Marking Scheme

This document was prepared for markers' reference. It should not be regarded as a set of model answers. Candidates and teachers who were not involved in the marking process are advised to interpret its contents with care.

Paper 1

SECTION A

Question No.	Key	Question No.	Key
1.	D (54%)	21.	D (54%)
2.	C (76%)	22.	A (60%)
3.	C (72%)	23.	D (48%)
4.	A (81%)	24.	A (65%)
5.	C (41%)	25.	B (24%)
6.	A (47%)	26.	B (33%)
7.	B (44%)	27.	B (64%)
8.	C (42%)	28.	A (55%)
9.	*	29.	C (62%)
10.	D (67%)	30.	C (7%)
11.	C (35%)	31.	B (64%)
12.	C (80%)	32.	B (47%)
13.	B (84%)	33.	A (79%)
14.	A (80%)	34.	C (81%)
15.	B (47%)	35.	D (90%)
16.	D (55%)	36.	D (55%)
17.	B (71%)		
18.	D (32%)		
19.	B (59%)		
20.	A (78%)		

* This item was deleted.

Note: Figures in brackets indicate the percentages of candidates choosing the correct answers.

General note on item deletion

It is normal for the HKEAA to delete a small number of items from its multiple-choice question papers if they prove unsatisfactory. In practice, there are a number of reasons why this is considered necessary. By far the most common reason for deleting an item is that the item fails to discriminate between weak and able candidates – in other words, the majority of the candidates involved had to rely on guesswork in answering that question. If such an item is retained, the measurement process is rendered less effective. Where items have been deleted in the live papers, they are still included in this series of publications. They are indicated as deleted items. Such items may be discussed in the examination reports.

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General Marking Instructions

1. In order to maintain a uniform standard in marking, markers should adhere to the marking scheme agreed at the markers' meeting.

2. The marking scheme may not exhaust all possible answers for each question. Markers should exercise their professional discretion and judgment in accepting alternative answers that are not in the marking scheme but are correct and well reasoned.

3. The following symbols are used:

/	A single slash indicates an acceptable alternative within an answer.
*	Correct spelling required

4. In questions asking for a specified number of reasons or examples etc. and a candidate gives more than the required number, the extra answers should not be marked. For instance, in a question asking candidates to provide two examples, and if a candidate gives three answers, only the first two should be marked.

5. In cases where a candidate answers more questions than required, the answers to all questions should be marked. However, the excess answer(s) receiving the lowest score(s) will be disregarded in the calculation of the final mark.

6. Award zero marks for answers which are contradictory.

7. Where applicable, markers should put a tick (✓) against the answer which counts for a point of merit and the aggregated mark awarded for each question should be entered into the mark box of the OSM system in the right-hand side. If no marks are to be given, a cross (X) should be inserted there instead.

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Paper 1 Section B

			Marks
1.		B C A	(1) (1) (1) 3 marks
2.	(a)	Type of joint: hinge joint * Example in our body: elbow joint / knee joint	(1) (1)
	(b)	• A binds bones together (1) • and prevents the dislocation of bones during movement (1) • B attaches muscles to bones (1) • and transmits the pulling force produced by muscle contraction (1)	(4) 6 marks
3.	(a)	• it is taken from the small intestine / ileum (1) • as evidenced by the presence of villi in the region (1)	(1) (1)
	(b)	Figure A: finger-like projections (villi) (1) provide a larger surface area for the absorption of digested food substances (1)	(2)
		Figure B: rich supply of blood / dense capillary network (1) helps transport away the absorbed food substances quickly (1), this maintains a steep concentration gradient of these food substances to facilitate the absorption (1)	(3) 7 marks
4.	(a)	- as Mary's father is red-green colour blind, he must have a X chromosome bearing the recessive allele for red-green colour blindness (1) - being a female, Mary must have inherited the X chromosome bearing the recessive allele from her father (1) - on the other hand, Mary is normal, therefore she must have a X chromosome bearing dominant allele for normal eye sight (1) - therefore, Mary is a heterozygote (1)	(4)
	(b)	(i) No, it is because - the photomicrograph cannot reveal the genetic make-up of the foetus / the photomicrograph only shows the number or appearance of chromosomes (1) - whereas red-green colour blindness is due to the presence of a certain allele (1)	(2)
		(ii) - the foetus is a female (1) because - the 23rd pair of chromosomes in the karyotype have similar size / length (1) - and thus the sex chromosomes of the foetus are both X chromosomes (1)	(3) 9 marks
5.	(a)	nitrification * (1)	(1)

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Marks

5. (b)
- nitrifying bacteria (1)
- which convert nitrite to nitrate (1) and help lower the nitrite level

(2)

(c)
- adding aquatic plants to the aquarium (1)
- the plants will assimilate / absorb / convert nitrate into their biomass (1)

(2)

5 marks

6. (a)
- avoid blockage of xylem by the air bubble formed during cutting (1)

(1)

(b)
- the rate of transpiration is the same as the rate of water absorption / the water absorbed is used for transpiration only (1)

(1)

