A Level Biology A

H420/01 Biological Processes

Question Set 25

Multiple Choice Questions

1 Which of the options, **A** to **D**, correctly describes how an endotherm would respond to an increase in temperature?

A dilation of arterioles near the surface of the skin

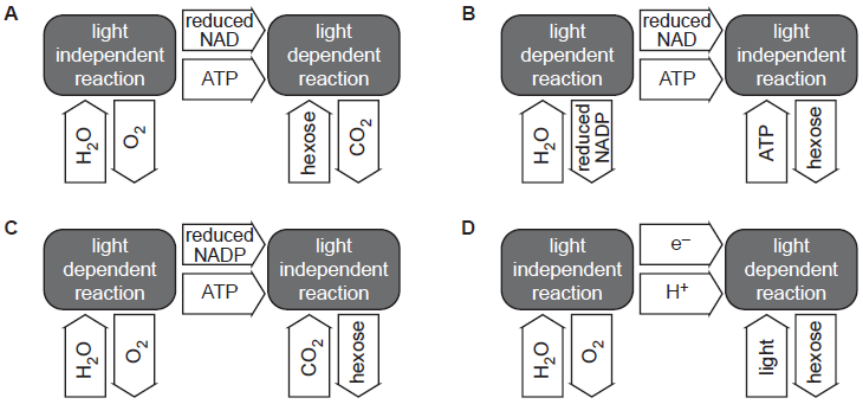
B erector muscles contract, causing hairs to stand up

C rapid contractions of skeletal muscles

D sweat glands release less sweat

Your answer A **[1]**

2 Which of the images, **A** to **D**, correctly summarises photosynthesis?



Your answer C **[1]**

3 Patients with kidney failure can be treated in different ways.

Which of the following statements describes a feature of peritoneal dialysis?

1 Urea and mineral ions pass into the tissue fluid.
2 Blood is passed over an artificial membrane to remove toxins.
3 The patient receives immunosuppressant medication.

A 1, 2 and 3

B Only 1 and 2

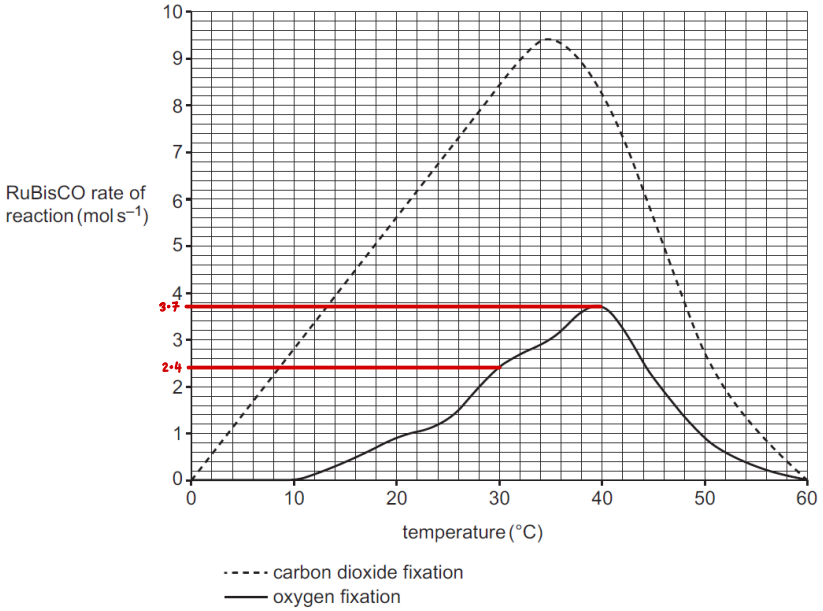
C Only 2 and 3

D Only 1

Your answer D **[1]**

4 RuBisCO is an enzyme that fixes carbon dioxide in photosynthesis. In some conditions, RuBisCOalso carries out oxygen fixation.

The graph below shows how the carbon dioxide and oxygen fixing activities of RuBisCO areaffected by temperature.



What are the correct percentage changes in RuBisCO carbon dioxide and oxygen fixing activities between 30 °C and 40 °C?

