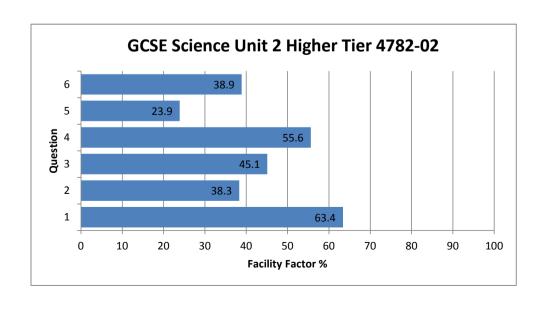


WJEC 2014 Online Exam Review

GCSE Science Unit 2 Higher Tier 4782-02

All Candidates' performance across questions

?	?	?	?	?	?	?
Question Title	N	Mean	S D	Max Mark	F F	Attempt %
1	49	8.2	1.9	13	63.4	100
2	47	3.1	1.3	8	38.3	95.9
3	49	4.1	1.3	9	45.1	100
4	49	5	1.6	9	55.6	100
5	49	1.7	1.2	7	23.9	100
6	49	5.4	2.5	14	38.9	100



2. (a) Complete the following table about the extraction of iron in the blast furnace.

Raw material	Chemical name	The purpose of the raw material
limestone	calcium carbonate	Removes impurities which form the waste called slag
hot air	oxygen	Allows the coke to burn
coke	carbon	
haematite		

(b) The table below shows information about the materials required for the production of **one tonne** of iron.

Complete the table to calculate the total cost of producing **one** tonne of iron. [3]

Raw material	Mass needed (tonnes)	Cost per tonne of raw material (£)	Cost in producing one tonne of iron (£)
iron ore	1.75	60.50	
coke	0.25	120.90	30.22
limestone	0.25		20.00
hot air	4.0	2.25	9.00
		Total cost	£

(C)	Aluminium is also extracted from its ore. Explain why aluminium cannot be explain the furnace using coke (carbon).	ktracted in a [2]

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4782 020007

© WJEC CBAC Ltd. (4782-02) Turn over.

2. (a) Complete the following table about the extraction of iron in the blast furnace.

Raw material	Chemical name	The purpose of the raw material
limestone	calcium carbonate	Removes impurities which form the waste called slag
hot air	oxygen	Allows the coke to burn
coke	carbon	fravioles Cerban teachs With iron oxide. Courses realized.
haematite	Tron ()Xide	Motten for is made when hot air. Also, impuritor are made. and oxygen is remained

(b) The table below shows information about the materials required for the production of one tonne of iron.

Complete the table to calculate the total cost of producing one tonne of iron.

[3]

Raw material	Mass needed (tonnes)	Cost per tonne of raw material (£)	Cost in producing one tonne of iron (£)
iron ore	1.75	60.50	34.57
coke	0.25	120.90	30.22
limestone	0.25	5	20.00
hot air	4.0	2.25	9.00
		Total cost	£ 93-79

(c) Aluminium is also extracted from its ore. Explain why aluminium cannot be extracted in a blast furnace using coke (carbon). [2]

Aliminium & Cannot be extracted from its ore. Explain why aluminium cannot be extracted in a [2]

reduction as it is to hard. Instead,

electrolysis is used.

2. (a) Complete the following table about the extraction of iron in the blast furnace.

Raw material Chemical name The purpose of the raw material

limestone calcium carbonate Removes impurities which form the waste called slag

hot air oxygen Allows the coke to burn

coke carbon Charles Carbon to calcs Causes

Noth Important Causes

haematite Dxide Causes

when hotted by Hoss of Causes

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and



Examiner only

(b) The table below shows information about the materials required for the production of **one tonne** of iron.

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[3]

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782

(c) Aluminium is also extracted from its ore. Explain why aluminium cannot be extracted in a blast furnace using coke (carbon). [2]

Aliminium is comnot be extracted from its one in the blost furnace using robustion as it is to hard. Instead, x



2. (a) Complete the following table about the extraction of iron in the blast furnace.

Raw material	Chemical name	The purpose of the raw material
limestone	calcium carbonate	Removes impurities which form the waste called slag
hot air	oxygen	Allows the coke to burn
coke	carbon	burns jorning the corbon you to start the reaction.
haematite	Iron	when heated hos molten iron comes from this in the blast furnace which ian then be Solidified
	C	into iron.

