

Inheritance

Question Paper 1

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|------------|--|
| Level | IGCSE |
| Subject | Biology (0610/0970) |
| Exam Board | Cambridge International Examinations (CIE) |
| Topic | Inheritance |
| Sub-Topic | Inheritance |
| Booklet | Question Paper 1 |

Time Allowed: 48 minutes

Score: /40

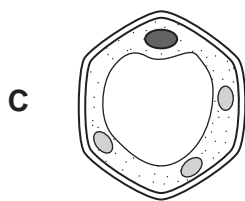
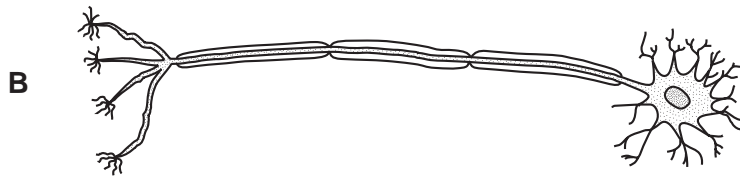
Percentage: /100

Grade Boundaries:

| | | | | | | | | |
|------|-----|-----|-----|-----|-----|-----|-----|------|
| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| >85% | 75% | 68% | 60% | 53% | 48% | 40% | 33% | <25% |

1 Cells are formed by the division of existing cells. Four different cells are shown.

Which cell is produced by meiosis?



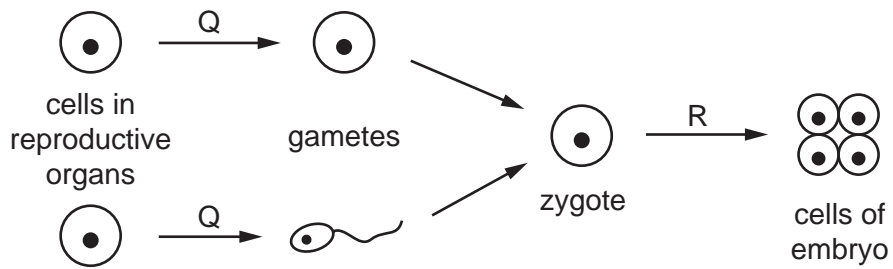
2 Albinism is an inherited condition in which pigment does not develop in the skin, hair and eyes.

The allele for albinism is recessive.

What are the chances of albino parents having an albino child?

- A 0% B 25% C 75% D 100%

3 The diagram represents processes in sexual reproduction.



Which processes are represented by stages Q and R?

| | Q | R |
|----------|---------|---------|
| A | meiosis | meiosis |
| B | meiosis | mitosis |
| C | mitosis | meiosis |
| D | mitosis | mitosis |

4 Which name is given to the observable features of an organism?

- A** alleles
- B** genes
- C** genotype
- D** phenotype

5 Which structure will be found in the nucleus of a body cell in a woman?

- A** X allele
- B** X chromosome
- C** Y allele
- D** Y chromosome

- 6 Owners of successful race horses hope that the horses' offspring will be like their parents.
How does a young race horse inherit its characteristics?
- A equally from its mother and father
 - B mainly from its father
 - C mainly from its mother
 - D passed across the placenta
- 7 In pea plants the allele for tall, T, is dominant to the allele for dwarf, t. Which cross would produce plants in the proportion of 1 tall : 1 dwarf?
- A $TT \times Tt$
 - B $Tt \times Tt$
 - C $Tt \times tt$
 - D $tt \times tt$
- 8 In the inheritance of ABO blood groups, when two parents have the genotypes $I^A I^A$ and $I^A I^O$, what is the blood group of their offspring?
- A group A
 - B group AB
 - C group B
 - D group O
- 9 When a cell divides, these events occur.
- 1 The DNA inside the cell is duplicated exactly.
 - 2 Daughter cells are produced with the same chromosome number as the parent cell. Which type of division has occurred?
- A meiosis producing genetically different cells
 - B meiosis producing genetically identical cells
 - C mitosis producing genetically different cells
 - D mitosis producing genetically identical cells

