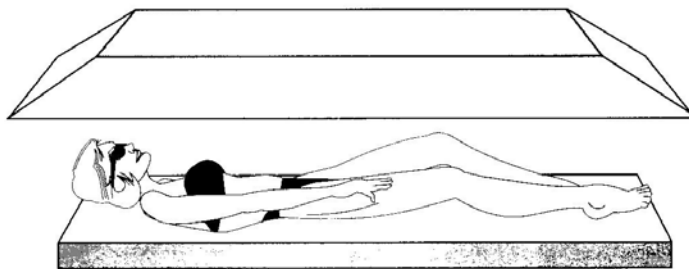
- (i) State **one** medical use of X-rays.
- (ii) What can be used to detect X-rays?

(c)

Colour photographs called thermograms are used to find the temperature variation in a patient's body.

Name the radiation used to make thermograms.

(d)



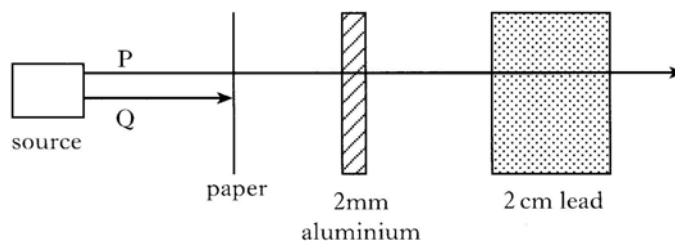
Explain why people need to be protected from overexposure to ultraviolet radiation.

General Level

Answer questions in your Homework Jotter.
Show working for each question.

KU	PS
	2
	2
	2
	1
	1
	1
	2

23. A radioactive source emits two types of radiation, P and Q.
The diagram below shows the effect of different materials on these radiations.



Name the types of radiation, P and Q.

24. Complete these statements about an atom, using all of the words from the following list.

electrons neutrons protons

The particles that make up the nucleus are.....

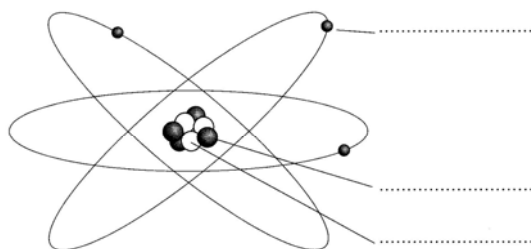
The particles that orbit the nucleus are

25. Two students are revising for a Physics test.

(a) One student draws a simple model of an atom.

Complete the diagram by adding the following labels.

protons neutrons electrons



(b) The other student writes incomplete statements about nuclear radiation.

Complete the statements using words from the following list.

alpha beta gamma becquerels sieverts

(i) The radiation that has the greatest range is

(ii) The radiation that is absorbed by a sheet of paper is

(iii) Dose equivalent is measured in

(c) The students ask each other about nuclear radiation and safety.

State **two** safety precautions necessary when handling radioactive substances.

General Level

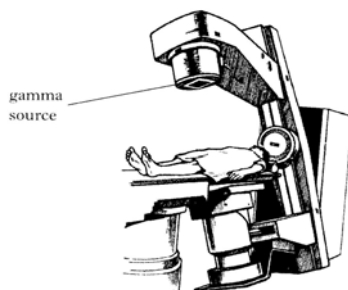
Answer questions in your Homework Jotter.

Show working for each question.

KU	PS
	1
	1
	1
	1

26.

The diagram shows a machine that emits nuclear radiation to treat bone cancer.



(a) Cancer cells are living cells that grow abnormally.

(i) What is the effect of nuclear radiation on cancer cells?

(ii) The machine emits gamma radiation.

Explain why gamma radiation is used rather than alpha or beta radiation.

(iii) Explain why the gamma radiation source is rotated around the patient.

(b) The nurse who operates the machine wears a film badge containing a small piece of photographic film.



What effect does nuclear radiation have on photographic film?

Credit Level

Answer questions in your Homework Jotter.

Show working for each question.

KU	PS
1	
	3
	2
	1
	1

27.

Ultrasound is used by doctors for treatment and diagnosis.