(b) The table below shows information about the materials required for the production of **one tonne** of iron.

Complete the table to calculate the total cost of producing **one** tonne of iron.

, pg			
Raw material	Mass needed (tonnes)	Cost per tonne of raw material (£)	Cost in producing one tonne of iron (£)
iron ore	1.75	60.50	105.87
coke	0.25	120.90	30.22
limestone	0.25	80	20.00
hot air	4.0	2.25	9.00
		Total cost	£ 165.09

(c) Aluminium is also extracted from its ore. Explain why aluminium cannot be extracted in a blast furnace using coke (carbon). [2]

It cannot be extracted in this way as aluminium is much igher than Carbon on the reactivity series. It must instead be extracted through electrolysis.

4782 020007

2. (a) Complete the following table about the extraction of iron in the blast furnace.

Raw material	Chemical name	The purpose of the raw material
limestone	calcium carbonate	Removes impurities which form the waste called slag
hot air	oxygen	Allows the coke to burn
coke	carbon	burns garning the corbon yes to Start the reaction.
haematite	Iron Ore	when heated those molter iron comes from this in the be comes in the beat which in the be solidified
	(into iron.

Examiner only

[3]

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3			
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Raw material	Chemical name	The purpose of the raw material
limestone	calcium carbonate	Removes impurities which form the waste called slag
hot air	oxygen	Allows the coke to burn
coke	carbon	The cone removes the iron one because it is more reactive.
haematite	Iron Oxide Fez + O,	Is the final thing left over when the extraction is completed. The oxide just have to be removed.

(b) The table below shows information about the materials required for the production of **one tonne** of iron.

Complete the table to calculate the total cost of producing one tonne of iron.

` 3			-
Raw material	Mass needed (tonnes)	Cost per tonne of raw material (£)	Cost in producing one tonne of iron (£)
iron ore 1.75		60.50	11.38
coke	0.25	120.90	30.22
limestone	0.25	80	20.00
hot air	4.0	2.25	9.00
		Total cost	£ 71.20

(c) Aluminium is also extracted from its ore. Explain why aluminium cannot be extracted in a blast furnace using coke (carbon). [2]

Aluminium is more reactive than carbon therefore has to be extracted from its one using electrolusis

2. (a) Complete the following table about the extraction of iron in the blast furnace.

Raw material	Chemical name	The purpose of the raw material
limestone	calcium carbonate	Removes impurities which form the waste called slag
hot air	oxygen	Allows the coke to burn
coke	carbon	The cone removes the iron from the iron ore Decause it is more reactive.
haematite	Iron Oxide Fez + O,	Is the final thing left over when the extraction is completed. The oxide just have to be removed.

Examiner only

[3]

(b) The table below shows information about the materials required for the production of **one tonne** of iron.