A carbon dioxide fixation –12.7%, oxygen fixation 23.3%

B carbon dioxide fixation –14.6%, oxygen fixation 18.9%

C carbon dioxide fixation –2.4%, oxygen fixation 54.2%

$\frac{3{\cdot}7-2{\cdot}4}{2{\cdot}4} \times 100 = 54{\cdot}2\%$

D carbon dioxide fixation –3.6%, oxygen fixation 35.1%

Your answer C

[1]

5 The hormone hCG can be detected in urine using pregnancy tests.

Which of the following properties of the hormone hCG allows it to be detected in urine?

A hCG is a polar molecule

B hCG has a molecular mass of less than 69,000

C hCG is a polypeptide

D hCG binds to cells using glycoproteins

Your answer B

[1]

6 The hormone ecdysone is synthesised in the prothoracic glands found in the upper thorax of some invertebrates and is released into haemolymph. It is then transported to cells near the surface of the body and causes the loss of the exoskeleton so that a new exoskeleton can form.

Which of the following statements explains how ecdysone is able to act on cells near the surface of the body?

1 Ecdysone is synthesised by specialised neurosecretory cells.

2 Ecdysone is soluble in haemolymph because it is a polar molecule.

3 Ecdysone is complementary to cell surface receptors on cells throughout the body of some invertebrates.

A 1, 2 and 3

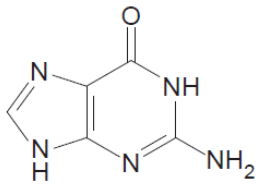
B Only 1 and 2

C Only 2 and 3

D Only 1

Your answer C **[1]**

7 The image below shows the structure of the nucleotide base guanine.



Bird droppings are known as *guano* because they contain a high proportion of guanine. Unlike mammals, birds excrete nitrogenous waste as guanine instead of urea. Guanine is synthesised from ammonia in the liver.

The following statements relate to guanine:

1 ammonia is more toxic than guanine
2 urea is more soluble in water than guanine
3 guanine has a high proportion of nitrogen

Which of the statements correctly explains why birds excrete guanine?

A 1, 2 and 3

B Only 1 and 2

C Only 2 and 3

D Only 1

Your answer A

[1]

8 The commercially grown tobacco plant, *Nicotiana rustica*, has many pests. One such insect pestis *Manduca sexta*, which causes damage to the stems and leaves of *N. rustica*.

The tiny wasp *Cotesia congregata* lays its eggs inside the body of *M. sexta*. When the larvae develop they feed on the body of the host, eventually killing it.

N. rustica produces a volatile organic compound called volicitin when its leaves are damaged.

Volicitin attracts *C. congregata* at high concentrations.

Which of the following explains why *N. rustica* releases volicitin?

1 volicitin release reduces herbivory in *N. rustica*
2 volicitin release increases *M. sexta* growth rate
3 volicitin release reduces parasitism of *M. sexta* by *C. congregata*

A 1, 2 and 3

B Only 1 and 2

C Only 2 and 3

D Only 1

Your answer D

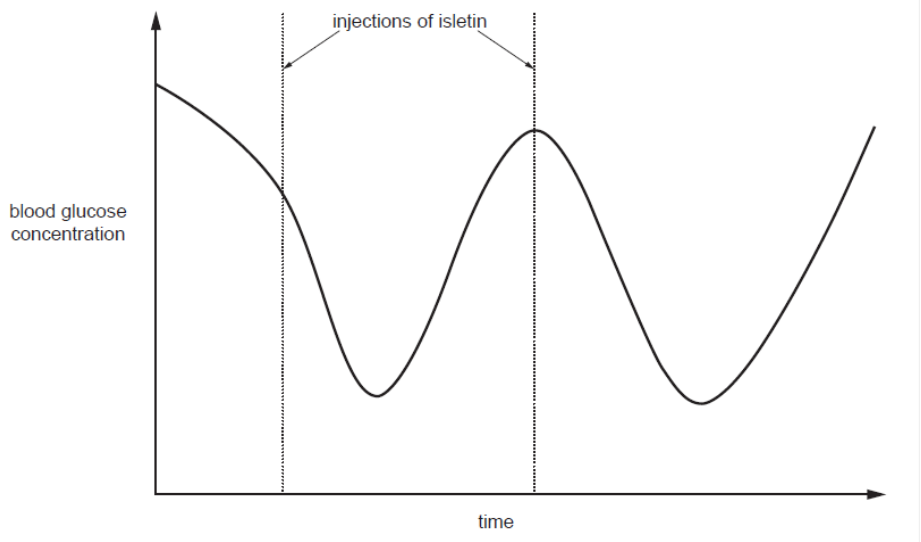
[1]

9 Banting and Best pioneered experiments into the functions of the pancreas.

In one experiment, they removed the pancreas of dogs. Shortly afterwards, the dogs developedthe symptoms of diabetes.

