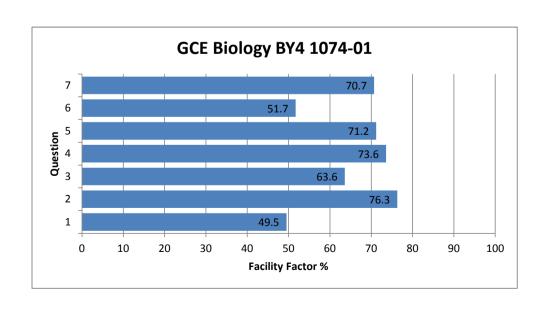


WJEC 2014 Online Exam Review

GCE Biology BY4 1074-01

All Candidates' performance across questions

?	?	?	?	?	?	?	_
Question Title	N	Mean	S D	Max Mark	F F	Attempt %	
1	3974	3	1.3	6	49.5	99.9	\leftarrow
2	3974	5.3	1.5	7	76.3	99.9	\leftarrow
3	3976	8.9	2.5	14	63.6	100	
4	3974	10.3	2.9	14	73.6	99.9	
5	3974	9.3	2.5	13	71.2	99.9	
6	3974	8.3	3.1	16	51.7	99.9	\leftarrow
7	3970	7.1	2.4	10	70.7	99.8	



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۱.		egenases are enzymes used by some organisms to fix atmospheric nitrogen gas (N_2) into m of nitrogen available to plants.	2
	The bacte	nif gene is the gene coding for the synthesis of nitrogenases, found in nitrogen fixingeria.	3
		bbium is a mutualistic nitrogen fixing bacteria forming a relationship with legume species me species of <i>Rhizobium</i> , the nif genes are located on plasmids.	i <u>-</u>
	(a)	Name the <i>form</i> of nitrogen produced by <i>Rhizobium</i> that is 'available to plants'. [1]
	(b)	Name <i>another</i> genus of nitrogen fixing bacteria. [1]
	(c)	State <i>precisely</i> where <i>Rhizobium</i> would be found in the legume. [1]
	(d)	Suggest how the relationship between <i>Rhizobium</i> and a legume species is beneficial to both organisms.	
	•••••		
	(e)	What are <i>plasmids</i> ? [1]
	•••••		. [

1.

Nitrogenases are enzymes used by some organisms to fix atmospheric nitrogen gas (N_2) a form of nitrogen available to plants.) into
The nif gene is the gene coding for the synthesis of nitrogenases, found in nitrogen f bacteria.	ixing
Rhizobium is a mutualistic nitrogen fixing bacteria forming a relationship with legume spe In some species of Rhizobium, the nif genes are located on plasmids.	cies.
(a) Name the form of nitrogen produced by Rhizobium that is 'available to plants'.	[1]
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(b) Name another genus of nitrogen fixing bacteria.	[1]
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(c) State precisely where Rhizobium would be found in the legume. Within Root ucdules	[1]
(d) Suggest how the relationship between Rhizobium and a legume species is benefic both organisms. Ruizobium within the voot nodules	ial to [2]
auam plants to take up nitrala from the	
sail and the plany praider the Christian	
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(e) What are plasmids?	[1]
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(a)	Name the form of nitrogen produced by Rhizobium that is 'available to plants'.	[1]
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(b)	Name another genus of nitrogen fixing bacteria.	[1]
	Azotobactev D	
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	Rhizobium within the voot nodules	
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Rhizobium gain excess respiratory products	
whilst the legime get a constant supply	
of nitrogen for nitrogen containing organic	
compounds le amino acid	
(e) What are plasmids?	[1]
circular DNA of bacterium	

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ammonium ions	
(b) Name another genus of nitrogen fixing bacteria. [7]	1]
Azotobacter	
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(d) Suggest how the relationship between Rhizobium and a legume species is beneficial to both organisms.	
the plant obtains a constant supply	
of useable nitrogen and the Rhizobiu	A
plant maintains an anaembic environment	\t
for the Rhizoblum to Junive	
(e) What are plasmids?	1]
small, music circular pieces of DNA that	
coole for primary protein structure.	