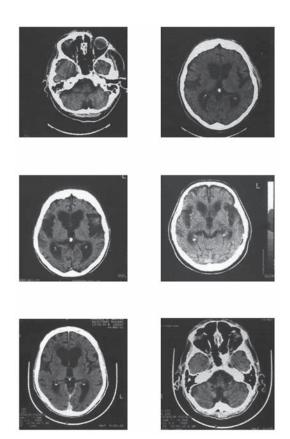
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3			-
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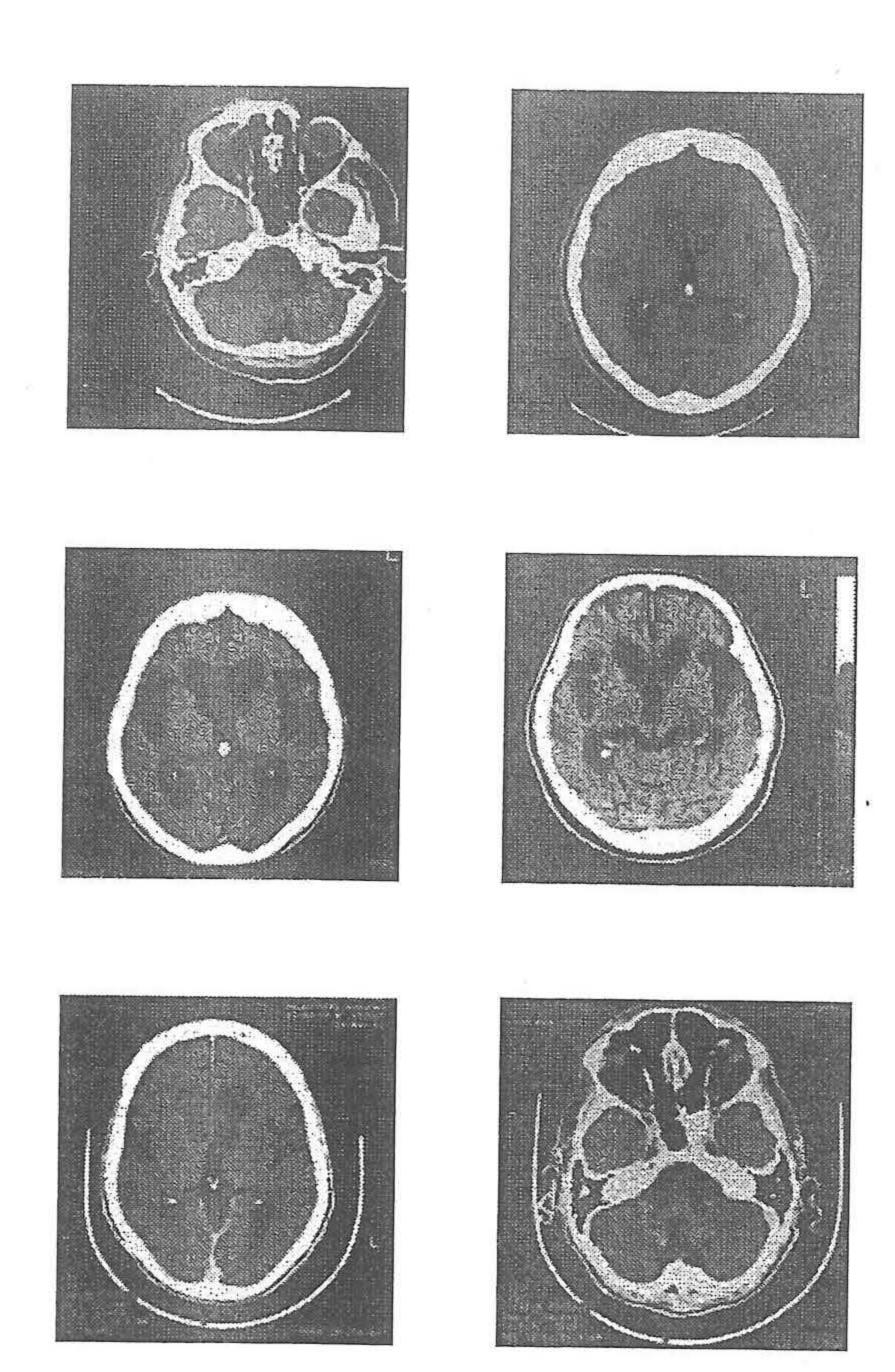
Aluminium is more reactive than carbon therefore has to be extracted from its one using





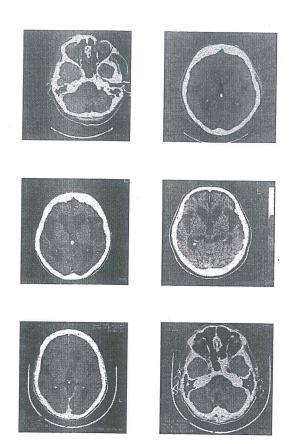
a)	Give	three reasons why a CAT scan is used in the diagnosis of Huntington's.	[3]
	1.		
	2.		
	3.		

(b)	(i)	Complete the Punnett square to show the offspring produced by a heteroz father and a mother who does not suffer from Huntington's.	ygous [3]	onl
	(ii)	Calculate the chance that their first child will suffer from Huntington's.	[1]	
			%	
(c)	Expl child	ain what advice could be given to this couple to avoid the possibility of produling suffering with Huntington's.	cing a [2]	
	•••••			
				9



Give	three reasons why a CAT scan is used in the diagnosis of Huntington's.	[3]
1.	Cen View image from	
	different angles	
2.	Gives a 3-D View	
3.	Malies It easy to detect as	
	Minkendlen'	