Banting ground up the removed pancreas to produce an extract.
He called the extract “isletin”.
The isletin was then injected into dogs that had had their pancreas removed.
He then tested the blood glucose concentration.

The graph below is a summary of the results.



Which of the following statements correctly explains these results?

1 Isletin is made in the α cells in the islets of Langerhans.
2 Isletin reduces blood glucose concentration.
3 The effects of isletin are short-lived.

A 1, 2 and 3

B Only 1 and 2

C Only 2 and 3

D Only 1

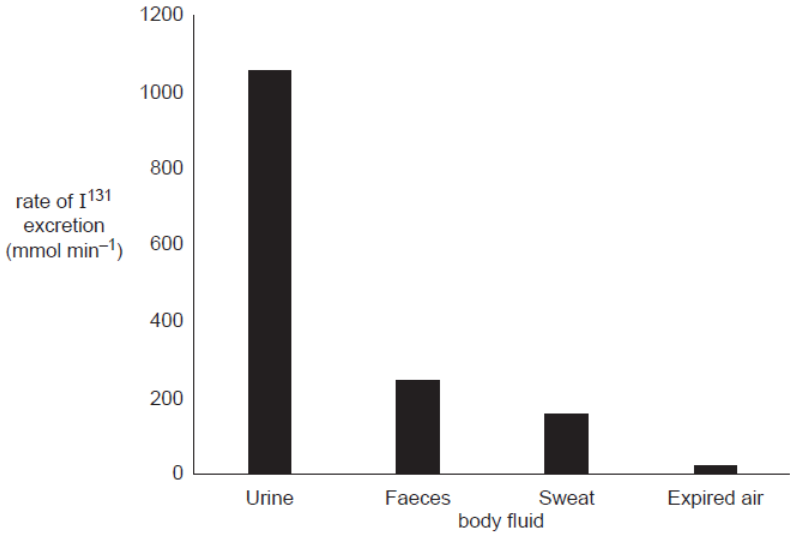
Your answer C

[1]

10 One treatment for thyroid cancer is radioactive iodine. The radioisotope I^{131} is used.

The thyroid gland absorbs any iodine that enters the body, so the radioactive isotope kills thecancerous cells in the thyroid gland. The I^{131} is then excreted from the body.

Different body fluids excrete different proportions of I^{131}, as shown in the following graph.



Which of the following, **A** to **D**, correctly explains the different proportions of I^{131} in each bodyfluid?

A I^{131} is very soluble in water.

B I^{131} is able to cross capillary walls.

C The kidneys are more efficient at excreting I^{131} than the lungs.

D The thyroid gland is well supplied with blood.

Your answer C **[1]**

11 Which of the following, **A** to **D**, is a similarity in the way ATP is made in respiration and photosynthesis?

A both involve NAD

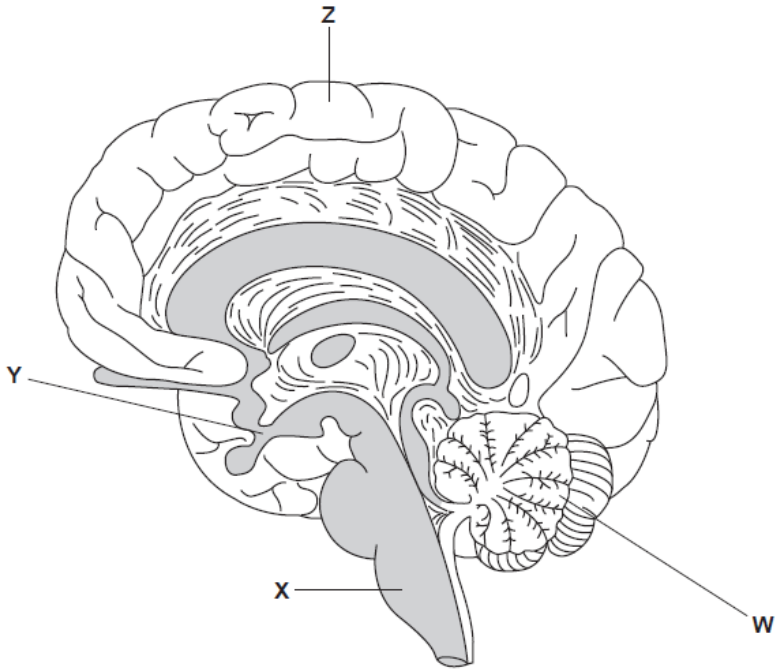
B both involve substrate level phosphorylation

