REDSPOT

O LEVEL

CLASSIFIED

BIOLOGY

Paper 1 (MCQ) - All Variants

(Syllabus 5090)

period	**2014 to J-2024**
contents	**June & November, Paper 1 (P11 & P12), Worked Solutions**
form	**Topic By Topic**
compiled for	**O Levels**

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CONTENTS

TOPIC 1

Cells

Cell structure and function, Specialised cells, tissues and organs

1. Which of the following have both cytoplasm and cell walls?

A liver cells **B** red blood cells **C** root hair cells **D** xylem vessels

[June 2014/P11/Q1]

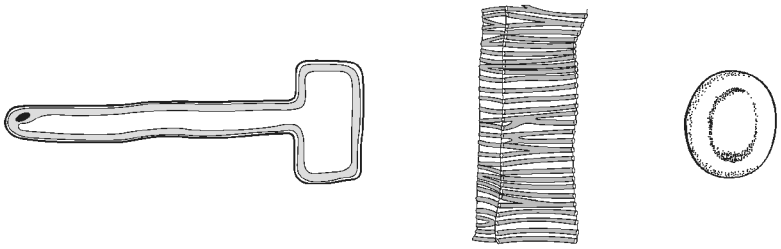
2. What are found in plant cells but **not** in animal cells?

1 cell membrane
2 nucleus
3 cell wall
4 chloroplast

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

[June 2014/P12/Q1]

3. The diagram shows three cellular structures.



1 2 3

Which statements about these cells are correct?

	1	2	3
A	adapted to carry oxygen	lacks a nucleus	adapted to carry water
B	adapted to carry water	lacks a nucleus	is in contact with the soil
C	is in contact with the soil	adapted to carry water	adapted to carry oxygen
D	is in contact with the soil	is in contact with the soil	lacks a nucleus

[Nov 2014/P12/Q1]

4. The cell wall of a plant cell is removed using an enzyme.
What would happen if this cell is then placed in distilled water?

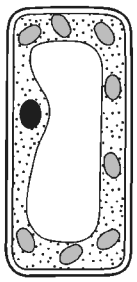
A It would take longer for the cell to become turgid.
B Proteins in the cytoplasm would leave through the cell membrane.

C The cell would become smaller as water passes out.

D The cell would burst as water moves into it.

[June 2015/P11/Q1]

5. The diagram shows a plant cell.

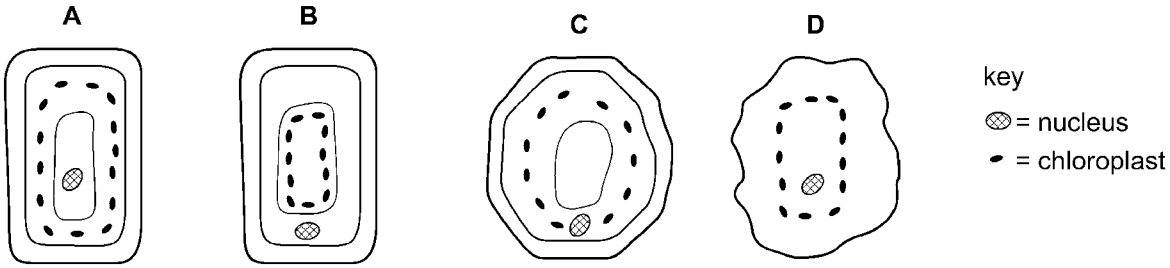


Which structure identifies this as a plant cell rather than an animal cell?

A cell membrane **B** cell wall **C** cytoplasm **D** nucleus

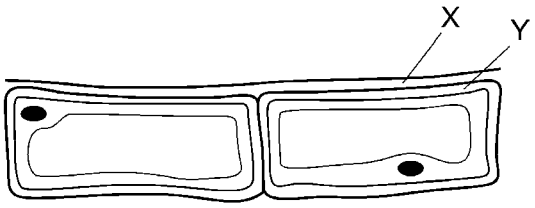
[June 2015/P12/Q1]

6. Which diagram shows the positions of the chloroplasts and the nucleus in a cell?



[Nov 2015/P12/Q1]

7. The diagram shows the upper layers of a leaf.



What are the structures labelled X and Y?