(a) Pulses of ultrasound are used to produce local heating of muscle deep inside the body. This heating effect can help relieve pain in the muscles.

(i) What is meant by ultrasound?

(ii) Calculate the time for a pulse of ultrasound to travel through 2 cm of muscle.

(Data you require will be found in the Data Sheet on page two.)

(b) Ultrasound is also used to build up images of an unborn baby.

(i) Explain how ultrasound is used to build up such images.

(ii) Why is ultrasound safer than X-rays for this sort of medical application?

28.

A newborn baby is given a hearing test. A small device, containing a loudspeaker and a microphone, is placed in the baby's ear.



(a) A pulse of audible sound lasting $10\mu\text{s}$ is transmitted through the loudspeaker. The sound is played at a level of 80 dB.

(i) Give a reason why this pulse of sound does not cause damage to the baby's hearing.

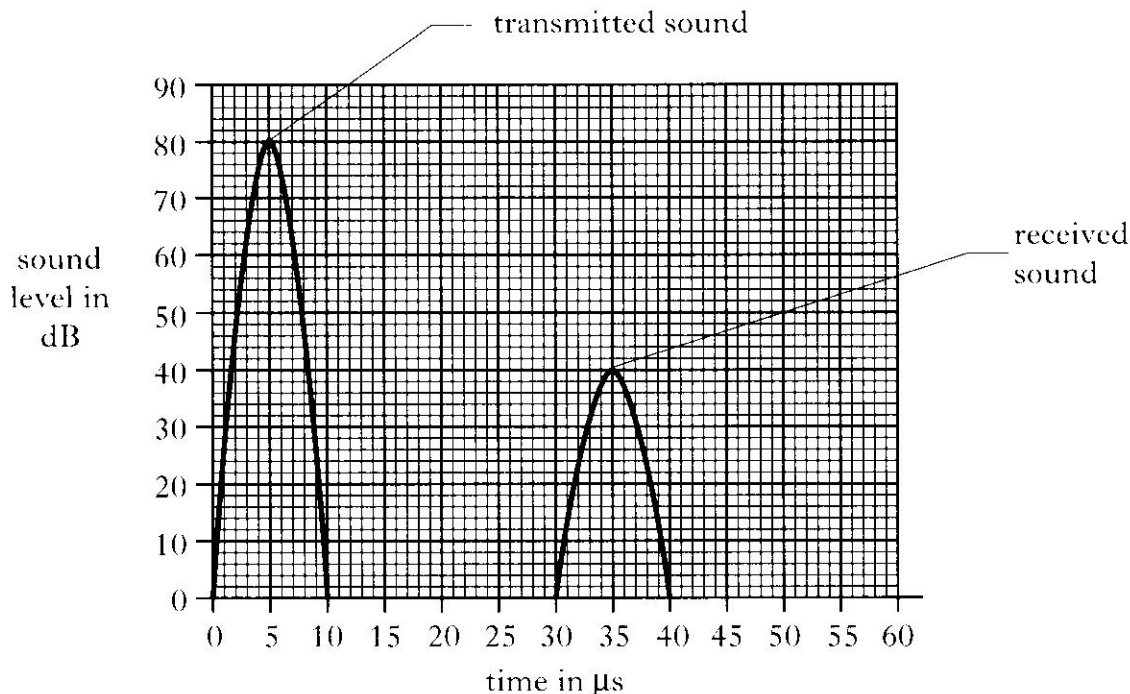
(ii) The transmitted pulse of sound makes the inner ear vibrate to produce a new sound, which is received by the microphone.

Signals from the transmitted and received sounds are viewed on an oscilloscope screen, as shown below.

Credit Level

Answer questions in your Homework Jotter.
Show working for each question.

28 a) (ii). continued



The average speed of sound inside the ear is 1500 m/s .