- 10 Which structures in plant cells build protein molecules under the control of the nucleus?
- A cell walls
 - B chloroplasts
 - C mitochondria
 - D ribosomes
- 11 Sickle cell anaemia is determined by the gene Hb. Hb^A is the allele for normal blood. Hb^S is the allele for sickle cell anaemia.
- Which combination of parents could result in some children with resistance to malaria and some with all normal red blood cells?
- A Hb^A Hb^A Hb^A Hb^A
 - B Hb^A Hb^A Hb^A Hb^S
 - C Hb^A Hb^A Hb^S Hb^S
 - D Hb^S Hb^S Hb^S Hb^S
- 12 Which substance is coded for by a length of DNA?
- A fat
 - B fatty acid
 - C glycerol
 - D lipase
- 13 What are alleles?
- A a pair of chromosomes
 - B different versions of the same gene
 - C the total number of genes on one chromosome
 - D two genes side by side on the same chromosome

14 A pure-breeding plant with smooth stems was crossed with a heterozygous plant with hairy stems.

What will be the ratio of hairy : smooth stems in the resulting plants?

- A 1 hairy : 1 smooth
- B 1 hairy : 3 smooth
- C 3 hairy : 1 smooth
- D all hairy

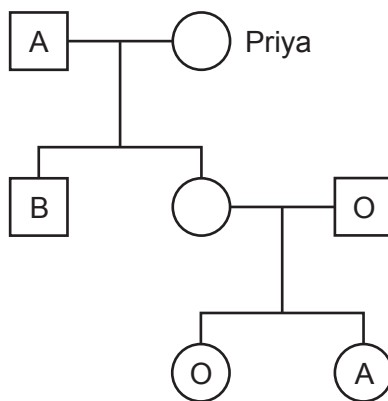
15 The diagram shows the sex chromosomes of a woman and of a man. Their genotypes for a recessive sex-linked condition are also shown.



What are the chances that their daughter will show the sex-linked condition?

- A 0%
- B 25%
- C 50%
- D 75%

16 The diagram shows the inheritance of ABO blood groups. The blood groups of some of the individuals are given.



What could be Priya's genotype?

- A $I^A I^O$
- B $I^B I^B$
- C $I^B I^O$
- D $I^O I^O$

17 Which statement about the human sex chromosomes is correct?

- A All boys have two Y chromosomes.
- B Everybody has at least one X chromosome.
- C Girls have a Y chromosome and an X chromosome.
- D Nobody has two X chromosomes.

18 What results from meiosis of a diploid cell?

- A genetically different diploid cells
- B genetically different haploid cells
- C genetically identical diploid cells
- D genetically identical haploid cells

19 What will be the genotypes of the offspring resulting from a genetic cross between two individuals, one of which is homozygous dominant, (TT), and the other heterozygous?

- A all Tt
- B 50% TT, 50% tt
- C 50% TT, 50%Tt
- D 25%TT, 50% Tt, 25% tt

20 Which of these cells is haploid?

- A liver cell
- B red blood cell
- C sperm cell
- D zygote

21 A genetic cross between two organisms may be shown as $Gg \times Gg$.

What does g represent?

- A** a dominant allele
- B** a dominant chromosome
- C** a recessive allele
- D** a recessive chromosome

22 Some fruit flies have orange eyes and others have red eyes.

If two orange-eyed fruit flies are crossed, their offspring always have orange eyes.

If two red-eyed fruit flies are crossed, their offspring sometimes include both orange-eyed and red-eyed flies.

What can be concluded from these observations?

- A** Crossing an orange-eyed fly with a red-eyed fly will produce a 1 : 1 ratio in the offspring.
- B** The allele for orange eyes is dominant.
- C** The allele for red eyes is dominant.
- D** We could determine which allele is dominant only by doing a cross that produces a 3 : 1 ratio.

23 What are correct descriptions of mitosis and meiosis?

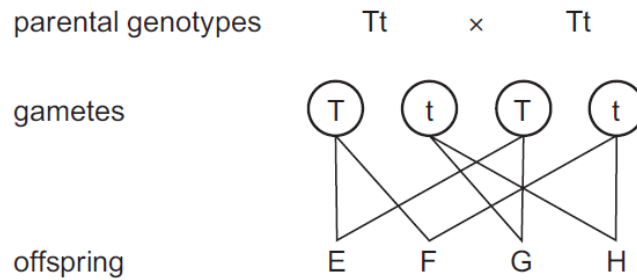
| | mitosis | meiosis |
|----------|--|--|
| A | cells produced are genetically identical | repairs damaged cells |
| B | halves the chromosome number | cells produced are genetically identical |
| C | involved in asexual reproduction | halves the chromosome number |
| D | involved in sexual reproduction | doubles the chromosome number |

24 A man has three sons.

What is the chance of his next child being a son?