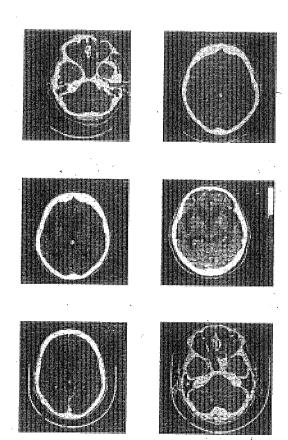
(b)	(i)	Complete the Punnet father and a mother w	t square to show the off ho does not suffer from I	spring produced by a het Huntington's.	terozygous [3]
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			Min		
		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	MM	\bigcap	
	/**>			CC	ra v
	(11)	Calculate the chance	that their first child will su	atter from Huntington's.	
				50	%
(c)	Expla	ain what advice could be suffering with Huntingt	ne given to this couple to on's.	avoid the possibility of p	roducing a [2]
	Th	e couple (elile adept	a Cheldins	ead
	Hin	anglans. And	the Otan I	SITVE W	
	UE	Mg a St	Wogate	······································	
					9



Give	three reasons why a CAT scan is used in the diagnosis of Huntington's.	[3]	
	different angles	, sa	
2.	Gives a 3-D ven V		\bigcirc
3.	Makes It easy to detect to		
	Minking Cen'r		

(a)

(b)	(i)		square to show the offer to does not suffer from I	spring produced by a he		01
8		Camples	No does not suiter from			
		<u> </u>	. 10 M			
	(ii)	Calculate the chance	that their first child will su	uffer from Huntington's.	[1]	
				50) %	ζ.
(c)	Explication of the child	ain what advice could be suffering with Huntington (Cayll (Maling) and	on's.	a child insulations of the control o		<u>(</u>
			.		6	- (



(a) Give three reasons why a CAT scan is used in the diagnosis of Huntington's.

1. Images are 3D we are able to see more of the bain.

2. X-Cays are yout to create a clear image of the bain.

3. Huntington's discase analysis.

*all around the body

(b)	(i)	Complete the Punnett square to show the offspring produced by a heterozygous father and a mother who does not suffer from Huntington's. [3]

gamebes	<u> </u>	h	Jalher
H	. H	Hh	
h	hh	hh	
mosher		1	_

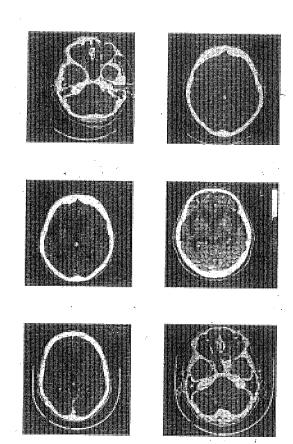
(ii)	Calculate the chance	that their first	child will suffer	from Huntington's.
------	----------------------	------------------	-------------------	--------------------

50 %

[1]

(c) Explain what advice could be given to this couple to avoid the possibility of producing a child suffering with Huntington's. [2]

As hur	Einctons	15 00	inherited
			couple
	t into		
			n option,
	rould d		
$l \sim 0 l \sim 1$	cely sph	in ella	inate
(See Cha	nce of	the Ch	hild
	ac hivet		



(a) Give three reasons why a CAT scan is used in the diagnosis of Huntington's.

[3

1. Images de 3D ve de la coble to see more of the bain.
2. X-rays de vseux to creuxe a clear image of the brain.
3. Huntingtons discosse ansisty



*all around the body

(b)	(i)	Complete the Punnett square to show the offspring produced by a	a heterozygous
()		father and a mother who does not suffer from Huntington's.	[3]

gomebes	<u> </u>	h	Jakher
H	Hib	Hh	
h	hh	hh	
mosher			נ

(ii) Calculate the chance that their first child will suffer from Huntington's.

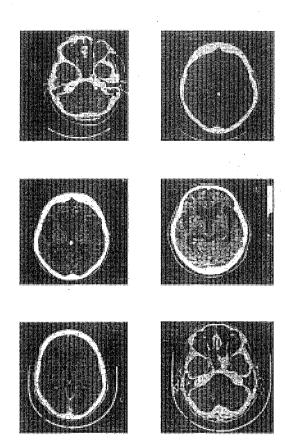
[1]

50 %

(c) Explain what advice could be given to this couple to avoid the possibility of producing a child suffering with Huntington's.
 [2]

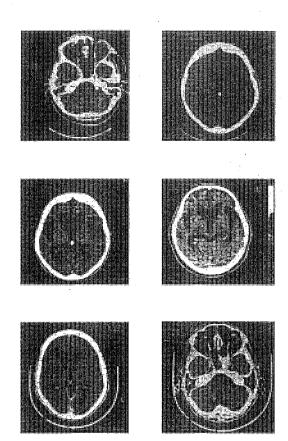
As huntingtons is an inherited disease advising the couple to look into IVF of admanda option. This would decrease of completely station eliminate the chance of the Chance of the Chance of the Chance of the Child developing huntingtons.