	X	Y
A	cell membrane	cell wall
B	cell wall	cell membrane
C	cell wall	cuticle
D	cuticle	cell wall

[Nov 2015/P12/Q5]

8. Which organelles are found in both animal and plant cells?

1 cell membrane
2 cell wall
3 nucleus
4 sap vacuole

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

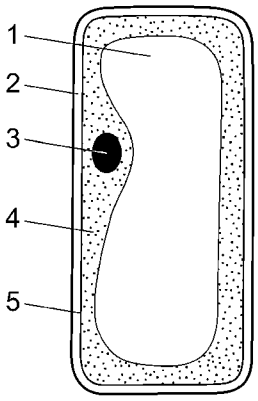
[June 2016/P12/Q1]

9. Which row correctly shows the function of a cell structure and its location?

	cell structure	function	location
A	cell membrane	controls the passage of substances into and out of cells	both plant and animal cells
B	cell membrane	maintains turgor	both plant and animal cells
C	cell wall	controls the passage of substances into and out of cells	plant cells only
D	cell wall	maintains turgor	animal cells only

[Nov 2016/P11/Q1]

10. The diagram shows a plant cell.

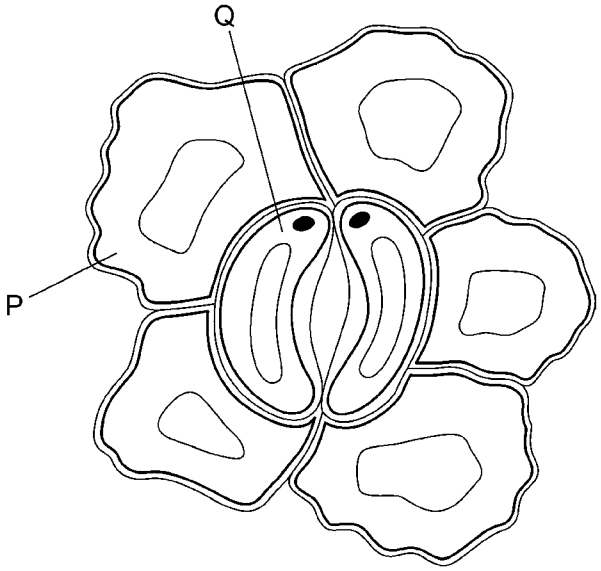


Which two structures are **not** found in animal cells?

A 1 and 2 **B** 2 and 3 **C** 3 and 4 **D** 4 and 5

[Nov 2016/P12/Q1]

11. The diagram shows cells in the epidermis of a leaf.



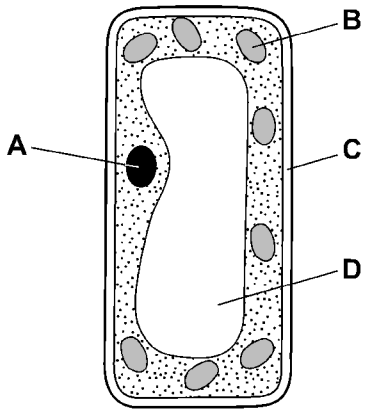
To complete the diagram, which structural features should be added to the cells P and Q?

	P		Q	
	chloroplasts	nucleus	chloroplasts	nucleus
A	✓	✓	✗	✗
B	✓	✗	✓	✓
C	✗	✓	✓	✗
D	✗	✗	✗	✓

key
✓ = yes
✗ = no

[Nov 2017/P11/P12/Q1]
Repeat [Nov 2014/P11/Q1]

12. The diagram shows a palisade cell.
Which structure is the site of photosynthesis?



[June 2018/P11/Q1]

13. Which feature indicates that a root cell is from a plant and **not** an animal?

A cell membrane **B** cell wall **C** chloroplast **D** cytoplasm

[June 2018/P12/Q1]

14. A cell is observed under a microscope.

Which feature identifies it as a plant cell?

A The cell contains a single large sap vacuole.

B The cell contains glucose and amino acids.

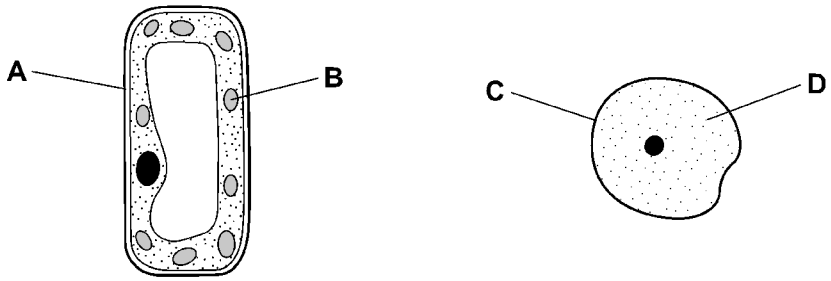
C The cell contains stored fat.

