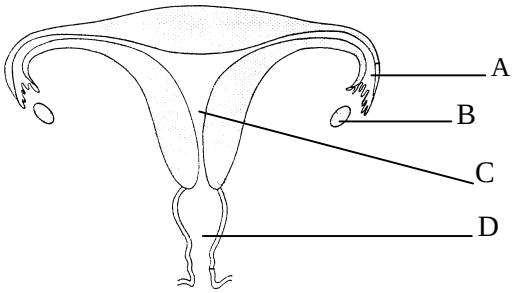
Low Demand Questions QUESTIONSHEET 1

The diagram shows the female reproductive system.



(a) Name the structures labelled A, B, C and D.
Use names from this list.

A. .....[1]

B. .....[1]

C. .....[1]

D. .....[1]

ovary urethra oviduct (fallopian tube) ureter cervix placenta uterus (womb) vagina

(b) Match **one** of the letters from the diagram with each of the following:

(i) an organ which produces eggs.

.....[1]

(ii) the normal site of fertilisation.

.....[1]

(iii) where sperm are deposited during intercourse

.....[1]

(iv) an organ where the embryo develops.

.....[1]

(c) State **two** ways in which egg and sperm cells are similar?

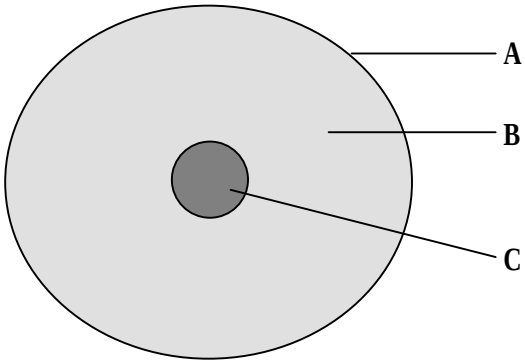
.....

.....[2]

TOTAL / 10

Low Demand Questions QUESTIONSHEET 2

The diagram shows a cell from the testes of an animal.



(a) Name the parts labelled A, B and C.

A. .....[1]

B. .....[1]

C. .....[1]

(b) Which of the parts A, B or C contains chromosomes?

.....[1]

(c) The cell in the diagram will develop into a male gamete.

(i) What name is given to male gametes?

.....[1]

(ii) What name is given to female gametes?

.....[1]

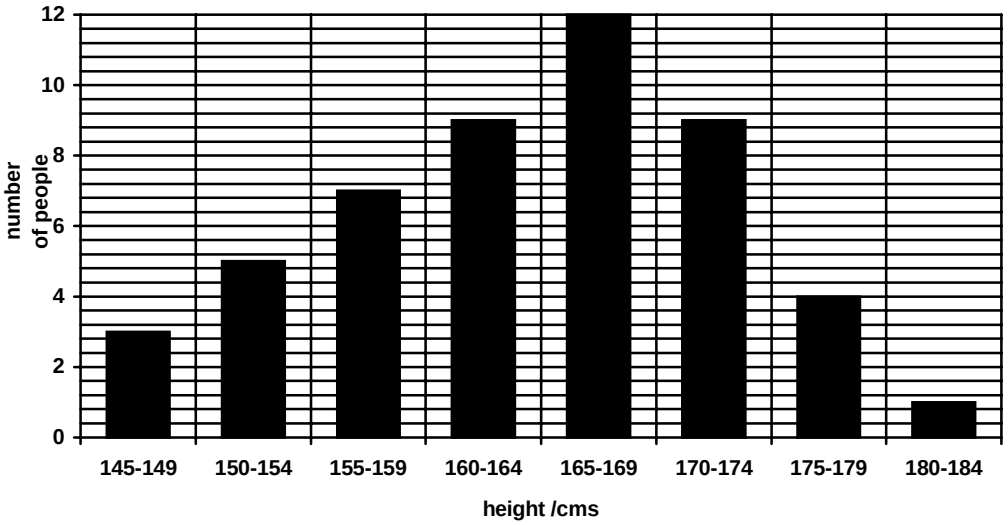
(d) Cells taken from the skin of this animal were examined under a microscope and seen to have 28 chromosomes.
How many chromosomes would be present in the male gametes?