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Plant maintains an anaerobic environment	
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code for primary protein structure.	
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(a)	Define the following terms with reference to bacterial growth.	•]
	(i) obligate aerobe	
	(ii) obligate anaerobe	
	(iii) facultative anaerobe	
(b)	Describe and explain the appearance of Gram positive and Gram negative bacteri following Gram staining.	
(c)	Most pathogens in humans are Gram-positive organisms. Six Gram-positive genera are sypically pathogenic in humans. Two of these, <i>Streptococcus</i> and <i>Staphylococcus</i> , are cocci. The remaining organisms are bacilli.	
	What three dimensional shape would the cocci and bacilli be? [1]
	pacilli	.

7

(a) Define the following terms with reference to pacterial growth.
(i) obligate aerobe
a bacterium that must have berygen
present in order to metabolise.
(ii) obligate anaerobe
a loacterium that metabolises in the
PRESENCE OF OXYGEN but can survive mithout it if need be, (iii) facultative anaerobe
a bacterium that cannot metabolise
whilst oxygen is present.
(b) Describe and explain the appearance of Gram positive and Gram negative bacterial following Gram staining. [3]
The stain, crystal violet, is added and
all Gram positive bacteria retain the dige
so turn pumple, then a counterstain, safrainin,
Is added and Gram regative butteria tom red. Gram regative butteria as not retain anystal violet aye because they have more & (c) Most pathogens in humans are Gram-positive organisms. Six Gram-positive genera are typically pathogenic in humans. Two of these, Streptococcus and Staphylococcus, are cocci. The remaining organisms are bacilli.
What three dimensional shape would the cocci and bacilli be? [1]
cocci spherical shaped
bacilli mal mapea
* obennier i an Alex mills mills of this ain
* chemically complex wells with a thinner layer of peptialogly can and an extra
Muller Of Honoral in the Color of the
Touser of lipopoly saccharides.

(<i>a)</i>	befine the following terms with reference to pacterial growth.
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	a bacterium that must have beggen
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/I-1	, , , , , , , , , , , , , , , , , , ,
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au	Gram positive bacteria retain the dije
	him pumple, then a counterstain, safrann,
11	added and Gram negative bacteria hm
cn	addlol and Gran regative bacteria tom L. Gran regative bacteria as not retain Dour notet aye because they have more of Most pathogens in humans are Gram-positive organisms. Six Gram-positive genera are
(C) ₁	Most pathogens in humans are Gram-positive organisms. Six Gram-positive genera are typically pathogenic in humans. Two of these, <i>Streptococcus</i> and <i>Staphylococcus</i> , are cocci. The remaining organisms are bacilli.
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	bacilli ma mapea
* (chemically complex wells with a thinner layer of peptialoglycan condition extra
	Jan

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2.	(a)	Define the following terms with reference to bacterial growth.	3]
		(i) obligate aerobe	
		An obligate acrobe bacteria is a bacteria which	
		can only survive in he presence g organ. (ii) obligate anaerobe	
		An obligate anaerable bacteria is a bacteria	
		which can only survive in he absence of oxigen, if oxygen is not present. (iii) facultative anaerobe	
		A pacultative ancerole tactera is a bacteria	
		which can survive in the absence of oxygen but lives /	
	(b)	Describe and explain the appearance of Gram positive and Gram negative bacter following Gram staining.	ia 3]
	Ga	am positive bacteria would be stained violet because	<u>.</u>
	the	Which Rephilogycan layer about the violet stain.	
		an regative bacteria would be stored red/pinh	
h		aux it does not retain the violet stain because it in additional lipopolysaccharide layer and a thinner peptidically can layer.	
	(c)	Most pathogens in humans are Gram-positive organisms. Six Gram-positive genera are typically pathogenic in humans. Two of these, <i>Streptococcus</i> and <i>Staphylococcus</i> , are cocci. The remaining organisms are bacilli.	
		What three dimensional shape would the cocci and bacilli be?	1]
		cocci Circular	
		bacilli rod shaped	. _

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	Ga	am positive bacteria would be stained violet becau	!se
		Which Rephiloghycan layer abouts he violet stown.	
	G.	am regative bacteria would be stained red/pink	
ha	bea	couse it does not retain the violet stain because it in additional lipopolysaccharide layer and a Winner peptrocyclic layer. Most pathogens in humans are Gram-positive organisms. Six Gram-positive genera	
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		cocci Cirwar	
		bacilli rod shapad	