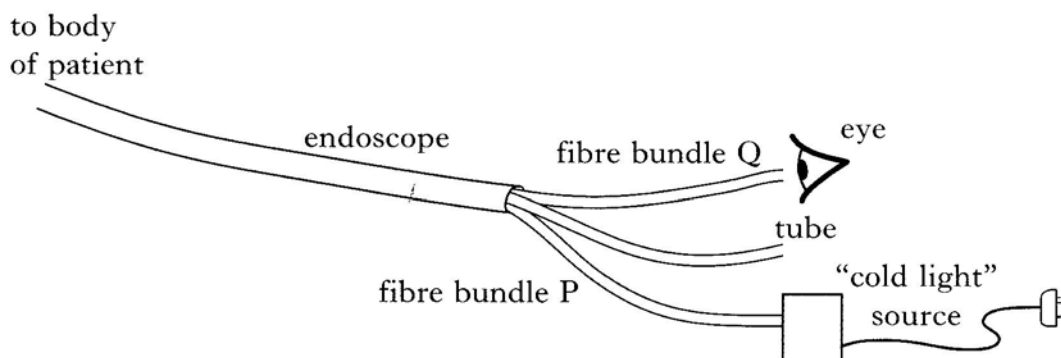
Calculate the distance between the device and the inner ear.

(iii) Suggest a frequency that could be used for the hearing test.

(b) An ultrasound scan can be used to produce an image of an unborn baby. Explain how the image of an unborn baby is formed by ultrasound.

29.

A health physicist is developing a system for measuring temperatures inside the body. A thermocouple is inserted through a tube beside the optical fibres of an endoscope. The endoscope allows the doctor to see where the thermocouple is being positioned. The endoscope consists of two fibre bundles and a “cold light” source.



KU	PS
	3 1 2

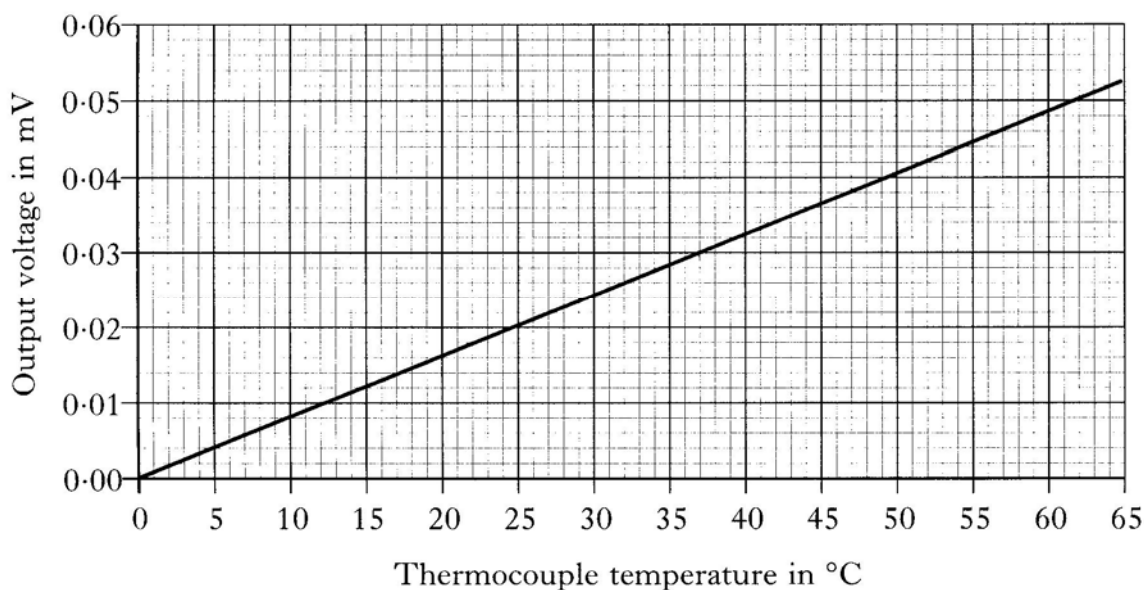
Credit Level

Answer questions in your Homework Jotter.

Show working for each question.

29. continued

- (a) (i) Explain the purpose of Fibre bundle P and Fibre bundle Q in the endoscope.
- (ii) What is meant by a “cold light” source?
- (iii) Explain whether a filament lamp or a discharge lamp would be more suitable for the light source of the endoscope.
- (b) State the energy transformation that takes place in a thermocouple.
- (c) The following graph shows how the output voltage from the thermocouple varies over a certain temperature range.