- A** 0% **B** 25% **C** 50% **D** 75%

25 The diagram shows a cross between heterozygous tall pea plants.

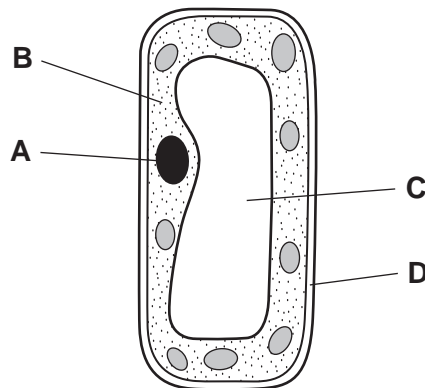


Which statement is **not** correct?

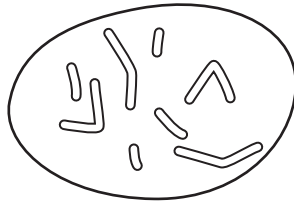
- A** Offspring E and H are both homozygous.
B Offspring F and G are both heterozygous.
C The phenotypes of offspring E, F and G are the same.
D The ratio of different phenotypes in the offspring is 1 : 1.

26 The diagram shows a plant cell.

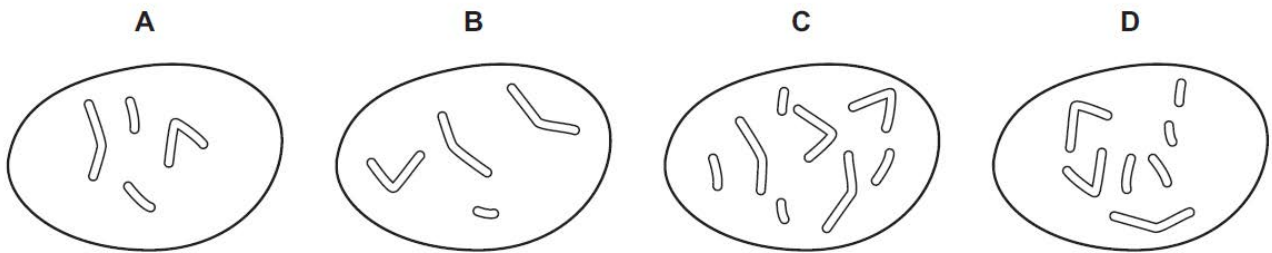
Where is most of the DNA found?



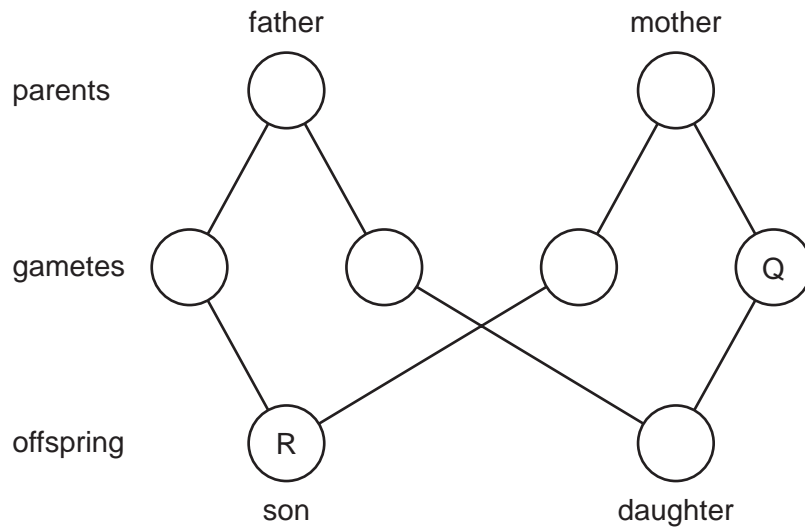
27 The diagram shows the chromosomes in the nucleus of a cell that divides by mitosis.



Which diagram shows the chromosomes in the nucleus of one of the daughter cells produced?



