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EDEXCEL COMBINED SCIENCE BIOLOGY: QUESTIONS BY TOPIC

Natural Selection and Genetic Modification (4)

Combined Science Biology (Foundation) Topic 4

2 questions · 20 marks · Mark schemes included

Pearson Edexcel Combined Science (9-1) Biology 1SC0, Foundation Tier, June 2018 - June 2025

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HOW TO USE THIS BOOKLET

Questions run from the lowest mark tariff to the highest, so similar questions sit together.
Click any row below to jump straight to that question.
On every question page, click ANSWER in the top-right corner to jump to its mark scheme.
Diagrams, graphs, tables and data are printed exactly as they appeared in the original papers.

QUESTION	SOURCE	MARKS	PAGE
1. Q3	Paper 1 November 2020	10	4
2. Q3	Paper 1 June 2024	10	7

QUESTIONS

2 questions · 20 marks · lowest tariff first



10-MARK QUESTIONS

2 questions in this booklet



- 3 (a) Farmers selectively breed chickens to produce larger chickens.

Figure 4 shows how the size of chickens has changed over time.

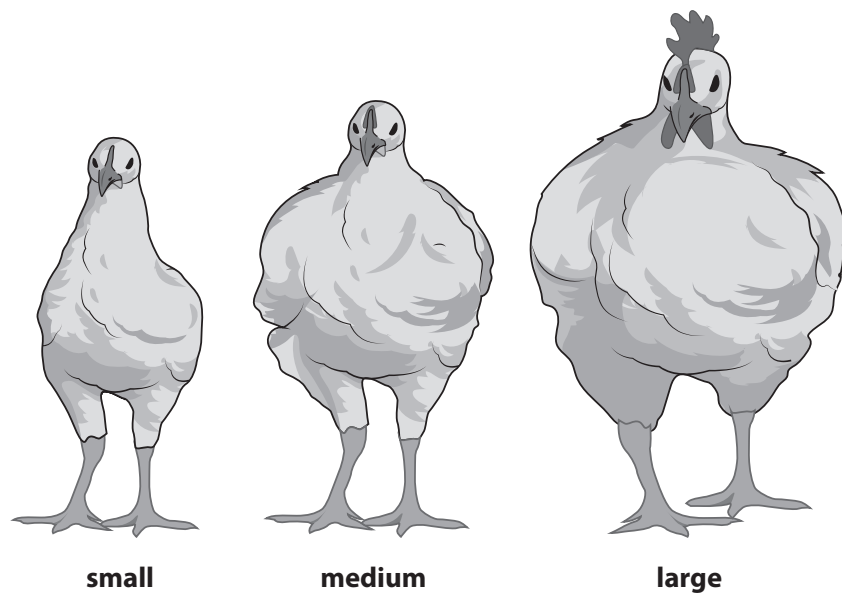


Figure 4

- (i) Explain how farmers have used selective breeding to produce larger chickens.

(3)

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(ii) Describe **one** benefit and **one** risk of selectively breeding chickens.

(2)

benefit.....

.....

.....

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risk.....

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.....

.....

(b) The body cells of chickens have 78 chromosomes in their nuclei.

(i) State the number of chromosomes found in each sex cell of a chicken.

(1)

.....

(ii) Name the type of cell division which produces sex cells.

(1)

.....

(c) (i) What is the correct definition of a genome?

(1)

- ☐ A all the cells of an organism
- ☐ B all the enzymes of an organism
- ☐ C all the genetic material of an organism
- ☐ D all the cytoplasm of an organism



- (ii) A new project called the Earth BioGenome Project aims to discover the sequence of bases in the DNA for all plants and animals.

State **two** benefits of discovering the sequence of bases for all plants and animals. (2)

1.

.....

.....

2.

.....

.....

(Total for Question 3 = 10 marks)



3 Scientists think that chickens were domesticated from red junglefowl thousands of years ago.

Figure 4 shows some information about these birds.

information	red junglefowl	domesticated chicken
photograph	 (Source: © Jamil Bin Mat Isa/ Shutterstock)	 (Source: © Tsekhmister/ Shutterstock)
mass of adult in kg	0.75 to 1.2	2.5 to 3.0
number of eggs laid per year	10 to 15	250 to 300

Figure 4

(a) Describe how selective breeding has produced chickens that lay large numbers of eggs.

(3)

(b) Chickens have 78 chromosomes in each of their body cells.

These chromosomes are in pairs.

(i) Which term describes a chicken body cell? (1)

- ☐ A dominant
- ☐ B haploid
- ☐ C recessive
- ☐ D diploid

(ii) State the number of chromosomes found in the gametes produced by chickens. (1)

(c) Complete the table to compare the production of body cells and gametes.

One box has been completed for you. (3)

type of cell produced	type of cell division	number of daughter cells produced
body cell	mitosis	
gamete		

(d) Some animal cells are stem cells.

Describe the function of stem cells. (2)

(Total for Question 3 = 10 marks)

MARK SCHEMES

official Pearson Edexcel mark schemes



Question number	Answer	Mark
3(a)(i)	An answer including: • select large chickens /chicks from larger chickens (1) • breed together (1) • repeat over (many) generations / long period of time (1)	(3)

Question number	Answer	Mark
3(a)(ii)	Benefit • produces more food / fewer chickens needed for the same amount of meat (1) Risk • less variation /losing useful genes (from the gene pool) / losing traits which may be desirable in the future / health issues related to larger bodies (1)	(2)

Question number	Answer	Mark
3(b)(i)	39 / thirty-nine	(1)

Question number	Answer	Additional guidance	Mark
3(b)(ii)	meiosis / meiotic cell division	reject mitosis / mitotic cell division	(1)



Question number	Answer	Mark
3(c)(i)	C all the genetic material of an organism The only correct answer is C <i>A is not correct because a genome is not all the cells of an organism</i> <i>B is not correct because a genome is not all the enzymes of an organism</i> <i>D is not correct because a genome is not all the cytoplasm of an organism</i>	(1)

Question number	Answer	Mark
3(c)(ii)	Any two from: • identify useful genes (1) • track evolution/ identify new species to show which species are more closely related (1) • understand diseases (of crop plants and animals) (1) • discover new medicines / find a cure for diseases (1) • identify the sequences that allow some plants and animals to cope with environmental change (1)	(2)

(Total for question 3 = 10 marks)



3(a)	A description including three from: - select birds with highest egg production (1) - breed (these birds) (1) - select / breed birds (with best traits) from these offspring (1) - repeat over many generations (1)	ignore select the best chickens accept offspring inherit genes for producing more eggs accept repeat over a long time	(3) A02 1
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Question number	Answer	Additional guidance	Mark
3(d)	A description including two from: - make (new) cells / divide (1) - differentiate / become specialised / become other (named) types of cell (1)	accept mitosis ignore stem cells are unspecialised / undifferentiated	(2) A01 1
	(provide new cells) {for growth / to replace (damaged) cells} (1)	ignore repair cells accept repair damaged tissues / organs	

Total marks for question 3 = 10 marks