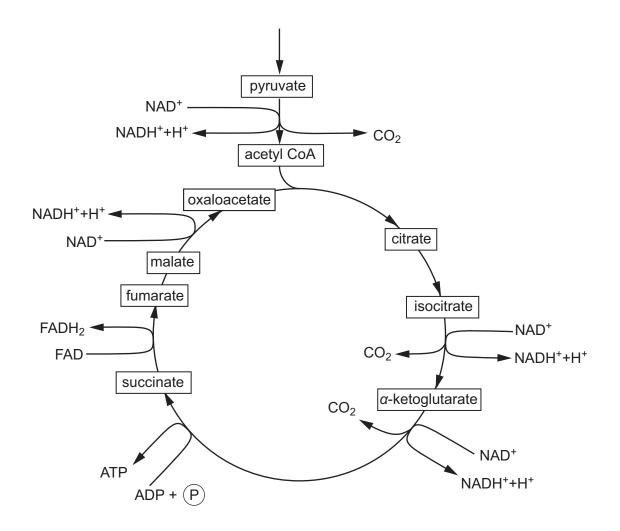
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(a) Define the following terms with reference to bacterial growth. [3]
(i) obligate aerobe
A bacterium that must have oxygen in
anow in oxygenated conclitions (aerobic). (ii) obligate anaerobe
A bacterium that connot survive in the
presence of oxygen, so will only grow in (iii) facultative anaerobe no oxygen (anaerobic)
I deally these bactors respire best in aerobic to xygenated)
condition, so grow best with exygen. However when no exygen is present they are also able to respire and explain the appearance of Gram positive and Gram negative bacteria
following Gram staining. [3]
Gram positive voctoria are purple of ter gram staining as
they are have a which peptidogrycan cell male with crossline
that almorth and Notaly the die frame worstill was and as
opptidogram layer with a thick outer layer of lipopolysacchands. The pure dye is early walked away to (c) Most pathogens in humans are Gram-positive organisms. Six Gram-positive genera are typically pathogens in humans. Two of these Strentoscopers and Stephylogens are
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bacilli ROO MARCI.
A TOTAL OF THE PARTY OF THE PAR

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A bacterium that connot survive in the
(iii) facultative anaerobe (anaerobic)
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Gram positive vocteria are purple of ter gram staining as
they are nave a vonich peptidogrycan cell mous with crossiins
that absorb and retain the dife. from negative are rea, as
that absorb and retain the dife from regative are real as peptidoquican layer with a thick outer layer of lipopolysacchands. The purple dife early walked away to (c) Most pathogens in humans are Gram-positive organisms. Six Gram-positive genera are typically pathogenic in humans. Two of these, Streptococcus and Staphylococcus, are cocci. The remaining organisms are bacilli.
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bacilli ROOL MAPECI.

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6. The detailed diagram below shows the link reaction and Krebs cycle. Most of the intermediates involved are named.



(a) (i) Using the diagram above, and your own knowledge, determine how many carbons there are in the following Krebs cycle intermediates. [1]

citrate
α-ketoglutarate
succinate

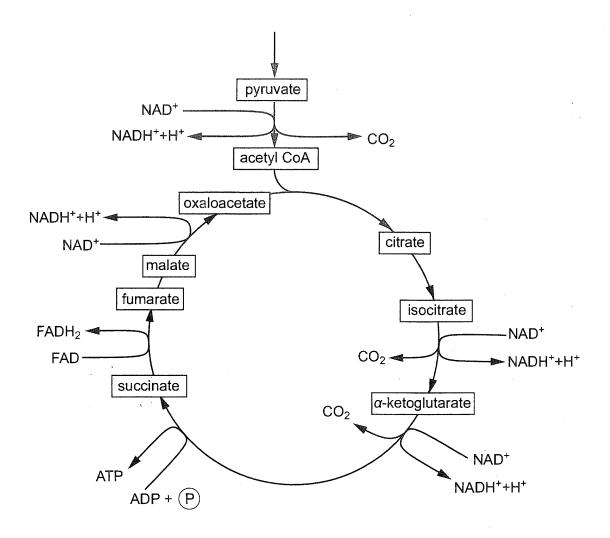
(ii) Explain precisely how you have arrived at these figures. [2]