D The cell surface membrane is partially permeable.

[Nov 2018/P12/Q1]

15. The diagram shows a cell from a plant leaf and a cell from an animal's skin.

Which part will stain blue-black with iodine solution?



[June 2019/P11/Q1]

16. Which two structures are found in all plant epidermal cells?

A cell wall and chloroplasts **B** cell wall and nucleus

C chloroplasts and starch grains **D** nucleus and starch grains

[June 2019/P12/Q1]
Repeat [June 2016/P11/Q1]

17. During a lesson about animal and plant cells, a student reads out a number of statements about cell structure. Only three of his statements are correct.

1 All cells have a cell wall.
2 Cell walls are made of cellulose.
3 Chromosomes carry DNA.
4 Cell walls contain starch.
5 All cells have a cell membrane.
6 A sap vacuole helps an animal cell maintain its turgor.
7 Chromosomes are found in the cytoplasm.

Which three statements are correct?

A 1, 3 and 7 **B** 2, 3 and 5 **C** 2, 4 and 6 **D** 4, 5 and 7

[Nov 2019/P11/Q1]

18. A human cheek cell and a spongy mesophyll cell from a leaf are examined under a microscope. Which structures are seen in both cells?

A cell membrane, nucleus and cytoplasm
B cell wall, cell membrane and nucleus
C cytoplasm, cell wall and cell membrane
D nucleus, cytoplasm and cell wall

[Nov 2019/P12/Q1]

19. Which structure is present in a liver cell and in a leaf cell?

A cell wall **B** chloroplast **C** cytoplasm **D** sap vacuole

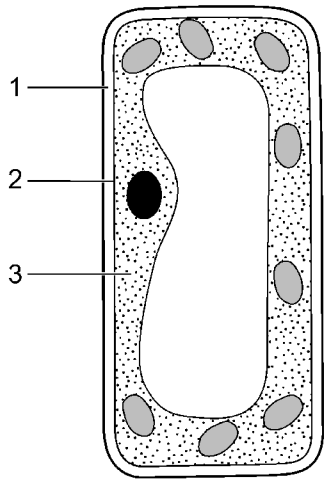
[June 2020/P11/Q1]

20. Starting with the smallest, and ending with the largest, what is the correct sequence of these parts of an organism?

A chromosome → gene → nucleus → cell → tissue
B chromosome → gene → nucleus → tissue → cell
C gene → chromosome → nucleus → cell → tissue
D gene → chromosome → nucleus → tissue → cell

[June 2020/P12/Q1]

21. The diagram shows the structure of a cell from a leaf of a green plant.



What are the numbered parts of the cell?

	1	2	3
A	cell membrane	cell wall	cytoplasm
B	cell membrane	cytoplasm	cell wall
C	cell wall	cytoplasm	cell membrane
D	cell wall	cell membrane	cytoplasm

[Nov 2020/P11/Q1]

TOPIC 1

Answer Keys

1. C	2. D	3. C	4. D	5. B	6. C
7. D	8. A	9. A	10. A	11. C	12. B
13. B	14. A	15. B	16. B	17. B	18. A
19. C	20. C	21. D	22. C	23. B	24. D
25. C	26. B	27. C	28. C	29. B	30. B
31. A	32. A	33. B	34. C	35. B	36. D

TOPIC 17

Inheritance

Variation, DNA, Selection

1. Which outcomes might farmers want to achieve by using artificial selection?

	increased	decreased
A	fertiliser use	pesticide use
B	growth rate	yield
C	pesticide use	growth rate
D	yield	fertiliser use

[June 2014/P11/Q37]

2. What is the effect of environment on discontinuous variation, and what is an example of this type of variation in humans?

	environmental effect	example
A	large	ABO blood group system
B	large	height
C	small	ABO blood group system
D	small	height

[June 2014/P12/Q37]

3. Which statement about chromosomes is correct?

A Chromosomes are long DNAmolecules called genes which are divided into sections.

B Chromosomes include a long molecule of DNA divided into sections called genes.

C Chromosomes include genes which are divided into sections called DNA molecules.

D Genes include long DNA molecules called chromosomes.

[June 2014/P11/P12/Q39]

4. Which statement is **always** true of dominant alleles?

A They cannot undergo mutation.

B They give a greater chance of survival than recessive alleles.

C They give the same phenotype in heterozygotes and homozygotes.