.....[1]

TOTAL / 7

Low Demand Questions QUESTIONSHEET 3

(a) The bar chart shows the range of heights in a sample of 17 year old males.



(i) What was the range of heights in the sample.

.....[1]

(ii) How many people were between 150 and 154 cm in height?

.....[1]

(iii) How many people were over 170 cm in height?

.....[1]

(iv) Calculate the percentage of people who were between 160 and 174 cm in height.

.....

.....[2]

(b) Variation in height may be caused by two factors.
One of these is the environment such as the amount of food available.
Name the other factor which causes variation in height.

.....[1]

TOTAL / 6

Low Demand Questions QUESTIONSHEET 4

The table gives some features of a group of plants of the same species.

Plant	colour of leaves	hairy stem	colour of flowers	height /cm	resistance to herbicide	shape of fruit
1	green	no	red	51	yes	round
2	green	no	red	56	no	oval
3	green	no	red	69	no	oval
4	variegated	yes	white	70	no	oval
5	green	no	red	61	no	oval
6	variegated	yes	white	53	no	oval
7	green	no	red	57	yes	round
8	green	no	white	66	no	oval
9	green	no	red	62	no	oval
10	variegated	yes	red	58	no	oval

(a) Which feature shows the greatest variation?

.....[1]

(b) What fraction of the sample of plants had variegated leaves?

.....[1]

(c) How many of the plants had green leaves and white flowers?

.....[1]

(d) What is the relationship between variegated leaves and hairy stem?

.....[1]

(e) What percentage of the plants had red flowers and were below 60 cm in height?

.....[1]

(f) A plant breeder wanted to develop a variety of the plant which had round fruits and was resistant to herbicides.

(i) Which **two** of the plants would he breed from?

.....[1]

(ii) Give a reason for your choice.

.....[1]

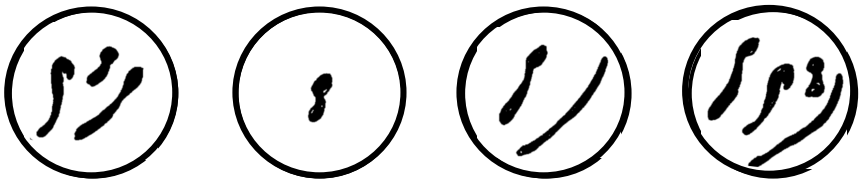
TOTAL / 7

Medium Demand Questions QUESTIONSHEET 5

(a) The diagram shows the chromosomes in a skin cell of a fish.

(i) Which of the following (A, B, C or D) represent the chromosomes present in the egg cells produced by the same fish?

