

Practice Exam C

Section 1

Question	Response	Mark	Top Tips
1.	D	1	More concentrated in solutes means lower concentration of water so water moves out – that causes the cells to shrink.
2.	A	1	The patchy molecules in the membrane are the proteins .
3.	C	1	Bases are complementary: A always pairs with T, and G always pairs with C.
4.	B	1	Remember, the pH scale measures acidity – the lower the pH number, the more acid. Look for the peaks at the low pH numbers.
5.	B	1	This mainly hinges on knowing that a chromosome is made up of two chromatids, which break apart during mitosis.
6.	C	1	Tricky – the energy in ATP is chemical but it is the energy in light that is required to make it. Water (H ₂ O) is split into hydrogen and oxygen.
7.	A	1	When the graph slopes, the limiting factor is on the x axis. If the graph line is flat, another factor is limiting – notice the effect of increased temperature at R.
8.	C	1	Remember glucagon is needed when glucose is gone .
9.	D	1	Flowers are different shapes but the internal parts are always laid out in a similar way.
10.	D	1	If a parental characteristic does not show in any of its offspring, then its allele must be recessive.
11.	A	1	You should be able to link the appearance of plant cells with their place in the plant.
12.	C	1	Mitosis in Meristems .
13.	D	1	Link villi with the small intestine then pick out the small intestine in the diagram.
14.	C	1	Remember all respiration starts in the cytoplasm but only aerobic requires further breakdown in the mitochondria.

Question	Response	Mark	Top Tips
15.	B	1	Why not make some flash cards of the terms in this question – the terms come up a lot and can be confusing.
16.	A	1	This is an unusual pyramid and obviously starts with a big plant. The large top often indicates parasites.
17.	A	1	Answer is based on knowing that intraspecific means within the same species. The herring are different stages of the same species.
18.	D	1	Tricky – can be done by eye but better to work out the ratio for each year – this won't take long because the light form is the same each year.
19.	B	1	You need to learn the story here: fertiliser promotes algal growth; aerobic bacteria feed on dead algae and multiply; they deoxygenate water.
20.	B	1	Quite easy if you are careful and read the information given.

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Section 2

Question	Expected response	Mark	Top Tips
1. (a)	chloroplasts are present	1	Chloroplasts are the sign of ability to photosynthesise.
(b)	aerobic respiration OR production of ATP	1	Have to recognise the mitochondria and know their function.
(c)	ribosomes	1	Remember that ribosomes can be attached to a membrane or be free in the cytoplasm.
(d)	walls composed of different substances OR fungal cells don't have chloroplasts	1	You need to know about differences in cell walls and that fungi don't have chloroplasts.

Question		Expected response	Mark	Top Tips
2.	(a)	active transport = 1 low to high concentration OR transported by membrane protein = 1	2	The concentration gradient shown by the molecules in the diagram is the clue!
	(b) (i)	scales and labels = 1 plots and joining = 1	2	As usual, remember the basic points.
	(b) (ii)	osmosis	1	When cells take up water they gain mass.
	(b) (iii)	1.8 g	1	Get the % increase from the table (90%) then apply it to 2.0 = 1.8 g.
3.	(a)	DNA	1	Genes are made up of DNA (apart from some virus genes, which are RNA).
	(b)	plasmid	1	Plasmids can be removed, altered, then put back into bacterial species.
	(c)	aseptic techniques ensures culture not contaminated and desired cell types have no competition from other types OR an appropriate medium provide nutrients to cells OR control of temperature and pH provide optimum conditions for enzymes	1	You should try to learn the conditions and techniques for cell culture as a group. Each condition or technique has a biological reason behind it.
	(d)	insulin OR growth hormone	1	There are many others but it's probably better to learn these ones.