D They occur more frequently in the population than recessive alleles.

[June 2014/P11/P12/Q40]

5. In the inheritance of blood groups in humans, the MN system is controlled by a single gene. The gene has two alleles, M and N, that are co-dominant.

The offspring of two parents were two boys of blood group MN and M and a girl of blood group N.

What are possible genotypes of the parents?

	father's genotype	mother's genotype
A	MM	MN
B	MN	MN
C	NN	MM
D	NN	MN

[June 2014/P12/Q38]

6. In conservation the aim can be to maintain a large number of individuals within a species.

What will result from this?

	more genetic variety in the species	species more likely to survive environmental change
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

[Nov 2014/P11/Q32]

7. Which characteristic shows continuous variation?

A blood group phenotypes **B** body weight

C sex **D** sickle cell anaemia

[Nov 2014/P11/Q37]

8. If a homozygous recessive is crossed with a heterozygous individual, what would be the ratio of dominant to recessive individuals in the offspring?

A 1 : 1 **B** 2 : 1 **C** 3 : 1 **D** 4 : 1

[Nov 2014/P11/Q40]

9. A red-flowered plant is crossed with a white-flowered plant. All the offspring have red flowers.

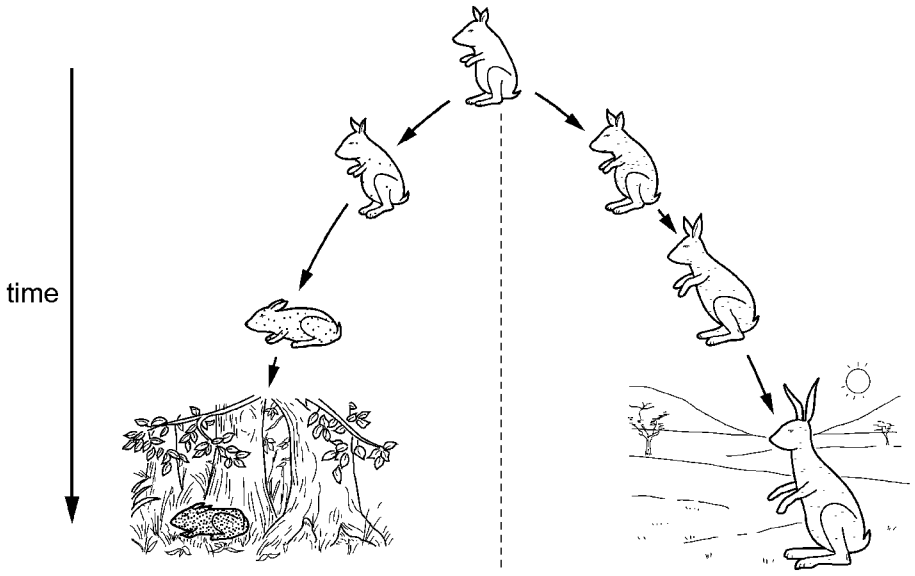
What is the genotype of these offspring?

A RR and Rr **B** RR only

C Rr only **D** rr only

[June 2015/P11/Q38]

10. The diagram shows a species becoming modified to survive in two different habitats.



Which process is responsible for these modifications?

A artificial selection
B conservation
C genetic engineering
D natural selection

[June 2015/P11/Q40]

11. Which of these may be heterozygous?

A a haploid cell
B an allele of a gene
C an organism with a dominant phenotype
D an organism with a recessive genotype

[June 2015/P11/P12/Q37]

12. A person with Down's syndrome is born with 47 chromosomes in each cell, instead of 46.
What could cause this?

A A mutation happened during the production of the egg cell.
B More than one sperm fused with the egg at fertilisation.
C Radiation caused a change in structure of a gene in the father's sperm.
D The mother was exposed to harmful chemicals while she was pregnant.

[June 2015/P11/P12/Q39]

13. In horses, red hair is dominant to brown.
A breeder crosses a number of heterozygous red-haired horses.
Approximately what percentage of the offspring will be red-haired?

A 25% **B** 50% **C** 75% **D** 100%

[Nov 2015/P11/Q37]

14. Which row in the table is correct?

	chromosome in mother's ovum	chromosome in father's sperm	sex of baby
A	X	X	male
B	X	Y	male
C	Y	X	female
D	X	Y	female

[Nov 2015/P11/P12/Q38]

15. In the ABO blood group system, which alleles are codominant?

A I^A and I^B **B** I^A and I^O **C** I^B and I^O **D** I^A, I^B and I^O

[June 2016/P11/Q38]

16. Two black female mice were mated with the same black male. One female had nine offspring, all of which were black. The other female had six black and two white offspring.