C both involve photons

D both involve proton gradients

Your answer D **[1]**

12 The image below is a diagram of the human brain.



Which of the labelled regions would be directly involved in learning to play a musical instrument?

A **W** and **X**

B **W** and **Y**

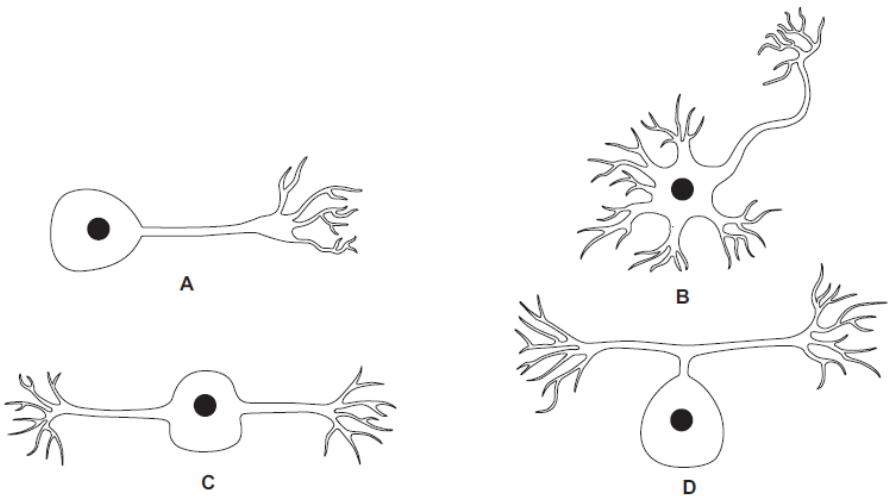
C **W** and **Z**

D **Y** and **Z**

Your answer C

[1]

13 Which of the following diagrams, **A** to **D**, shows a sensory neurone?



Your answer D

[1]

14 The table below shows the membrane potentials of different neurones at a cholinergic synapse.The data were recorded on five separate occasions, as shown in the five rows.

	Membrane potential (mV)			
	Presynaptic neurone A	*Presynaptic neurone B*	*Presynaptic neurone C*	*Postsynaptic neurone*
1	+40	–70	–70	–70
2	–70	+40	–70	–70
3	–70	–70	+40	–70
4	+40	+40	–70	–70
5	+40	+40	+40	+40

Which of the following, **A** to **D**, explains these data?

A divergence

B hyperpolarisation

C spatial summation

D temporal summation

Your answer C

[1]

15 The drug metoprolol prevents stimulation of post-synaptic receptors in the sympathetic nervoussystem.

Which of the following conditions could this drug be used to treat?

1 Muscle fatigue
2 Tachycardia
3 High blood pressure

A 1, 2 and 3

B Only 1 and 2

C Only 2 and 3

D Only 1

Your answer C

[1]

16 Which of the following, **A** to **D**, is **not** an example of cell signalling?

A The hormone insulin being removed from the blood by the glomerulus.

B The neurotransmitter acetylcholine causing depolarisation.

C The hormone prolactin binding to a cell receptor in breast tissue.

D Epithelial cells releasing cytokines in response to histamine.

Your answer A

[1]

17 The following passage outlines the process of phototropism in plants:

Auxin is synthesised in cells at the.....of the shoot. Auxin causes the cells to.....on one side, so the stem bends. Scientists originally thought auxin was .....by light but this was disproved by the fact that plants growing in the dark and plants growing in unilateral light had .....auxin levels.

Which option, **A** to **D**, is the correct sequence of missing words?