- (i) What is the voltage produced by the thermocouple at 37°C?
- (ii) The thermocouple is inserted inside the body of a patient who has a fever.
Suggest a value for the voltage produced by the thermocouple.

KU	PS
2	
1	
	2
1	
	1
	1

Credit Level

Answer questions in your Homework Jotter.

Show working for each question.

KU	PS
1	
2	1
3	
1	
2	
	1

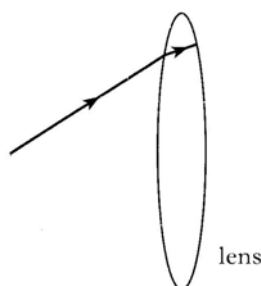
30.

(a) A long-sighted person is prescribed glasses that have lenses each with a power of 2.5 D.

(i) State what is meant by long-sight.

(ii) Calculate the focal length of each lens.

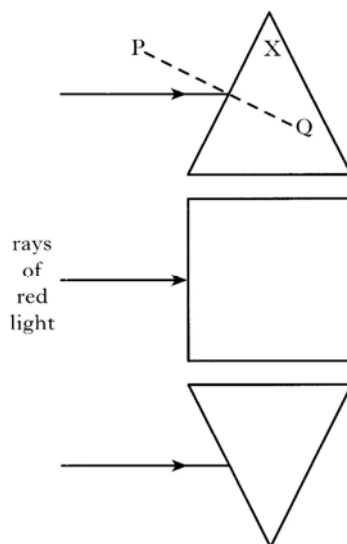
(b) Complete the diagram below to show the path of the ray of light after it emerges from the lens.



31.

A student investigates the effect of glass shapes on rays of light.

(a) The student places glass shapes in the path of three rays of red light as shown.



(i) Complete the diagram to show the paths of the rays of light through and out of the three glass shapes.

(ii) The student has drawn line PQ on the diagram at shape X at right angles to the glass surface.

(iii) **On the diagram**, label **one** angle of incidence as i and **one** angle of refraction as r .

(b) Name the type of lens that would have a similar effect on the rays of light as the three glass shapes, arranged as in part (a).

Credit Level

Answer questions in your Homework Jotter.
Show working for each question.

KU	PS
2	4

32.

A textbook has three diagrams showing how an eye lens changes when looking at objects that are different distances away. The diagrams below are copies of these three diagrams, with parts omitted.

Diagrams 1 and 3 are not complete.