Examine
only

(b)	Briefly describe how reduced FAD and reduced NAD are used to create an electrochemical gradient. [4]
••••••	
•••••	
	In patients with a suspected mitochondrial disorder a minimally invasive tissue biopsy provides the best opportunity to examine mitochondrial function, freezing the sample immediately after collection.
	In addition to activity measurements of individual enzymes, analysis of mitochondrial respiration and ATP production rates are performed. This includes the measurement of mitochondrial oxygen consumption in the presence of different substrates, such as pyruvate and α -ketoglutarate. Analysis may show increased levels of a Krebs cycle intermediate, such as malate and succinate.
	Defects in mitochondrial ATP synthesis may lead to high lactate levels in blood. **J Inherit Metab Dis. 2011 April; 34(2): 283–292.**
(c)	Name the two enzyme types involved in the conversion of pyruvate to acetyl CoA. [2]
	Using the diagram opposite, the text above and your own knowledge, answer the following questions.
(d)	Suggest a suitable tissue to examine mitochondrial function and explain why you have chosen this tissue with respect to patient safety. [2]

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into man a di ata a 0	a
'	_
	What could be deduced if there was a build up of any one of the Krebs cycle intermediates? [1

6. The detailed diagram below shows the link reaction and Krebs cycle. Most of the intermediates involved are named.



(i)	Using the diagram above, and your own knowledge, determine how many carb there are in the following Krebs cycle intermediates.	ons [1]
	citrate 6	
	α-ketoglutarate5	
	succinate	
(ii)	Explain precisely how you have arrived at these figures.	[2]
t	he acetyl which is added-2000 bonded	
to	the axaloacetate to form citrate contains	••••••
2	carbons. At each removal of CO2 a corbon	
	lost, the next intermediate will have	
	l less carbon.	

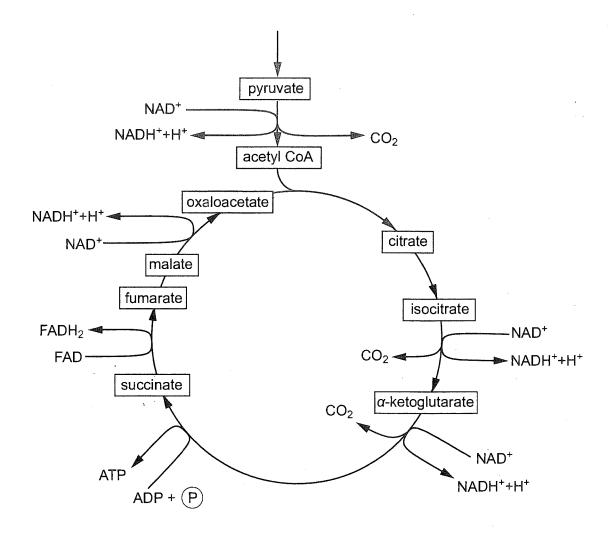
© WJEC CBAC Ltd.

(a)

 (b) Briefly describe how reduced FAD and reduced NAD are used to create an electrochemical gradient.
In the electron transport chain, NADH2 and
F90th donate hydrogen ions and electrons
As the electron at at proton pumps As
election are moved between carrier, hydrogen ions
are pumped into the intermembrane space. The membrane
is impermeable to love, so there is an
In patients with a suspected mitochondrial disorder a minimally invasive tissue biopsy provides the best opportunity to examine mitochondrial function, freezing the sample immediately after collection. In addition to activity measurements of individual enzymes, analysis of mitochondrial respiration and ATP production rates are performed. This includes the measurement of mitochondrial oxygen consumption in the presence of different substrates, such as pyruvate and α-ketoglutarate. Analysis may show increased levels of a Krebs cycle intermediate, such as malate and succinate. Defects in mitochondrial ATP synthesis may lead to high lactate levels in blood. J Inherit Metab Dis. 2011 April; 34(2): 283–292.
(c) Name the two enzyme types involved in the conversion of pyruvate to acetyl CoA. [2]
dehydrogonase
decarboxlyase
Using the diagram opposite, the text above and your own knowledge, answer the following questions.
(d) Suggest a suitable tissue to examine mitochondrial function and explain why you have chosen this tissue with respect to patient safety. [2]
muscle, contains high amounts of
mitrochendiria

substrate but high with α-ketoglutarate as a substrate? [2]
That the conversion of pyravate does
not require ATP but the conversion of
a-notogutarate doesa
(f) What could be deduced if there was a build up of any one of the Krebs cycle intermediates?
That is a shortage of NAD shot FAD
That the mitrochondria are not functioning.
(g) Explain why there is a raised blood lactate level in many patients with mitochondrial disease. [2]
There is not enough amon ATP for acrobic
respiration to occur so anaerobic respiration
takes place producing lactic acid.