(c)
- the transpiration rate will increase (1)
- because the air current sweeps away the water vapour around the leafy shoot (1)
- the concentration gradient of water vapour between the atmosphere and the air space in the leaves becomes steeper (1)
- water vapour diffuse out to the atmosphere at a faster rate (1)

(4)

(d) (i)
- cell B contains chloroplasts but cell A does not (1)
- the cell wall of cell B has uneven thickness while that of cell A is even (1)

(2)

(ii)
- the size of C will be reduced (1)
- to reduce transpiration / water loss (1)
- when the need for gas exchange decreases in the absence of photosynthesis (1)

(3)

11 marks

7. (a)
- the tip is responsible for detecting the unilateral light (1)
- because if it is removed / blocked from the stimulus, no bending growth movement occurs (1)
- on the other hand, the same response is produced even if the lower part of the coleoptile is covered in soil (1)

(3)

(b)
- to show that the failure to produce response in set-up II is not due to the effect of injury / damage when the tip is removed (1)

(1)

(c)
- some substances are produced from the tip of the coleoptiles (1)
- which can diffuse through the agar block (1) to reach the lower part of the coleoptile
- and exert effect / lead to bending growth at the lower part of the coleoptile (1)

(3)

(d)

Science is based on evidence.	✓ (1)	Both Darwin and Jensen used the results from their experiment to develop their understanding about phototropism in plants (1)
Science knowledge is tentative and dynamic.	✓ (1)	Darwin's work only provided some understanding about phototropism and Jensen's results helped develop further the science knowledge (1)

(4)

11 marks

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Marks

8. (a)
- correct title (1)
  - concept: distribution of species, defined location, e.g.
    - > The distribution and abundance of animal species A and B on a rocky shore
    - > Abundance of species A and B from the back of a shore to the waterfront
- correct choice of axes (1)
- axes with labels and units (1)
  - X: distance from the back of the shore (m); Y: abundance (number of individuals m^{-2} or m^{-2})
- correct plotting and joining of line showing the distribution of species A and B (1,1)

(5)

(b)
- species A is found to be more abundant at the back of the shore than species B (1)
- the back of the shore has a lower chance / shorter period of time to be covered by seawater (1)
- thus, organisms found at this region is more likely to face the problem of desiccation (1)
- therefore, it can be deduced that species A has a higher tolerance of desiccation (1)

(4)

(c)
- place a transect line from the back of the shore to the waterfront (1)
- place a quadrat along the transact line at regular intervals (1)
- count the number of species A and B in the quadrat (1) and record the results

(3)

12 marks

9. (a) (i)
A: passive immunity (1)
B: active immunity (1)
C: active immunity (1)

(3)

(ii)
- some antibodies in the maternal blood pass through the placenta and enter into the foetal blood (1)
- some maternal antibodies in the mother's milk pass to the newborn via breast feeding (1)

(2)

(b)
- vaccine contains antigens (1)
- which stimulate the immune system to produce memory cells for that particular antigens (1)
- on the second exposure to the same antigen (1)
- these memory cells are capable of producing a large amount of antibodies (1)

therefore, child with vaccination has a better protection

(4)

9 marks

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Marks

10. Factors determining the different conformations of protein molecules (S)

- amino acid sequence:
  - ✓ proteins are built from 20 different amino acids (1)
  - ✓ amino acids are joined together to form a polypeptide (1)
  - ✓ the amino acids sequence of the polypeptide determines the final conformation of protein molecule (1)
  - ✓ this amino acid sequence is encoded by the base sequence of a gene / code / nucleotide on DNA (1)

S = max. 3

- folding of the polypeptide:
  - ✓ the polypeptide chains then coil / fold up (1)
  - ✓ while some polypeptide chains bind together (1) to form a molecule with specific conformation

The unique shape of each protein allows different proteins to perform different functional roles in our body, e.g. it gives rise to (R)

- enzymes with unique active sites / substrate binding sites (1) that fit with specific substrates for controlling cellular metablism (1)
- receptors with binding sites for neurotransmitters (1) that allows transmission of nerve impulses across synpase (1)
- antibodies which allow recognition of antigens / pathogens (1) for body defence (1)
- haemoglobin with binding site (1) for carrying oxygen (1)

R = max. 5

C = max. 3

11 marks

Mark award for communication:

Mark	Clarity of expression and relevance to the question	Logical and systematic presentation
3	• Answers are easy to understand. They are fluent showing good command of language. • There is no or little irrelevant material.	• Answers are well structured showing coherence of thought and organisation of ideas.
2	• Language used is understandable but there is some inappropriate use of words. • A little relevant material is included, but does not mar the overall answer.	• Answers are organised, but there is some repetition of ideas.
1	• Markers have to spend some time and effort on understanding the answer(s). • Irrelevant material obscures some minor ideas.	• Answers are a bit disorganised, but paragraphing is evident. Repetition is noticeable.
0	• Language used is incomprehensible. • Irrelevant material buries the major ideas required by the question.	• Ideas are not coherent and systematic. Candidates show no attempt to organise thoughts.

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