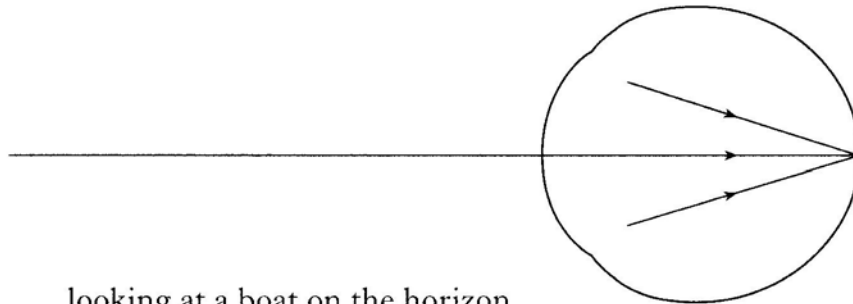


Diagram 1 looking at a boat on the horizon

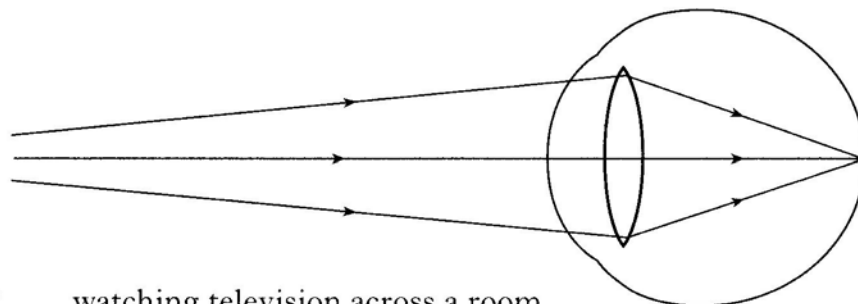


Diagram 2 watching television across a room

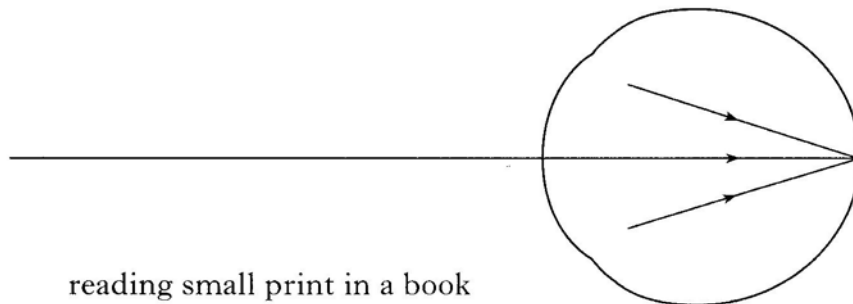


Diagram 3 reading small print in a book

(a) On diagrams 1 **and** 3:

- (i) draw two rays to show light coming from each object to the eye;
- (ii) draw a lens to show how the shape of the eye lens is different from the shape of the lens in diagram 2.

(b) The focal length of an eye lens system (the cornea and the eye lens together) is 2.5 cm.

Calculate the power of this eye lens system.

Credit Level

Answer questions in your Homework Jotter.

Show working for each question.

KU	PS
1	
2	3
1	
2	1

33.

A person visits an optician for an eye test and is found to be long sighted in both eyes. The optician issues the following prescription for lenses.

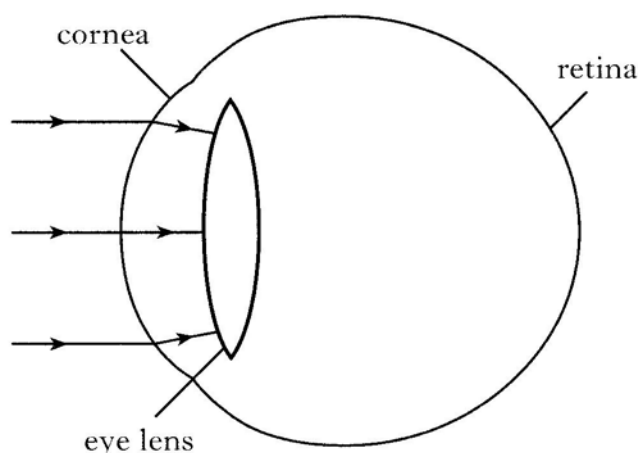
	<i>Power of lens required (D)</i>
Left eye	+2.5
Right eye	+1.0

- (a) State what is meant by long sight.
- (b) Draw the shape of the lenses used to correct the defect in each eye.
Your drawings must show how the two lenses are different.
- (c) Calculate the focal length of the lens prescribed for the left eye.

34.

In the eye, refraction of light occurs at the cornea and at the eye lens.

- (a) What is meant by refraction of light?
- (b) The diagram below shows light rays entering the eye of a short-sighted person.



- (i) Complete the diagram above to show how the light rays reach the retina of this short-sighted eye.
- (ii) A concave lens of focal length 400 mm is needed to correct the vision in this eye.
Calculate the power of this lens.

Credit Level

Answer questions in your Homework Jotter.
Show working for each question.

