PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 3: GENETICS (PACK 1)

SCORE	PERCENTAGE
/51	%

STEMUP

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Q1.

Proteins are made up of amino acids.

The table shows the DNA bases that code for some of the amino acids found in proteins.

DNA bases	AAA	AAC	CAA	TAC	TTC
Amino acid	phe	leu	val	met	lys

Part of the DNA coding for a protein is:

T A C C A A T T C

(i) State the order of amino acids coded for by this sequence of DNA.

(1)

.....

(ii) These amino acids will be joined together during protein synthesis.

During which stage of protein synthesis will this take place?

(1)

.....

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Amino acids are joined together

(1)

☒ **A** at the membrane

☒ **B** in the mitochondria

☒ **C** in the nucleus

☒ **D** at the ribosome

Q2.

Answer the questions with a cross in the boxes you think are correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new

answer with a cross ☒.

Figure 1 shows part of a DNA molecule.

T	T	G	A	T	T	G	C	G	T	A	A

Figure 1

(i) Write the code for the complementary DNA strand in Figure 1.

(2)

(ii) Three bases code for each amino acid.

Which is the maximum number of amino acids coded for by this strand of DNA?

(1)

☒ **A** 3

☒ **B** 4

☒ **C** 6

☒ **D** 12

(iii) What is the shape of a DNA molecule?

(1)

☒ **A** triple stranded

☒ **B** single stranded

☒ **C** single helix

☒ **D** double helix

(Total for question = 4 marks)

Q3.

Answer the question with a cross in the box you think is correct ☒. If you change your

mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Birds are classified in the domain Eukarya.

(i) Why are the cells from birds described as eukaryotic?

(1)

☒ **A** they have membrane-bound organelles

☒ **B** they do not have nuclei

☒ **C** they have a rigid cell wall

☒ **D** they have a cell membrane

(ii) Give **one** reason why the three domain classification system was proposed.

(1)

.....

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.....

(Total for question = 2 marks)

Q4.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Birds are classified in the domain Eukarya.

(i) Why are the cells from birds described as eukaryotic?

(1)

☒ **A** they have membrane-bound organelles

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☒ **C** they have a rigid cell wall

☒ **D** they have a cell membrane

(ii) Give **one** reason why the three domain classification system was proposed.

(1)

.....

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(Total for question = 2 marks)

Q5.

A student wanted to extract the DNA from fresh peas.

The student crushed the peas and added washing up liquid and water.

The enzyme protease was then added to this mixture.

(i) Explain why the enzyme protease was added to the mixture.

(2)

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(ii) The mixture was then heated and filtered.

Finally, the student poured the filtrate into a test tube and ice cold ethanol was poured down the side of the test tube into the filtrate.

State why ice cold ethanol was poured into the filtrate.

(1)

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(Total for question = 3 marks)

Q6.

Gregor Mendel used pea plants in plant breeding experiments. He discovered the basis of genetic inheritance.

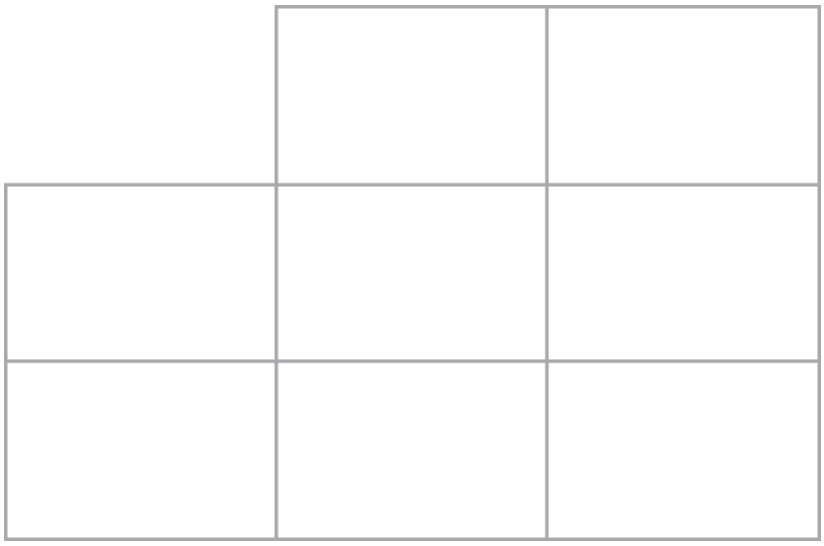
Pea plants produce different coloured peas.

The allele for yellow-coloured peas (A) is dominant to the allele for green-coloured peas (a).

Two heterozygous parent plants were used in a genetic cross.

(i) Predict, using the Punnett square, the percentage probability that this cross will have offspring that produce
green-coloured peas.

(3)



percentage probability of green-coloured peas =.....%

(ii) Explain **one** advantage to pea plants of using sexual reproduction to produce offspring.

(2)

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(Total for question = 5 marks)

Q7.

There are four blood groups: A, B, AB and O.

Explain how a father who is blood group A and a mother who is blood group B can have a child that has blood group O.

