EXAM PAPERS PRACTICE

Boost your performance and confidence with these topic-based exam questions

Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

Time allowed

59 Minutes

Score /49

Percentage %

Biology

Mark Scheme

AQA
AS & A LEVEL

3.6 Organisms respond to changes in their internal and external environments (A-level only)

1 (a) (i) where a change triggers a response which reduces the effect of a change;

1

(ii) e.g. sweating, breathing, defaecating, other valid example;

(reject respiration
evaporation not acceptable as a 2nd mark if sweating or breathing given)

2 max

(iii) hypothalamus;

1

(b) (i) pituitary;

(ignore anterior pituitary)

1

(ii) 1. ADH causes vesicles containing aquaporins / aquaporins to be inserted into membrane / collecting duct wall / plasma;
2. water enters cell through aquaporins;
3. by osmosis / diffusion / down a water potential gradient;
4. (from cell) to capillary;
5. via interstitial fluid;

4 max

(c) (i) excessive urination / drinking / diluted urine / thirst;

1

(ii) because males only have one X chromosome / do not have Y chromosome;
a single copy of the recessive allele will be expressed;

2

(iii) recessive alleles can be carried by individuals without showing effects / dominant allele always expressed;
organism that are carriers more likely to reproduce / affected organism less likely to reproduce;
therefore recessive alleles are more likely to be passed on / dominant alleles less likely to be passed on;

3

[15]

2 (a) 1. (Acetylcholine) released from / in presynaptic side;

2. Receptors in postsynaptic (side) / binds on postsynaptic (side);

2. Mark for diffusion only awarded in context of unidirectional movement.

2

(b) (i) 1. Rapid response;

2. Short duration;

Specific wording is not important. It is the principles that matter here.

Points may be made by referring to figures.

2

(ii)

	1	2	3
Percentage	80	0	0

Ignore % sign.

1

[5]

3 (a) (i) maintaining a constant internal environment;

1

(ii) *one mark for example of factor kept constant; one mark for explaining its importance;*

e.g.
temperature / pH; optimum for enzymes / effect of pH / temperature on enzyme activity;

OR

water potential / blood glucose;
effect of osmotic / blood glucose imbalance on cells;

2 max

(b) cannot interact with / move tropomyosin from binding sites on actin;
(reject active sites)
myosin(heads) do not bind / actinomyosin not formed;
does not activate ATPase / energy not released from ATP;

3

[6]

4 (a) 1. Positive correlation between sucrose and dopamine concentrations / higher concentration of sucrose, more dopamine;

Q *NB question is 'How <u>do</u> these ...', not 'Do these ....*

1. Ignore simple statements of numbers from graph without description of trend

2. So (dopamine) makes them want to drink / eat more (sucrose);

3. Positive feedback because drinking / eating leads to wanting to drink / eat (even) more;

3. It must be a clear statement of why this example is positive feedback, not inferred from points 1 and 2

3

(b) 1. (Refractory period) leads to discrete / separate nerve impulses / time when another nerve impulse can't happen;

OR

(Refractory period) limits number of impulses per second / frequency of nerve impulses;

2. When maximum frequency reached / exceeded, no further increase in information / all (higher) concentrations of sucrose seem the same;

2

(c) 1. (Negative feedback) stops desire / wish to eat / appetite;

1. Accept stops dopamine release (in this context)

1. Accept makes them feel full

2. (This) limits amount eaten / stops eating;

2. Accept prevents constant eating

3. Prevents / reduces risk of obesity / too much energy intake;

3. Accept prevents vomiting

Accept descriptions based on what would happen in absence of the feedback mechanism - or if stomach empty for points 1 and 2

3

[8]

5 (a) 1. Release of glucagon;

2. Leads to formation of glucose in liver (cells);

Reject: glucagon breaks down glycogen, or any other biological molecule

3. From non-carbohydrates / amino acids / fatty acids.

Accept: gluconeogenesis / references to glycogen as source of glucose

3

(b) 1. Mutant mice (mRNA suggests) make a lot of (the) enzyme;

Accept: PCK1 made (for enzyme made)

2. Mutant mice use kidney / intestine (cells) to make glucose;

Accept: use other organ (than liver)

3. Normal mice do this much less / normal mice use liver cells.

3

(c) 1. Differences significant;

Reject: references to results being significant once

2. Probability of difference being due to chance less than 0.01 / 1% / 1 in 100 / probability of difference not being due to chance more than 0.99 / 99% / 99 in 100.

Ignore: references to 0.05 / 5% / 5 in 100

2

[8]

6 (a) (i) Eaten;

Containing carbohydrate / sugar;

Glucose absorbed from intestine / into blood;

Long time after insulin injection / needs more insulin / has not taken insulin;

Does not convert glucose to glycogen / glucose not taken up from blood;

2 max

(ii) Shows positive correlation / directly proportional;

A range of results for a particular value / values (for different colours) overlap;

Urine test only an arbitrary scale / not directly related to concentration / colour is subjective / few colour values;

Accept description

3

(b) Glycogen to glucose / glycogenolysis by activating enzymes;

If name incorrect this disqualifies.

Gluconeogenesis;

Allow explanation in terms of glucose from a

non-carbohydrate / named non-carbohydrate source.

2

[7]