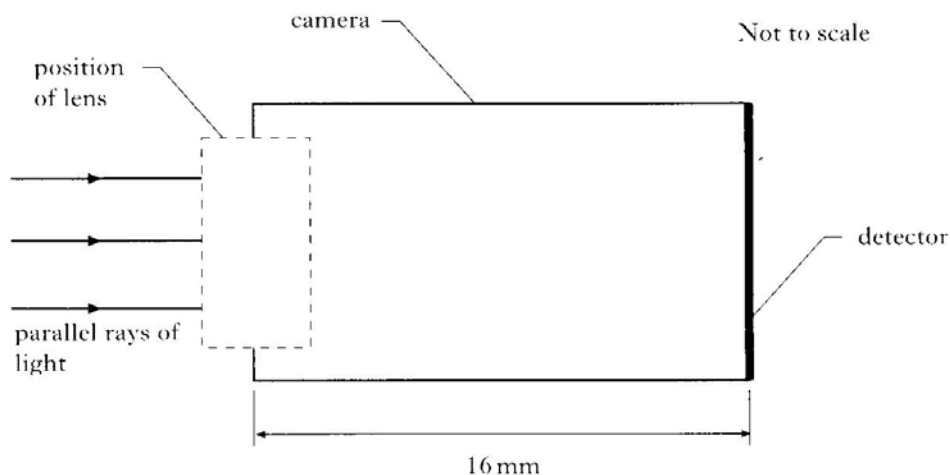
35.

A door entry system in an office block allows video and audio information to be sent between two people.



(a) A camera at the entrance uses a lens to focus parallel rays of light onto a detector.

Part of the camera is shown in the diagram below.



- (i) Complete the diagram above by:
 - (A) drawing the lens used;
 - (B) completing the path of the light rays.

- (ii) Using information from the diagram, calculate the power of the lens used in the camera.

36.

Gamma rays, ultraviolet and infrared are three members of a family of waves. Every member of this family travels at the speed of light.

(a) What name is given to this family of waves?

KU	PS
1	2

Credit Level

Answer questions in your Homework Jotter.
Show working for each question.

36. continued

(b) Some uses of waves in this family are shown below.



Photographing bones inside a body



Tanning with a sun-ray lamp



Sterilising medical instruments



Communicating with mobile phones



Linking networked computers through optical fibres



Treating injuries using a heat-lamp

(i) From the examples above, give a use for:

gamma rays

ultraviolet

infrared

(ii) Which of the three waves in (i) has:

the longest wavelength

the highest frequency?

37.

Some members of the electromagnetic spectrum are named below.

TV and Radio		Infrared	Visible light		X-rays	Gamma rays
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(a) Write the names of the missing radiations in the correct spaces in the diagram above.

(b) State **one** radiation that has a lower frequency than visible light.

(c) State **one** detector of X-rays.

(d) State **one** medical use of infrared radiation.

KU	PS
	3
	2
	2
	1
	1
	1

Credit Level

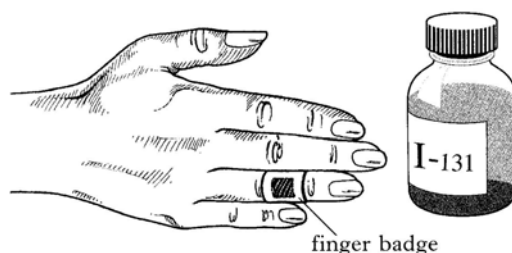
Answer questions in your Homework Jotter.

Show working for each question.

KU	PS
1	
1	
1	
	2
1	
2	
1	
2	
1	

39. continued

- (ii) What effect does radiation have on living cells?
- (b) Two safety precautions necessary when using radioactive sources are:
- wear a film badge attached to clothing
 - keep as large a distance as possible away from the source.
- (i) (A) What happens to photographic film when it is exposed to a radioactive source?
- (B) Describe how information obtained from a film badge is used to indicate the dose of radiation that has been received.
- (ii) As well as these precautions, a technician wears an additional film badge on a finger when handling a bottle of iodine-131 solution.



What is the reason for this **additional** film badge?

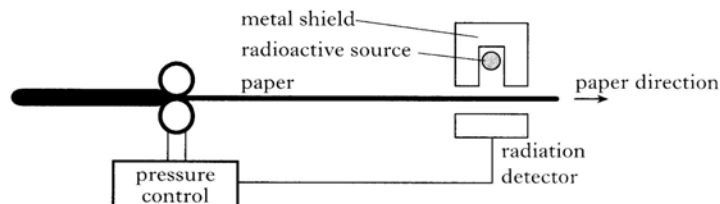
- (iii) State one **other** safety precaution necessary when dealing with radioactive substances.
40. Carbon dating is used by scientists to tell the age of organic (formerly living) material. This method is based on knowing that the half-life of radioactive carbon is 5730 years.
- (a) Explain what is meant by the statement “the half-life of radioactive carbon is 5730 years”.
- (b) The proportion of radioactive carbon in the organic material is found by measuring its activity using a scintillation counter.
- (i) State the **unit** that is used for the activity of a radioactive source.
- (ii) Describe how a scintillation counter is used as a detector of radiation.
- (iii) State an example of the effect of radiation other than scintillations.