- Give three reasons why a CAT scan is used in the diagnosis of Huntington's.

	(b)	(i)	Complete the Punnett father and a mother w	square to show the offs ho does not suffer from h	spring produced by a he Huntington's.	eterozygous [3]
1=H Hh				H	h	
My		2	h.	Hh:	hh	
·			h	Hh	hh.	
·		(ii) ·	Calculate the chance	that their first child will su	uffer from Huntington's.	[1]
					5	0%
	(c)	Explication The CC UX	suffering with Huntingt		re advice	that may



- (a) Give three reasons why a CAT scan is used in the diagnosis of Huntington's.
 - 1 Huntingtons affects the brain therefore
 - a CAT scan can take images from different
 - 3. The image clearly shows if the pateint has huntingtons

('b)	(i)	Complete the Punnett father and a mother will	square to show the offs no does not suffer from h	spring produced by a he Huntington's.	eterozygous [3]
= 11				H	h	
MV.		2	h	Hh:	hh	
1 87			h	Hh	hh.	

(ii) Calculate the chance that their first child will suffer from Huntington's.

7	$\overline{}$
١,	_

[1]

(c) Explain what advice could be given to this couple to avoid the possibility of producing a child suffering with Huntington's. [2]

The advice two tidd The advice that could be given is that the couple May want to think arout other ways about having children such as IVF or adoption.



6. The image of the thyroid gland below is from a gamma camera.



- (a) Describe how iodine-123 is used to generate an image from the gamma camera. Your answer should refer to: [6 QWC]
 - how it is administered;
 - · detecting the radiation;
 - formation of the image.

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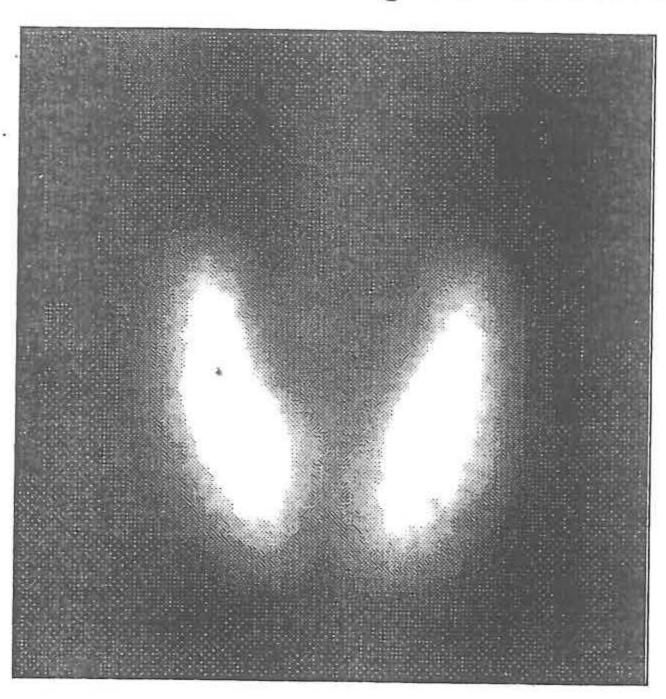
(b) The table below shows some isotopes of iodine.

Radio-isotope	Symbol	Half-life
iodine-111	1111	2.5 seconds
iodine-123	123	13.2 hours
iodine-131	131	8 days

(i)	State what is meant by the term <i>half-life</i> .	2]
(ii)	Calculate the fraction of the original amount of iodine-123 that would be left in the body after 66 hours.	ne 2]
(iii)	Fraction =lodine is absorbed by the thyroid. Explain why iodine-123 is the most suitable this technique.	
(iv)	Explain why a patient should only have a limited number of gamma came investigations in a year.	era 2]

END OF PAPER

6. The image of the thyroid gland below is from a gamma camera.



- (a) Describe how iodine-123 is used to generate an image from the gamma camera. Your answer should refer to:
 - how it is administered;
 - detecting the radiation;
 - formation of the image.

