

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

(a) 20,000

accept 20 kilo

or

20 k

or *20 001*

1

an atom

1

- (b) Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer in the Marking Guidance and apply a 'best-fit' approach to the marking.

0 marks

no relevant content

Level 1 (1–2 marks)

At least one relevant statement is given for either type of wave

Level 2 (3–4 marks)

either

a use, risk and precaution is given for one type of wave

or

A medical use is given for both types of wave

plus

a risk or precaution for one type of wave

Level 3 (5–6 marks)

At least one medical use is given for both types of wave linked to the risks and any precautions necessary

Examples of the points made in the response

Medical use of X-rays

Any one from:

- Detecting bone fractures
- Detecting dental problems
- Killing cancer cells
- CT scanning.

Ignore details about how X-rays / ultrasound work

accept any specific use of X-rays, eg

- *detecting heart / lung disorders (with chest*

X-rays)

- mammograms / breast cancer detection
- detecting stones / bowel disease (with abdominal X-rays)

Risks with X-rays

X-rays pose a risk / danger / hazard

accept are harmful

X-rays cause ionisation / damage to cells

or

mutate cells / cause mutations / increase chances of mutations

or

turn cells cancerous / produce abnormal growths / produce rapidly growing cells

or

kill cells

accept a description of what ionising is

instead of cell, any of these words can be used: DNA / genes / chromosomes / nucleus

accept (may) cause cancer

Operator precautions with X-rays

The X-ray operator should go behind a (metal / glass) screen / leave the room when making an X-ray / wear a lead lined apron

accept appropriate precautions for the patient e.g. limit the total exposure / dose (in one year)

wear a radiation badge is insufficient

Medical use of ultrasound

Any one from:

- Pre-natal scanning
- Imaging (a named body part).
- removal / destruction of kidney / gall stones
- removing plaque from teeth
- *cleaning teeth is insufficient*
- accept examples of repair, eg alleviating bruising, repair scar damage, ligament / tendon damage, joint inflammation.

accept physiotherapy

*accept curing prostate cancer **or** killing prostate cancer cells*

Risks with ultrasound

Ultrasound poses no risk / danger / hazard (to the user / patient)

accept ultrasound is safer than using X-rays

Ultrasound is not ionising

or

Ultrasound does not damage (human) cells

Precautions with ultrasound

The operator needs to take no precautions when making an ultrasound scan

this can be assumed if it is stated that ultrasound is harmless or it is safer than using x-rays or it is non-ionising

Q2.

(a)	dark matt	1
	light shiny	1
(b)	B A C	1
	biggest temperature difference (80 °C) <i>dependent on first mark</i>	1
(c)	(i) (the can that is) dark matt	1
	best absorber (of infrared radiation)	1
	(ii) any three from: • same area / shape of can • surrounding temperature is the same for all cans • same surface underneath cans • same position in the room	3
(d)	fox A	
	smaller ears	1
	thicker fur	1
	these minimise energy transfer <i>dependent on first 2 marks</i>	1
		[12]