(2)

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(Total for question = 2 marks)

Q8.

(i) Figure 10 shows the percentages of bases for three organisms.

organism	percentage of each base in DNA (%)			
	adenine	thymine	cytosine	guanine
Human	30.8	30.8	19.2	19.2
Beetle	28.4	28.4		
Ebola virus	23.7	17.0	26.2	27.0

Figure 10

Calculate the percentage of cytosine for the beetle.

(2)

..... %

(ii) Explain why the information given about the Ebola virus indicates that this virus does not have a typical DNA structure.

(3)

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(Total for question = 5 marks)

Q9.

A scientist obtained a mass of 0.0062 nanograms of DNA from a diploid human cell.

Calculate the mass of DNA the scientist should obtain from a haploid human cell.

Give your answer in picograms.

(1 nanogram = 1000 picograms)

(2)

..... picograms

(Total for question = 2 marks)

Q10.

A scientist obtained a mass of 0.0062 nanograms of DNA from a diploid human cell.

Calculate the mass of DNA the scientist should obtain from a haploid human cell.

Give your answer in picograms.

(1 nanogram = 1000 picograms)

(2)

..... picograms

(Total for question = 2 marks)

Q11.

(i) Figure 14 shows the percentages of bases for three organisms.

organism	percentage of each base in DNA (%)			
	adenine	thymine	cytosine	guanine
Human	30.8	30.8	19.2	19.2
Beetle	28.4	28.4		
Ebola virus	23.7	17.0	26.2	27.0

Figure 14

Calculate the percentage of cytosine for the beetle.

(2)

..... %

(ii) Explain why the information given about the Ebola virus indicates that this virus does not have a typical DNA structure.

(3)

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(Total for question = 5 marks)

Q12.

Describe the causes of variation in a population.

(2)

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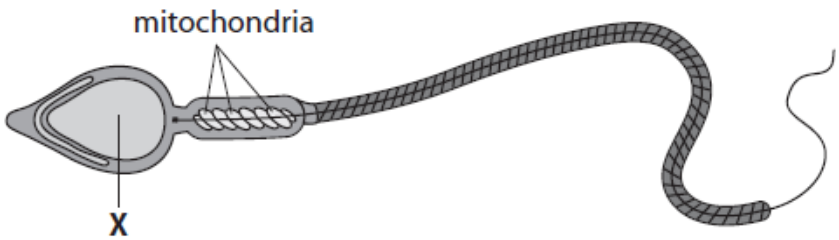
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Q13.

Cells

The diagram shows a human sperm cell.



(a) (i) Structure **X** on the diagram contains DNA.

Name structure **X**.

(1)

.....

(ii) Which statement is true for DNA?

Place a cross (☒) in the box next to your answer.

(1)

☒ **A** DNA is made up of amino acids and bases.

☒ **B** DNA is made up of amino acids which give instructions to make proteins.

☒ **C** In DNA, the bases A and T are complementary.

☒ **D** Every gene in a DNA molecule contains only three bases.

(b) Sperm cells are involved in fertilisation.

Define fertilisation.

(2)

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(c) (i) Describe the function of mitochondria.

(2)

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(ii) Gene mutations in DNA can produce abnormal mitochondria.

Explain how a gene mutation can produce a different protein.

(2)

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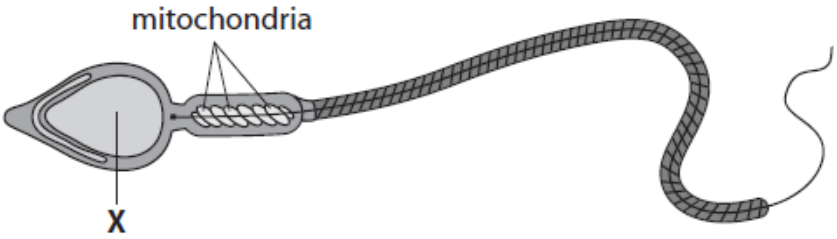
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(Total for question = 8 marks)

Q14.

Cells

The diagram shows a human sperm cell.



(a) (i) Structure **X** on the diagram contains DNA.

Name structure **X**.

(1)

.....

(ii) Which statement is true for DNA?

Place a cross (☒) in the box next to your answer.

(1)

☒ **A** DNA is made up of amino acids and bases.

☒ **B** DNA is made up of amino acids which give instructions to make proteins.

☒ **C** In DNA, the bases A and T are complementary.

☒ **D** Every gene in a DNA molecule contains only three bases.

(b) Sperm cells are involved in fertilisation.

Define fertilisation.

(2)

.....

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(c) (i) Describe the function of mitochondria.

(2)

.....

.....

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.....

(ii) Gene mutations in DNA can produce abnormal mitochondria.

Explain how a gene mutation can produce a different protein.

(2)

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(Total for question = 8 marks)

Q15.

Mitosis and meiosis are processes that produce new cells.

Compare the outcomes of mitosis and meiosis.

(3)

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(Total for question = 3 marks)