6. The detailed diagram below shows the link reaction and Krebs cycle. Most of the intermediates involved are named.



(i)	Using the diagram above, and your own knowledge, determine how many carb there are in the following Krebs cycle intermediates.	ons) [1]
	citrate 6	
	α-ketoglutarate 5	
	succinate	
(ii)	Explain precisely how you have arrived at these figures.	[2]
·······································	he acetyl which is addednot bonded	••••••
to	the axaloacetate to form cutrate contains	
2	carbons. At each removal of CO2 a corbon	
, 	s lost, . The next intermediate will have	
	l less carbon.	

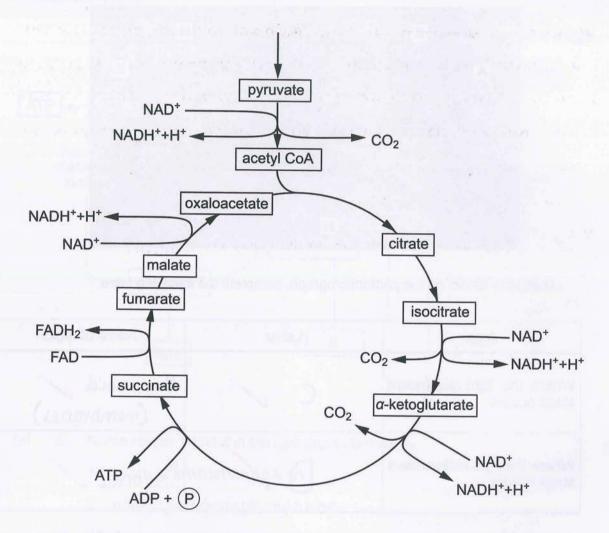
(a)

Examiner only

 (b) Briefly describe how reduced FAD and reduced NAD are used to create an electrocher gradient. 	nical [4]
In the electron transport chain, NADH2 and	
Faoth donate hydrogen ions and explorens	
As the electron or at proton pumps As	
election are moved between carrier, hydrogen ions	••••
are pumped into the intermembrane space. The membrane	310
is impermeable to ions, so there is an	
In patients with a suspected mitochondrial disorder a minimally invasive tissue bid provides the best opportunity to examine mitochondrial function, freezing the sar immediately after collection. In addition to activity measurements of individual enzymes, analysis of mitochondrespiration and ATP production rates are performed. This includes the measurer of mitochondrial oxygen consumption in the presence of different substrates, suc pyruvate and α-ketoglutarate. Analysis may show increased levels of a Krebs of intermediate, such as malate and succinate. Defects in mitochondrial ATP synthesis may lead to high lactate levels in blood. J Inherit Metab Dis. 2011 April; 34(2): 283–	mple drial ment h as cycle
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Using the diagram opposite, the text above and your own knowledge, answer the follow questions.	wing
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muscle, contains high amounts of	
mitrochandiria	

(e) What could be deduced if the oxygen consumption was low with the pyruvate as a substrate but high with α-ketoglutarate as a substrate? [2]	- · · · ,
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(g) Explain why there is a raised blood lactate level in many patients with mitochondrial disease. [2]	
There is not enough enough ATP for acrobic	
respiration to occur so anacrobic respiration	
takes place producing lactic acid.	16

The detailed diagram below shows the link reaction and Krebs cycle. Most of the intermediates involved are named.



Using the diagram above, and your own knowledge, determine how many carbons there are in the following Krebs cycle intermediates. [1]

citrate	SEX.	6	 	
α-ketog	lutarate	5	 	
succina	ite	4	 	113

Explain precisely how you have arrived at these figures.

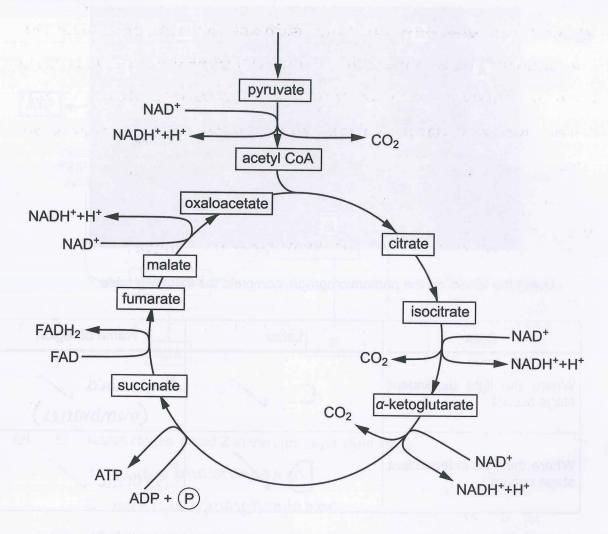
[2] Citrate is produced from combining ox a loace tate, a four carbon compound, with a cetyl coenzy me A, a two carbon compound, and is a thus a rix carbon compound a - hetoglutarate is produced following the decarbosupation of iso circate, where cor is removed * CONTINUED IN ADDITIONAL BOOKLET