Which cross represents the parents of the all black family?

	female	male
A	bb	Bb
B	Bb	Bb
C	Bb	BB
D	BB	Bb

key
B = allele for black
b = allele for white

[June 2016/P11/Q39]

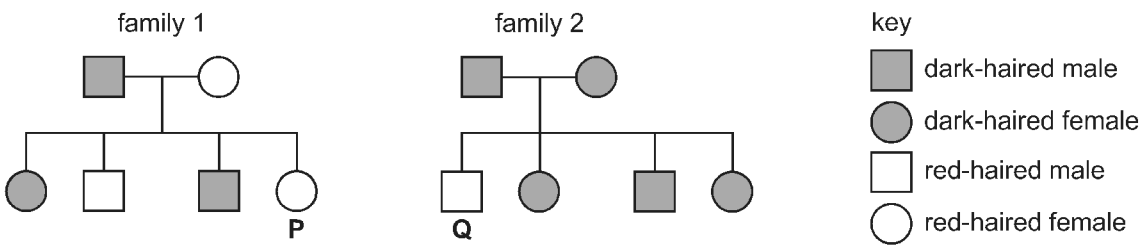
17. Which statements describe an allele?

	an alternative form of a gene	copied during cell division	part of a DNA molecule
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
✓ = yes
✗ = no

[June 2016/P12/Q37]

18. The diagram shows the pattern of inheritance of dark hair and red hair in two families.



If individuals **P** and **Q** have children together, which prediction can be made about the hair colour of these children?

A All the children will have dark hair.
B All the children will have red hair.
C Half the children will have dark hair.
D Three-quarters of the children will have dark hair.

[June 2016/P12/Q39]

19. Which statement is evidence that genes are copied and passed on to the next generation?

A Asexual reproduction produces genetically identical offspring.
B Different alleles of a gene can produce variation in phenotype.
C Each species of a plant or animal has a fixed number of chromosomes.
D Sexual reproduction produces genetically different offspring.

[June 2016/P11/P12/Q40]

20. The inheritance of the ABO blood groups depends on three alleles I^A, I^B and I^O.

What are the possible genotypes for a person of blood group A?

A I^AI^A only
B I^AI^A, and I^AI^B only
C I^AI^A, and I^AI^O only
D I^AI^A, I^AI^O and I^AI^B

[Nov 2016/P11/P12/Q38]

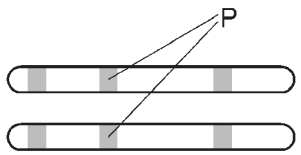
21. Two heterozygous individuals are crossed. Some of the offspring show the recessive characteristic.

What is the probability that one of these offspring that shows the recessive characteristic is homozygous?

A 0.00 **B** 0.25 **C** 0.50 **D** 1.00

[Nov 2016/P11/P12/Q39]

22. The diagram shows a pair of chromosomes from the same cell.



What do the lines labelled P point to?

A the site of alleles made up of two or more genes which are always the same
B the site of alleles made up of two or more genes which might be different
C the site of genes made up of two or more alleles which are always the same
D the site of genes made up of two or more alleles which might be different

[Nov 2016/P11/P12/Q40]

23. Which statements about genes and chromosomes are correct?

	A chromosome carries a molecule of DNA.	A gene is a section of DNA.
A	true	true
B	true	false
C	false	true
D	false	false

[June 2017/P11/Q37]

24. Which feature of bacteria shows discontinuous variation?

A the diameters of their cells
B the masses of their cytoplasm
C the numbers of their flagella
D the thicknesses of their cell walls

[June 2017/P11/Q38]

25. Over several hundred years, the milk production of a particular type of farm animal has steadily increased.

How has this been achieved?

A artificial selection
B continuous variation
C genetic engineering
D natural selection

[June 2017/P11/Q39]

26. What is essential for natural selection to occur?

	competition	variation
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

[June 2017/P12/Q37]

27. Which statement about chromosomes is correct?

A A chromosome is part of a DNA molecule.
B A chromosome carries a long molecule of DNA.
C Each chromosome controls the inheritance of one body feature.
D Genes are made up of a chain of chromosomes.

[June 2017/P12/Q39]

28. In fruit flies, the allele for an ebony coloured body is recessive to the allele for a grey coloured body. In an investigation, an ebony-bodied fly is crossed with a grey-bodied fly.