Tormation of the image.
Jodine-123 can either be injected
or Wank by the putient. The
Sadio-180tepe 15 then inside the body
This hould be revolved to as internal
Padrotherapy. The ladine may be tragged 50
that D finds the part of the Edy
needed to be lacked at Radication
15 than awar aft and detected.
by the Jameson The
Comeva con then piece together
an image, so we can detect
What Is wond.
The Padro-180tope is then absorbed by the
thyroid gland. It then emits reduction
Which is picked up by the gumma
Cernera

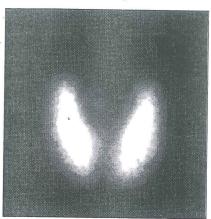
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Radio-isotope	Symbol	Half-life
iodine-111	111	2.5 seconds
iodine-123	123	13.2 hours
iodine-131	131	8 days

(i) State what is meant by the term hall-life.	
The time in which the count rate of the ladio 150tepe decreases by 50%	
(ii) Calculate the fraction of the original amount of iodine-123 that would be left in the body after 66 hours.	
1=13-2 -1 13-2 -1 26-4 = 39-6	
$\frac{2}{16} - \frac{2}{52.8} = \frac{1}{32}$ Fraction = $\frac{3}{32}$	
(iii) Iodine is absorbed by the thyroid. Explain why iodine-123 is the most suitable for this technique. [2]	
The half life is long enough to the delect the problem but not to long that	
(iv) Explain why a patient should only have a limited number of gamma camera	
investigations in a year. TO Mand gamma Camera investigations! Ceuld live the patient exposed to ladeolon.	**
this could than damage or kell heatthy cells, causing the patient to bett ill or die.	

END OF PAPER

6. The image of the thyroid gland below is from a gamma camera.



- (a) Describe how iodine-123 is used to generate an image from the gamma camera. Your answer should refer to: [6 QWC]
 - how it is administered;
 - · detecting the radiation;
 - formation of the image

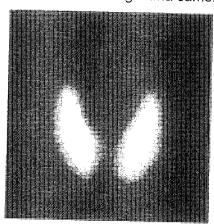
of infination of the image.
Todone-123 can either be injected
or alonk by the patient The
Tadio-180tene 13 their inside the lorder
This could be referred to as internal
ladietherapy. The ladine may be knowed 50
that D finds the Best of the Bedy
needed to be locked at Karlentien
, 12 than over all and delected.
by the Jamma Campor The
Climera con then piece together
an image so we can detect
What Is wrong.
The Padro-180tope is than absorbed by the
thyraid gland. It then emits reduction
Which is picked up by the gumma
Cernera

(b) The table below shows some isotopes of iodine.

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2 13-2 7 20-7 8 3 7	
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The half life is long enough to tothe	//
the Outent is reduce for does. This could	
(iv) Explain why a patient should only have a limited number of gamma camera investigations in a year.	¥
TO Mand gamma Camera investigations	r
This could than Jamage or Kell heathy	\[\sum_{\infty}\]
cells, causing the patient to beth ill or die	14
END OF PAPER	

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- (a) Describe how <u>iodine-123</u> is used to generate an image from the gamma camera. Your answer should refer to: [6 QWC]
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(i)	State what is meant by the term half-life.	[2]
	The time it takes for the kn	Ane
	decrees by \$ 50%. Months. Calculate the fraction of the original amount of iodine-123 that would be left i	
	decrease by \$ 50%. Annhaya	
(ii)	Calculate the fraction of the original amount of iodine-123 that would be left i	n the
,	body after 66 hours.	[2]
	17 7 - 4 7	

13.2 = 12 26.4 = 17 39.6 = 18 52.8 = 16Fraction = 32

(iii) Iodine is absorbed by the thyroid. Explain why iodine-123 is the most suitable for this technique. [2]

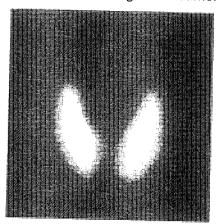
Jb 14565 just long enough for the patient not to be harmed by the redisactivity during the treatment.

(iv) Explain why a patient should only have a limited number of gamma camera investigations in a year. [2]

Canna Cameras use ionising Padiations Large doses of the Cadiations can be harmful and lead to cancers of cell mutations.