A meristem, shorten, destroyed, different

B tip, elongate, destroyed, similar

C meristem, shorten, synthesised, raised

D tip, elongate, synthesised, similar

Your answer B

[1]

18 A scientist tested a plant suffering from water stress. The plant was found to have high levels of abscisic acid (ABA) in its tissues.

Which of the following statements, **A** to **D**, explains this observation?

A ABA causes fruit ripening

B ABA prevents leaf drop

C ABA causes phototropism

D ABA stimulates stomatal closing

Your answer D

[1]

19 Which of the following statements, **A** to **D**, is evidence for geotropism?

A leaves are shed from deciduous plants in the autumn

B roots grow downwards

C shoots grow towards the light

D flowers can change position throughout the day

Your answer B

[1]

20 Plant hormones, such as ethene, can be used commercially.

Which of the following is/are a commercial use of ethene?

1 control of fruit ripening
2 hormonal weedkiller
3 rooting powder

A 1, 2 and 3

B only 1 and 2

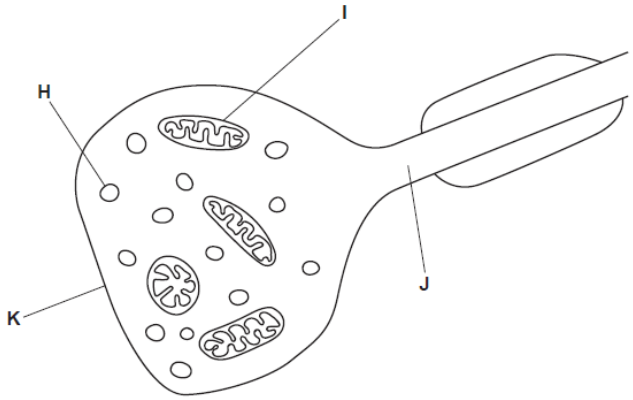
C only 2 and 3

D only 1

Your answer D

[1]

21 The image below shows a synaptic bulb.



Which of the following rows, **A** to **D**, correctly names the parts labelled **H** to **J** in the image?

	H	I	J	K
A	vesicle containing neurotransmitter	mitochondrion	dendron ✗	postsynaptic membrane ✗
B	vesicle containing Ca^{2+} ✗	mitochondrion	axon	presynaptic membrane
C	vesicle containing Ca^{2+} ✗	myelin ✗	dendron ✗	postsynaptic membrane ✗
D	vesicle containing neurotransmitter	mitochondrion	axon	presynaptic membrane

Your answer D

[1]

22 Damage to the hypothalamus results in lower water potential of the blood.

Which of the following, **A** to **D**, explains these observations?

A ADH causes arterioles to constrict.

B Mineralocorticoids affect cells in the loop of Henle.

C Fewer water channels are inserted into the cell surface membranes of the collecting duct.

D The anterior pituitary releases hormones into the blood.

Your answer C

[1]

23 Cyanobacteria are photosynthetic prokaryotes.

A scientist exposed cyanobacteria to light of different colours and intensities and made thefollowing observations:

- Most cyanobacteria are blue in colour.
- At low light intensities, glucose production in cyanobacteria is low.
- When light intensity reaches a certain level the rate of glucose production in cyanobacteriastops increasing.

Which of the following statements, **A** to **D**, correctly explains these observations?

A The pigments in cyanobacteria absorb blue light and light intensity is a limiting factor for the rate of photosynthesis.

B The pigments in cyanobacteria absorb red light and light intensity is not a limiting factor for the rate of photosynthesis.

C The pigments in cyanobacteria absorb blue light and light intensity is not a limiting factor for the rate of photosynthesis.

D The pigments in cyanobacteria absorb red light and light intensity is a limiting factor for the rate of photosynthesis.

Your answer D **[1]**

24 The hormone aldosterone is produced by the adrenal cortex. Excess production of aldosteronecan result in high blood pressure.

The following statements describe processes that occur as a result of aldosterone secretion:

1 Na^+/K^+ pumps in the collecting duct of the kidney move three Na^+ ions into the blood and two K+ ions out of the blood.
2 Cl^- ions enter the blood to maintain electrochemical balance.
3 H^+ ions enter cells lining the kidney tubules.

Which of the above statements explain(s) why excess aldosterone production can result in highblood pressure?

A 1, 2 and 3

B only 1 and 2

C only 2 and 3

D only 1

Your answer B **[1]**

Total Marks for Question Set 25: 24