(b)	Briefly describe how reduced FAD and reduced NAD are used to create an electrochemical gradient. [4]
Red	uced FAD and reduced NAD donate promon and electrons to
the	election transport chain. The electrons pass along a series of
ولعد	von carriers at increaningly lower energy levels. This releases
ene	rgy notion is used to fuel proton pumps. Proton pumps pump
.p.c.o.	tons across the inner mitochondrial membrane grom me
ma	mix into one inter-membrane space Protons accumulate in
the	inter-membrane Space and thus an electrochemical account with a suspected mitochondrial disorder a minimally invasive tissue biopsy provides the best opportunity to examine mitochondrial function, freezing the sample immediately after collection. In addition to activity measurements of individual enzymes, analysis of mitochondrial respiration and ATP production rates are performed. This includes the measurement of mitochondrial oxygen consumption in the presence of different substrates, such as pyruvate and α-ketoglutarate. Analysis may show increased levels of a Krebs cycle intermediate, such as malate and succinate. Defects in mitochondrial ATP synthesis may lead to high lactate levels in blood. J Inherit Metab Dis. 2011 April; 34(2): 283–292.
(c)	Name the two enzyme types involved in the conversion of pyruvate to acetyl CoA. [2]
	decarboxylase
	denydrogenase
	Using the diagram opposite, the text above and your own knowledge, answer the following questions.
(d)	Suggest a suitable tissue to examine mitochondrial function and explain why you have chosen this tissue with respect to patient safety. [2]
.A.su	itable hisue would be the leg muscle because there are many mitochondra
here	to produce ATP for muscle convaction and it is sage for one
	ent because the muscle is easily accessible and easily healed.

(e) What could be deduced if the oxygen consumption was low with the pyruvate as a substrate but high with α-ketoglutarate as a substrate? [2]
This would ruggest that grantist was not working but mat me
Krebs cycle was working Oxygen consumption is proportional to
rare of respiration because osugen is me final electron acceptor in
the election transport chain. If oxygen consumption is low min *
(f) What could be deduced if there was a build up of any one of the Krebs cycle intermediates?
That there is a problem in breaking down these wreb cycle intermediates
perhaps me enzymes that usually do this cannot function properly.
(g) Explain why there is a raised blood lactate level in many patients with mitochondrial disease. [2]
Because aeropic respiration does not take place as efficiently, so
patients have to very on anarromic respiration to gain ATP Anaerobic
respiration produces lactate.

aii	one molecule of carbon diosuide in removed, leaving a give
	carbon compound. Succinate is produced following me decarbo-
	sylation of a-heroglutarate and is mus a four carbon
	compound (since it contains one less carbon).
6b	gradient is created. FAD only releases its results in two Win
	FAD, electrons pass along the electron carriers wheras win
	NAD, eurons pass along three electron carniers.
60	pynwate, this would suggest mat pynwate cannot be broken down
	as ethiciently. Since it is brown down using me same enzymes
	that are involved in the web will, this perhaps suggests that
	there is insufficient coenzyme A to bond win acetate. However,
	since more all high oxygen consumption win a-hergewards,
	this suggests that a ke
-	invertible of the property of
	action than the source of the second of the second transfer of the second of the secon
	Appropriate of a consultation as you project the other as
	The control of the co
	the season of th
	The state of the s
	THE STATE OF PARTIES AND A PAR
	1 C. S. L. resonant land and deal of the part open at the attack of the second section of the second section of the second second section of the second seco
	Take the second of the second
	Total Control of the
THE	
7.4	

The detailed diagram below shows the link reaction and Krebs cycle. Most of the intermediates involved are named.



Using the diagram above, and your own knowledge, determine how many carbons there are in the following Krebs cycle intermediates. [1]

citrate SEX	6	unavlet etc	
α-ketoglutarate	5		\mathcal{D}
succinate	4		

Explain precisely how you have arrived at these figures.