Credit Level

Answer questions in your Homework Jotter.

Show working for each question.

41. A paper mill uses a radioactive source in a system to monitor the thickness of paper.

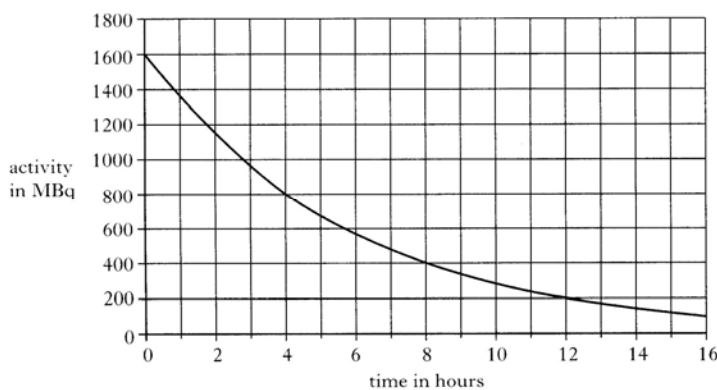


The count rate detected by the radiation detector changes as the thickness of the paper varies. The radiation detector sends signals to the pressure control to maintain an even thickness of paper. The radioactive source emits a type of radiation that is partly absorbed by the paper. The source also has a half-life that allows the mill to run continuously, for several days.

- (a) What is meant by the term “half-life”?
 (b) The following radioactive sources are available.

Source	Half-life	Radiation emitted
P	500 years	alpha
Q	20 hours	beta
R	450 years	beta
S	300 years	gamma

- (i) Explain why source P cannot be used in this system.
 (ii) Which source should be used? Explain your answer.
 (c) Why does the radioactive source in the paper mill have a metal shield?
 (d) Another radioactive source emits gamma radiation. The graph shows how the activity of this source decreases with time.



Calculate the half-life of this radioactive source.

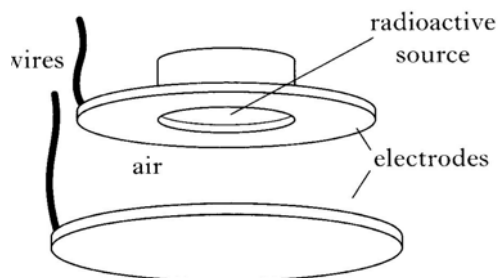
KU	PS
	1
	2
	1
	1

Credit Level

Answer questions in your Homework Jotter.

Show working for each question.

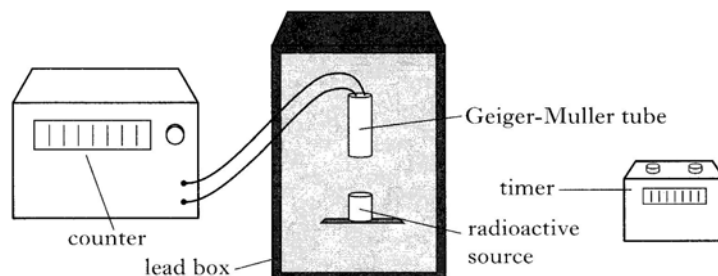
42. A smoke detector contains two metal electrodes, a battery and an alarm circuit. Alpha radiation from a radioactive source ionises air between the two electrodes.



A voltage is applied across the electrodes. Although there is a gap between the two electrodes, there is a current between the electrodes. When there are smoke particles between the electrodes, this current is reduced. This sets off the alarm.