28 The diagram shows the fusion of gametes to produce a son and a daughter.



What are the sex chromosomes in gamete Q and son R?

| | Q | R |
|---|---|----|
| A | X | XX |
| B | X | XY |
| C | Y | XX |
| D | Y | XY |

29 What are the sex chromosomes for human females and males?

| | female | male |
|----------|--------|------|
| A | XX | XY |
| B | XX | YY |
| C | XY | XX |
| D | YY | XY |

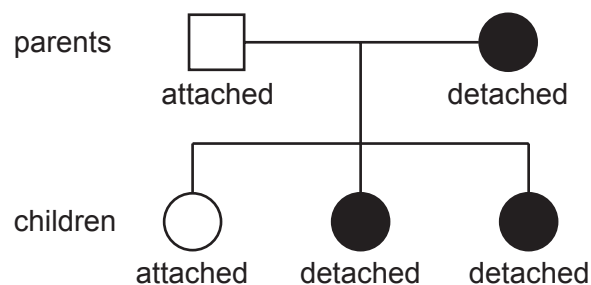
30 A plant has two different alleles of a gene resulting in it having a green seed. Which row describes the phenotype and genotype of the seeds of this plant?

| | phenotype | genotype |
|----------|-----------|--------------|
| A | Gg | heterozygous |
| B | Gg | homozygous |
| C | green | heterozygous |
| D | green | homozygous |

31 The shape of a person's earlobes is determined by a single gene. This gene has dominant and recessive alleles.

The allele for detached earlobes is dominant to the allele for attached earlobes.

The diagram shows the inheritance of earlobe shape in a family.



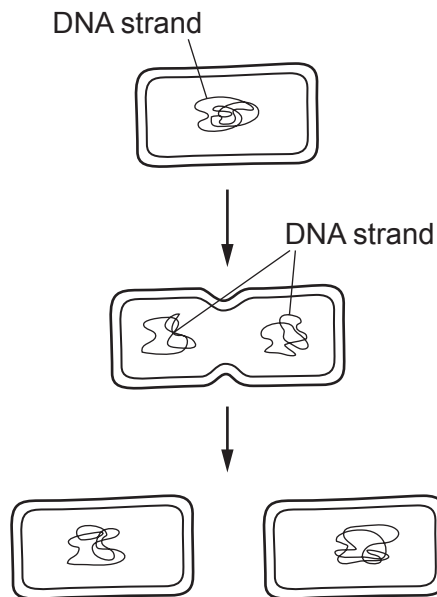
What is the probability of the next child from the same parents having detached earlobes?

- A** 0% **B** 25% **C** 50% **D** 75%

32 Which sex chromosomes are present in all mature human sperm cells?

- A both X and Y chromosomes
- B either X or Y chromosomes
- C only X chromosomes
- D only Y chromosomes