[2] Citrate is produced from combining oxaloacetate, a four corbon compound, with a cetyl coenzy me A, a two carbon compound, and is a thus a six carbon compound a - hetoglutarate is produced following the decarbosupation of isoprate, where cor is removed * CONTINUED IN ADDITIONAL BOOKLET

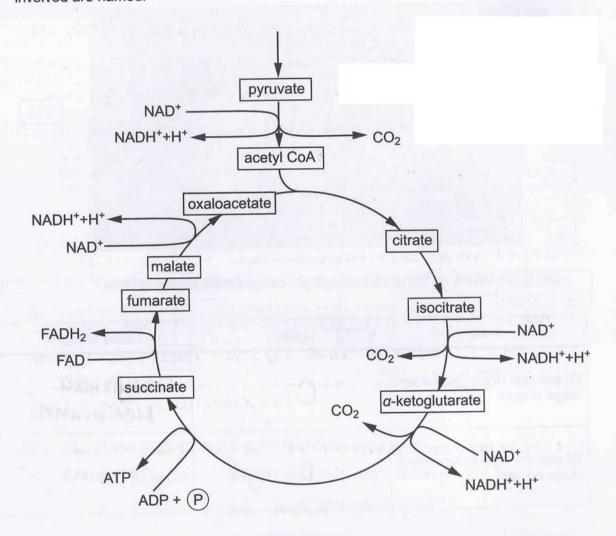
(b) Briefly describe how reduced FAD and reduced NAD are used to create an electrochemical gradient. [4]
Reduced FAD and reduced NAD donate promou and electrons to
the electron transport chain. The electrons pass along a series of
election courriers at increaningly lower energy levels. Inci releases
energy which is used to fuel proton pumps. Proton pumps pump
protons across the inner mitochondrial membrane grom me
matrix into one inter-membrane space Protons accumulate in
the inter-membrane space and thus an electrochemical acontinued in patients with a suspected mitochondrial disorder a minimally invasive tissue biopsy provides the best opportunity to examine mitochondrial function, freezing the sample immediately after collection. In addition to activity measurements of individual enzymes, analysis of mitochondrial respiration and ATP production rates are performed. This includes the measurement of mitochondrial oxygen consumption in the presence of different substrates, such as pyruvate and α-ketoglutarate. Analysis may show increased levels of a Krebs cycle intermediate, such as malate and succinate. Defects in mitochondrial ATP synthesis may lead to high lactate levels in blood. J Inherit Metab Dis. 2011 April; 34(2): 283–292.
(c) Name the two enzyme types involved in the conversion of pyruvate to acetyl CoA. [2]
decarboxylate
denydrogenase
Using the diagram opposite, the text above and your own knowledge, answer the following questions.
(d) Suggest a suitable tissue to examine mitochondrial function and explain why you have chosen this tissue with respect to patient safety. [2]
A suitable hisue would be the leg muscle because more are many mitochondre
here to produce ATP for musile convaction and it is sage for one
patient because the muscle is easily accessible and easily healed.

What could be deduced if the oxygen consumption was low with the pyruvate as a substrate but high with α-ketoglutarate as a substrate? the link reaction hinchoning This would ruggest that guyetust was not working but mat me krebs cycle was working of gen consumption is proportional to rare of respiration because oxygen is me final electron acceptor in me election vanipor chain. If oxygen consumption low min * What could be deduced if there was a build up of any one of the Krebs cycle intermediates? That there is a problem in breaking down these wreb cycle intermediates perhaps me enjumes that usually do this califor hunchion properly Explain why there is a raised blood lactate level in many patients with mitochondrial disease. Because aerobic respiration does not take place as efficiently, so Produce parients have to very on anarromic respiration to gain ATP Anaerobic respiration produces lactate



6aii	one molecule of carbon dioxide in removed, leaving a give
	carbon compound. Succinate is produced following me decarbo-
	sylahon of a-keroglutarate and is mus a four carbon
	compound (since it contains one less carbon).
6b	gradient is created. FAD only releases its rejults in two Wim
	FAD, electrons pass along three electron corniers whereas wim
	NAD, electrons pass along three electron carriers.
60	10
	as ethiciently. Since it is brown down using mesamalenzymen
	that are involved in the web ayds, this perhaps suggests that there is insufficient overzyme A bo bond win accepte. However,
	there is insufficient coenzyme A to bond win accetate. However,
	since more all high oxygen consumption with a herogen water,
	this suggests that it he
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1	

The detailed diagram below shows the link reaction and Krebs cycle. Most of the intermediates involved are named.