What will be the body colour of the offspring if the grey-bodied fly is heterozygous?

A all ebony
B all grey
C half ebony and half grey
D three-quarters grey and one-quarter ebony

[June 2017/P11/P12/Q40]

29. A gene is a unit of inheritance that controls the production of

A a chromosome. **B** an allele. **C** a protein. **D** DNA.

[Nov 2017/P11/P12/Q37]

30. Two brothers had different blood groups. One was blood group A and the other was group B. What can be concluded about their parents' blood group genotypes?

A Both of the parents must be heterozygous.
B Both of the parents must be homozygous.
C One parent (at least) must be heterozygous.
D One parent (at least) must be homozygous.

[Nov 2017/P12/Q38]

31. What is a potential danger of growing genetically engineered crops?

A changing the genotypes of plants in nearby ecosystems
B producing cereals with different nutrient content
C producing greater yields within a shorter time
D reducing the amount of pesticides on crops

[Nov 2017/P12/Q39]

32. The table shows the genotypes and phenotypes for hair colour for the members of a family, but **one** phenotype is shown incorrectly.

	genotype		phenotype
family member	allele 1	allele 2	hair colour
mother	a	A	brown
father	A	A	brown
son 1	a	A	blonde
daughter 1	a	a	blonde
son 2	A	A	brown
daughter 2	A	a	brown

Which family member has the **incorrect** phenotype?

A daughter 1 **B** daughter 2 **C** son 1 **D** son 2

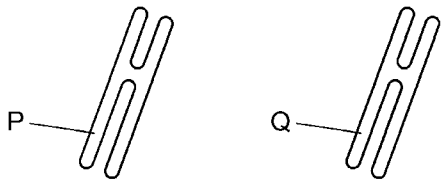
[Nov 2017/P11/P12/Q40]

33. Which characteristics show continuous and discontinuous variation in humans?

	continuous variation	discontinuous variation
A	blood groups	skin colour
B	free or attached ear lobes	blood groups
C	height	free or attached ear lobes
D	intelligence	hair colour

[June 2018/P11/Q38]

34. The diagram shows a pair of chromosomes from the same cell.



A gene is found at the point labelled P.

In a heterozygous individual, what will be found at the equivalent position labelled Q?

A a different allele of a different gene

B a different allele of the same gene

C a different gene of the same allele

D the same gene of the same allele

[June 2018/P11/P12/Q37]
Repeat [Nov 2014/P12/Q40]

35. The table shows the variation in foot length in a number of students.

foot length / cm	number of students
20.0 – 20.9	0
21.0 – 21.9	5
22.0 – 22.9	12
23.0 – 23.9	15
24.0 – 24.9	17
25.0 – 25.9	8
26.0 – 26.9	0

Which row identifies this type of variation and states its cause?

	type of variation	cause
A	continuous	genes and the environment
B	continuous	genes only
C	discontinuous	environment only
D	discontinuous	genes and the environment

[June 2018/P12/Q38]

36. The colour of the fruit of tomato plants is determined by alleles of the same gene. A tomato plant with red fruit was crossed with a tomato plant with yellow fruit. Of the offspring, 26 plants had red fruit and 24 had yellow fruit.

Three explanations were suggested.

1 Both parents were homozygous.

2 One parent had two recessive alleles.

3 One parent was heterozygous.

Which explanations are correct?

A 1 only **B** 3 only **C** 1 and 2 **D** 2 and 3

[June 2018/P12/Q39]

TOPIC 17

Answer Keys

1. D	2. C	3. B	4. C	5. B	6. A
7. B	8. A	9. C	10. D	11. C	12. A
13. C	14. B	15. A	16. D	17. A	18. B
19. A	20. C	21. D	22. D	23. A	24. C
25. A	26. A	27. B	28. C	29. C	30. C
31. A	32. C	33. C	34. B	35. A	36. D
37. C	38. B	39. C	40. A	41. D	42. A
43. A	44. C	45. D	46. A	47. A	48. C
49. D	50. D	51. D	52. D	53. D	54. C
55. C	56. A	57. B	58. D	59. C	60. A
61. A	62. A	63. C	64. B	65. B	66. B
67. C	68. C	69. A	70. D	71. C	72. A
73. C	74. C	75. D	76. D	77. A	78. B
79. D	80. B	81. B	82. C	83. B	84. C
85. D	86. B	87. B	88. C	89. C	90. C
91. C	92. D	93. B	94. C	95. C	