END OF PAPER

6. The image of the thyroid gland below is from a gamma camera.



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The table below shows some isotopes of iodine. (b)

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iodine-123	123	. 13.2 hours
iodine-131	131	8 days

(i) State what is meant by the term ha	alf-life.
--	-----------

[2]

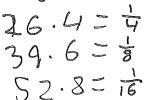
The time it takes for the known decrease by \$ 50%. Anshauga



(ii) Calculate the fraction of the original amount of iodine-123 that would be left in the body after 66 hours.

13.2=\$

$$66 = \frac{1}{32}$$



Fraction =.



lodine is absorbed by the thyroid. Explain why iodine-123 is the most suitable for this technique.

14566 just long enough

for the patient not to be remed by the redisactivity



Explain why a patient should only have a limited number of gamma camera investigations in a year.

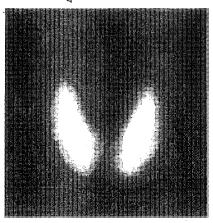
Gamma Cameras use ionising Rudiation. Large doses og

a read to concers of Red

14

mubations.

6.) The image of the thyroid gland below is from a gamma camera.



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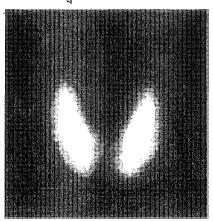
lockine - 123 is used to generate an image from the gamma camera because it is attataned to an isotope which is then administed to the patient as an injection or anink. The sea drug then gives off a radiation-that is picted up from the camera. The image is formed by the properation are absorbing the drug that it was attataned to is a targeted at a certain organ of the body in this ase the thursical because doctors know it will absorb it. The gamma camera is then able to pick up the radiation and form an image. The image is 2d and allows the doctors to examine the cancer and detect the size of it.

(b) The table below shows some isotopes of iodine.

Radio-isotope	Symbol	Half-life
iodine-111	111	2.5 seconds
iodine-123	123	* 13.2 hours
iodine-131	131	8 days

(i)	State what is meant by the term <i>half-life</i> . [2]
	Haif life is the term used to describe how
	long it takes for rodiation to decrease by 50%. Calculate the fraction of the original amount of iodine-123 that would be left in the
(ii)	Calculate the fraction of the original amount of iodine-123 that would be left in the body after 66 hours. [2]
	13.2h = 1/2 $66h = 1/32$
	216.4h = 1/4
	$39^{\circ}4h = 1/8$ $52^{\circ}8h = 1/16$ Fraction = $1/32$
(iii)	lodine is absorbed by the thyroid. Explain why iodine-123 is the most suitable for this technique.
	lodine-123 is most suitable for this
	technique because it is in the body long
	enough to do its job but has a half life
(iv)	trat makes it safe for the latent to leave after a short time. Explain why a patient should only have a limited number of gamma camera investigations in a year.
	A patient should only have a limited
	number of gamma camera investigations
	in a upar homuse vadiation is how
	radiation would build up and become dangerous,
	maybe even end of paper
	Cause Cancer.

6. The image of the thyroid gland below is from a gamma camera.



- (a) Describe how iodine-123 is used to generate an image from the gamma camera. Your answer should refer to: [6 QWC]
 - how it is administered;
 - detecting the radiation;
 - formation of the image.

from the gamma camera because it is attataned to an isotope union is then administed to the patient as an injection or annix. The sea drug then gives off a radiation-that is picted up from the camera. The image is formed by the problematic area absorbing the drug that it was attataned to is a targeted at a certain organ of the bady in this case the thyroid because doctors know it will absorb it. The gamma camera is then able to pick up the radiation and form an image. The image is 2d and allows the doctors to examine the cancer and detect the size of it.



(b) The table below shows some isotopes of iodine.

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(i)	State what is meant by the term half-life.	[2]
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/ii\	long it takes for radiation to decrease by making it safe.	eft in the

) Calculate the **fraction** of the original amount of iodine-123 that would be left in the body after 66 hours. [2]

$$13.2h = 1/2$$
 $26.4h = 1/4$
 $39.4h = 1/8$
 $52.8h = 1/6$
Fraction =

Fraction = $\frac{1}{32}$

(iii) Iodine is absorbed by the thyroid. Explain why iodine-123 is the most suitable for this technique. [2]

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transmoves it sofe for the patent to leave offer a short time (iv) Explain why a patient should only have a limited number of gamma camera investigations in a year.

A patient should only have a limited number of gamma carnera investigations in a year because radiation is not some of they had to have alot of investigations the radiation would build up and become dangerous,

maybe even END OF PAPER