(a) (i) Using the diagram above, and your own knowledge, determine how many carbons there are in the following Krebs cycle intermediates. [1]

α-ketoglutarate succinate 4.

(ii) Explain precisely how you have arrived at these figures.

[2]

A cerate is 2 carbon, and oxalos cerate is 4 so they commine to give 6 carbon eitrate. It goes through I decarboxylation where CO2, hence I carbon, is removed to

form a hetogratavate, hence S. Another de carboxylation mene Co., hence I carbon, is removed occurs to give succinate, which is four carbons.

Briefly describe how reduced FAD and reduced NAD are used to create an electrochemical gradient.

NADER and FAD, when reduced move to the electron wanspour chain. Here the hydrogen dissociates in to Hour (proton) and electrons. The electrons travel down a schoin of electron earner, and while energy west by whem provides everyy for proson pumps to pump motor from the mothis, into the intermembrane space across the inner membrane. The membrane is impermeable to protons froming back, so a high concentration of Ht ions (protons) is puilt up [continued in separate booktet]
In patients with a suspected mitochondrial disorder a minimally invasive tissue biopsy

provides the best opportunity to examine mitochondrial function, freezing the sample

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Defects in mitochondrial ATP synthesis may lead to high lactate levels in blood. J Inherit Metab Dis. 2011 April; 34(2): 283-292.

(c)	Name the two enzyme types involved in the conversion of pyruvate to acetyl CoA.	[2
	Demyanogenar.	
	Decarboxylar.	

Using the diagram opposite, the text above and your own knowledge, answer the following questions.

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Muscle tissue. This is early to obtain without anaestretic, and contains a lot of mitochonding per unit of space so only a small amount would be needed to analyse. It is easy to do this aseptically so infection nime would be minimise. The ideal prace of removal is the thirty which has a night level of much and will not haven any vital organi, so the patient is as safe as possible.

(e) What could be deduced if the oxygen consumption was low with the pyruvate as a substrate but high with α-ketoglutarate as a substrate? [2]

This could indicate that the disease is preventing the winh reaction that convert pyruse from occurring, possibly by inhibiting the specific enzyme or

stopping pyravate entering the mito choncinon. This would prevent

would not be used so much as the tinal electron acceptor

(f) What could be deduced if there was a build up of any one of the Krebs cycle intermediates?

It could be acquired that une specific denyangener or

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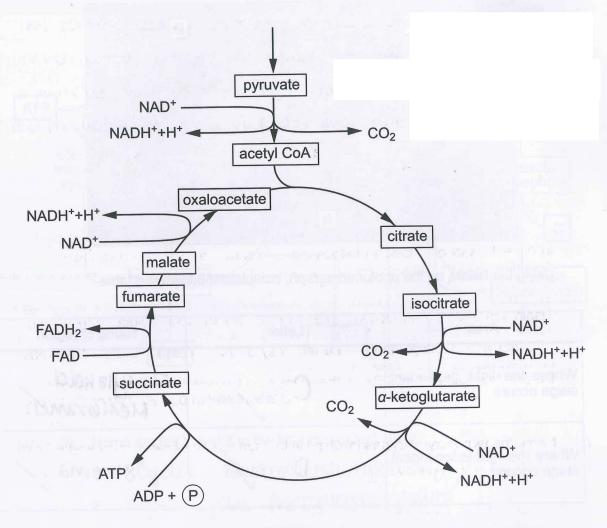
inhibited or not synthetical elue to the distance (g) Explain why there is a raised blood lactate level in many patients with mitochondrial disease. [2]

Objection an occurs in the cytoplatur, so NADH, and 2ATP and be produced in this way. Therefore, However, in discard mitochandria the the electron transport chain may not occur as efficiently, if at all. Therefore NADH, has no-where to relate its hydrogen. As ma Anderstoic repression occurs, so the pyruvate produced is re-reduced by hydrogen from NADH, into lactate, and NAD+ can be re-used.

the As it occurs in the mitochonarion, as do the link reaction and krebs eyele which may also be damaged or not occur.

6 b)	join whe election transport again at the
	Birst pump, so uses all three, where FABHZ
	join it at sono second pump so only
	we two of the three so a smarrer
	gradient is generated due to ATP.
6e)	in the electron transport enain as the NABHZ
	would not be produced in suff large
	quatities, so were of a proton gracifient
	is built up.
61	

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