33 The diagram shows a cell dividing into two.

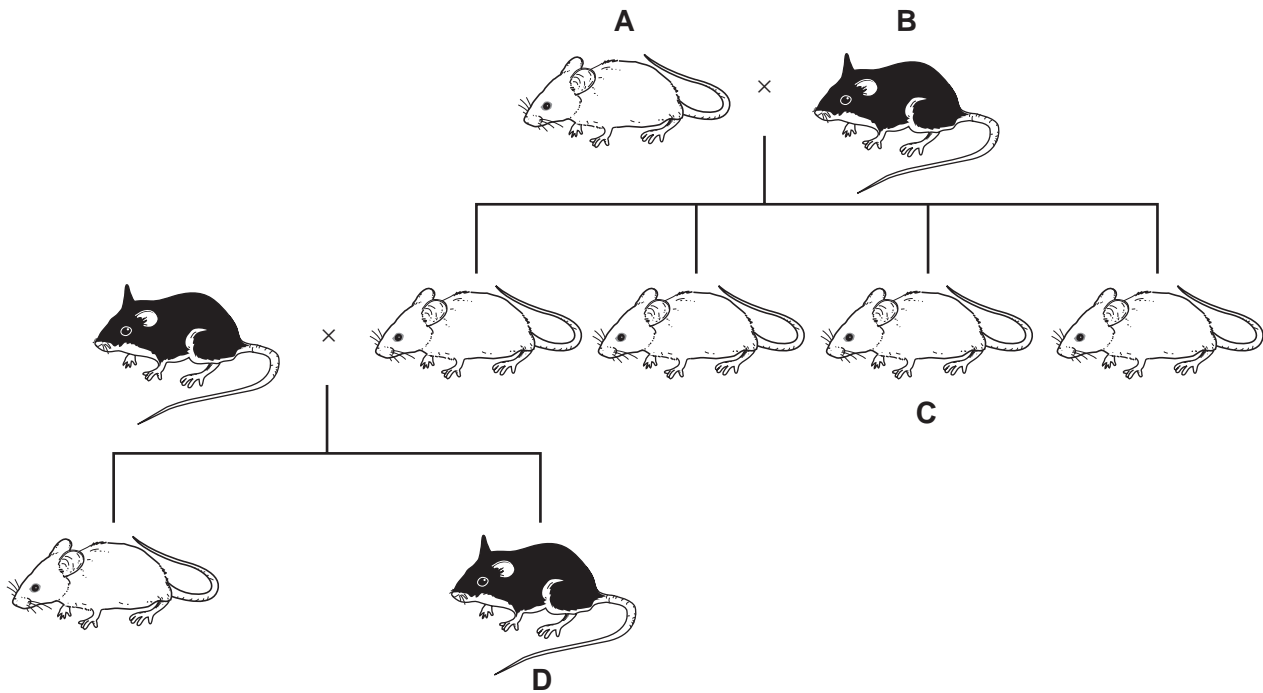


Which process is shown in the diagram?

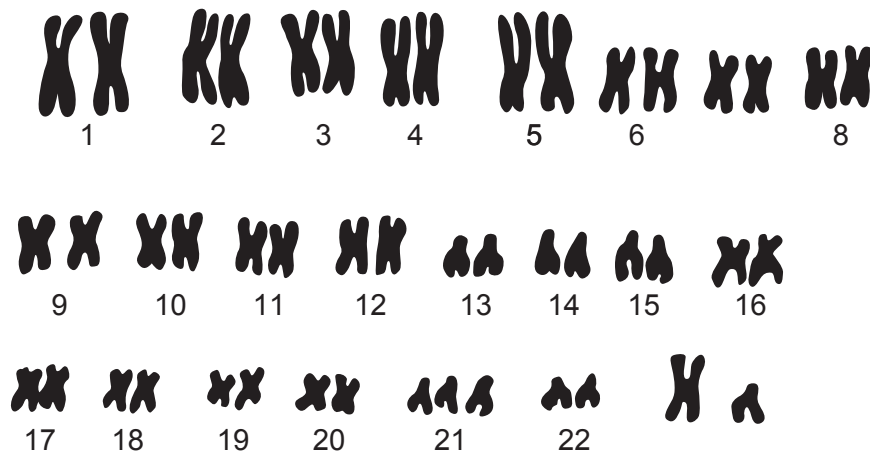
- A asexual reproduction in a bacterium
- B asexual reproduction in a potato plant
- C meiosis in a woman's ovary
- D mitosis in the root of a plant

34 The chart shows the inheritance of fur colour in a small mammal.

If the allele for white fur is dominant, which animal **must** be heterozygous for the gene controlling fur colour?



35 The diagram shows the chromosomes from one person.



What can be deduced about the person who has these chromosomes?

- A a female with Down's syndrome
- B a male with Down's syndrome
- C a normal female
- D a normal male

36 Genetics is the study of

- A development of organisms.
- B mechanisms of inheritance.
- C nuclear division.
- D variation between species.

37 What is **unlikely** to be affected by the environment?

- A blood group
- B body mass
- C health
- D height

38 Which statement is true of both chromosomes and genes?

- A Each codes for a specific protein.
- B Each may be copied and passed on in mitosis.
- C Each may be either dominant or recessive.
- D Each may exist as two or more alleles.

39 Most birds have a coloured pigment in their feathers, but in a few individuals, pigment is absent and the birds are albinos.

Albinism occurs when a bird is homozygous recessive for the gene which creates the coloured pigment.

If two albino birds mated, what describes the appearance of their offspring?

- A all albino
- B all coloured
- C 50% coloured, 50% albino
- D 75% coloured, 25% albino

40 In an animal, the allele for straight fur is dominant to the allele for curly fur.

A pair of these animals mate and have nine offspring with straight fur and three with curly fur.

F represents the allele for straight fur and f represents the allele for curly fur.

What are the most likely genotypes of the parents?

- A** F and f **B** FF and ff **C** FF and Ff **D** Ff and Ff