- (a) (i) What is meant by ionisation?
- (ii) Explain how the current is produced in the gap between the electrodes.
- (b) Apart from safety reasons, why is a source that emits alpha radiation more suitable in a smoke detector than a source that emits gamma radiation?
- (c) State the unit of activity of a radioactive source.
43. Radioactive sources are used in medical investigations.

- (a) A technician uses a Geiger-Muller tube, a counter and a timer to measure the half-life of a radioactive source. The source and the tube are placed in a lead box to exclude background radiation.



- (i) Describe how the apparatus is used to measure the half-life of the radioactive source.
- (ii) The half-life of the source is 10 minutes. The initial count rate is 1200 counts per minute.
- Calculate the count rate after 40 minutes.

KU	PS
1	
	1
1	
1	
3	
	2

Credit Level

Answer questions in your Homework Jotter.
Show working for each question.

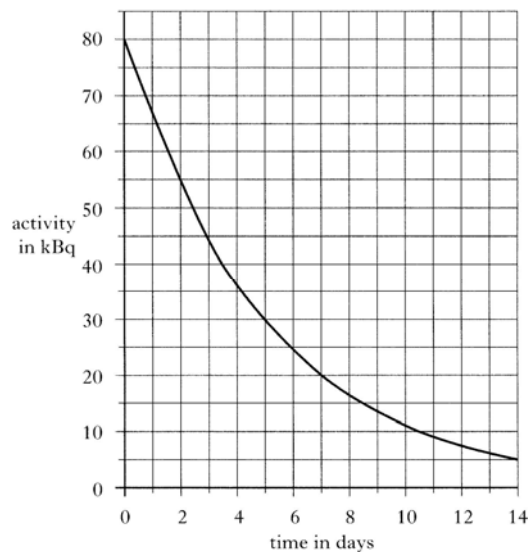
KU	PS
1	
2	
1	
2	
	2

43. continued

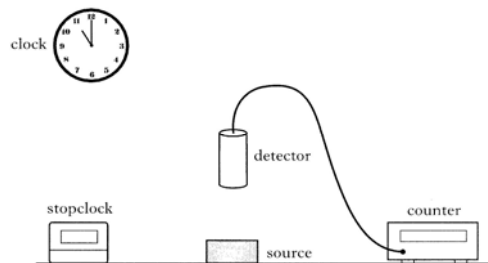
- (b) Dose equivalent measures the biological effect of radiation.
- What unit is used to measure dose equivalent?
 - State **two** factors that dose equivalent depends on.

44.

A radioactive source is used for medical treatment. The graph shows the activity of this source over a period of time.



- (a) Use information from the graph to calculate the half-life of this source.
- (b) Describe a method that could be used to measure the half-life of this radioactive source, using the apparatus shown. You can ignore background radiation.



- (c) A sample of this source is to be given to a patient at 9.30 am on May 17. When the sample is prepared, its initial activity is 200 kBq. The activity of the sample when given to the patient must be 12.5 kBq.
- Calculate at what time and on what date the sample should be prepared.

SQA Source Papers

<u>General</u> - Section		Paper	Question
Multiple Choice	1	2003	1
	2	2000	2
	3	2003	2
	4	2004	2
	5	2002	1
	6	2004	3
	7	2002	3
	8	2006	2
	9	2006	3
1. The Use of Thermometers	10	2001	11
	11	2003	12
	12	2006	10
2. Using Sound	13	2000	10
	14	2002	12
	15	2004	11
	16	2005	11
	17	2005	13
3. Light and Sight	18	2003	13
	19	2006	11
	20	2007	11
4. Using the Spectrum	21	2000	11
	22	2007	10
5. Nuclear Radiation - Humans & Medicines	23	2002	6
	24	2002	7
	25	2004	12
	26	2005	12

<u>Credit</u> - Section			
2. Using Sound	27	2002	5
	28	2007	7
3. Light and Sight	29	2000	6
	30	2001	5
	31	2002	6
	32	2003	5
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	34	2005	6
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37		2004	15
38		2006	6
5. Nuclear Radiation - Humans & Medicines	39	2000	5
	40	2001	6
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	42	2004	7
	43	2005	7
	44	2006	5
	45	2007	6