Question		Expected response	Mark	Top Tips
4.	(a)	8%	1	A two-part calculation: first, take the actual decrease and divide it by the starting length; second, multiply the answer by 100. $(4 / 50) \times 100 = 8\%$
	(b)	energy in glucose has not been released = 1 ATP is a source of instant energy = 1	2	The energy in glucose must be released by respiration – this can only happen in live tissue!
	(c)	as a control to show the effects of glucose and ATP	1	The control shows that the factor that was causing the contraction in muscle B was the ATP not the water, which would have been present in the ATP solution.
	(d)	a group of similar cells carrying out the same function	1	Remember the sequence? Organelle – cell – tissue – organ – system – organism.
5.	(a)	A sensory neuron B relay neuron C motor neuron All 3 = 2, 2 or 1 = 1	2	The names of the neurons are clues to their functions.
	(b)	heat = 1 (muscular) withdrawal movement = 1	2	Reflexes are protective so the stimulus is potentially damaging.
	(c)	rapid response provides protection	1	Response has to be rapid because the stimulus will be starting damage immediately. Try RAP = R apid, A utomatic, P rotective.
6.	(a)	temperature light intensity watering 1 each, any 2	2	These are the very basic variables for plant growth – any two will do.
	(b)	43–63 cm	1	The range is the smallest in the sample through to the largest in the sample.

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	(c)	gap between tall range and dwarf range caused by genetic differences = 1 range within a variety = 1	2	In discrete variation there are clear-cut differences – here the cut comes between the tallest dwarf plant and the smallest tall plant!	
7.	(a)	(i)	X vena cava = 1 Y coronary artery/vein/vessel = 1	2	The clue for X is the direction of blood flow. For Y it is the fact that the vessel is attached to the outer surface of the heart.
	(a)	(ii)	true false capillaries false veins All 3 = 2, 2 or 1 = 1	2	Arteries carry blood Away . Veins have Valves .
	(b)	(i)	0.4 litres	1	Tricky – the 2% has to be applied to the 20 litres inhaled to get the carbon dioxide.
	(b)	(ii)	38 litres	1	For this question, drawing lines on the graph using a ruler will help avoid misreads.
8.	(a)	1 mass of water lost as shown on balance 2 area of leaf to be measured 3 time to be measured 1 each	3	You need to look at the units of transpiration on the table and think how each part would be measured.	
	(b)	repeat the investigation but... alter chosen factor = 1 keep all other factors same = 1	2	Standard three-step approach needed again – repeat the experiment, keep the original variable constant and vary your chosen factor.	
9.	(a)	similar fauna flora climate 1 each	3	The fauna and flora and climate are similar but <u>not</u> identical	
	(b)	38%	1	Just add up the percentages of the different forest-based biomes.	
	(c)	role played by an organism	1	A difficult idea so remember the word role as an alternative	

Question		Expected response	Mark	Top Tips
10.	(a)	number of traps used method of setting same time of day time left 1 each, any 2	2	It's really common sense to keep the sampling method the same so that the method does not influence the sample differently for different areas of grassland.
	(b)	not enough traps not randomly set badly set left too long before checking any = 1	1	The sources of error are not so much with the traps as with the methods of using them! For example, if the trap lip is above the soil surface or if predators are able to consume the sample!
	(c)	moisture, temperature, pH = 1 moisture meter, thermometer, pH meter/paper = 1	2	Remember that the instruments are all meters .
11.	(a)	isolated populations of finches = 1	3	Read the question – what could be stopping interbreeding occurring?
	(b)	different mutations occur in different populations = 1		It's important to say that mutations are different
	(c)	natural selection ensures only best suited organisms survive to breed = 1	It's survival to breed which is crucial to evolution	
	(b)	neutral	1	Some mutations have little apparent effect on the organism – they are neutral – neither good nor bad.

Question		Expected response	Mark	Top Tips
12.	(a)	formation of nitrates in soil	1	Nitrification is the creation of nitrates in soil – it is essential for soil fertility.
	(b)	1 harvest of crop = 1 2 leaching to drainage ditch = 1	2	Anything that removes nitrates or nitrogen-containing substances is a loss to the ecosystem. Crops are harvested so nitrogen is lost in the proteins, etc., which are in the crop plants.
	(c) (i)	fertiliser application	1	This is the standard way of replacing nitrogen lost in the harvest.
	(c) (ii)	nodules have nitrogen-fixing bacteria = 1 which convert nitrogen gas into nitrate/ = 1 plough clover into soil	2	In organic farming, fields of clover that have natural nitrogen-fixing bacteria in their roots are grown. The bacteria make nitrates, which are added to the soil when the clover is ploughed.
	(d)	use GM/selectively bred crops OR use biological control of pests	1	Intensive farming has led to environmental damage in recent decades, often through the use of chemicals such as fertiliser and pesticides. These methods avoid the use of such chemicals but still produce high yields.