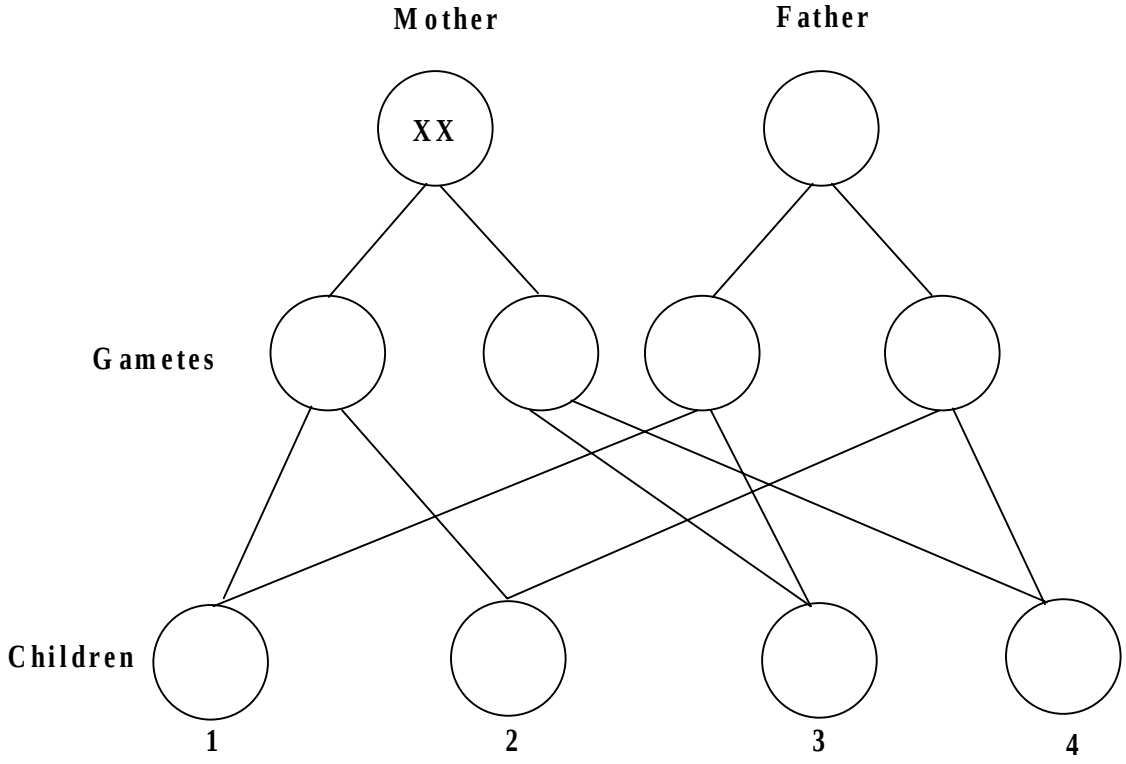
.....[1]



(ii) Give a reason for your answer.

.....[1]

(b)(i) Complete the following genetic diagram to show the chromosomes present in the parents, gametes and children. [3]



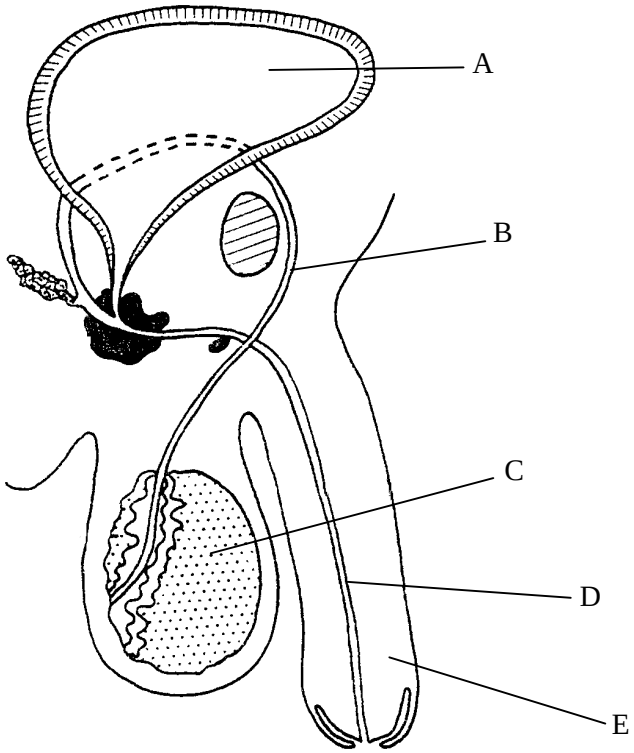
(ii) What is the sex of child 1?.....[1]

(iii) What is the sex of child 2?.....[1]

TOTAL / 7

Medium Demand Questions QUESTIONSHEET 6

The diagram shows the male reproductive system.



(a) Name the structures labelled A, B, C, D and E.

A ..... B ..... C .....

C..... D ..... E.....[5]

(b) Use the letters from the diagram to match the following:

(i) a structure where male gametes develop.

.....[1]

(ii) a tube which carries sperm and urine.

.....[1]

(iii) a tube which carries sperm only.

.....[1]

(c) The testes are situated outside the body cavity. Suggest a reason for this.

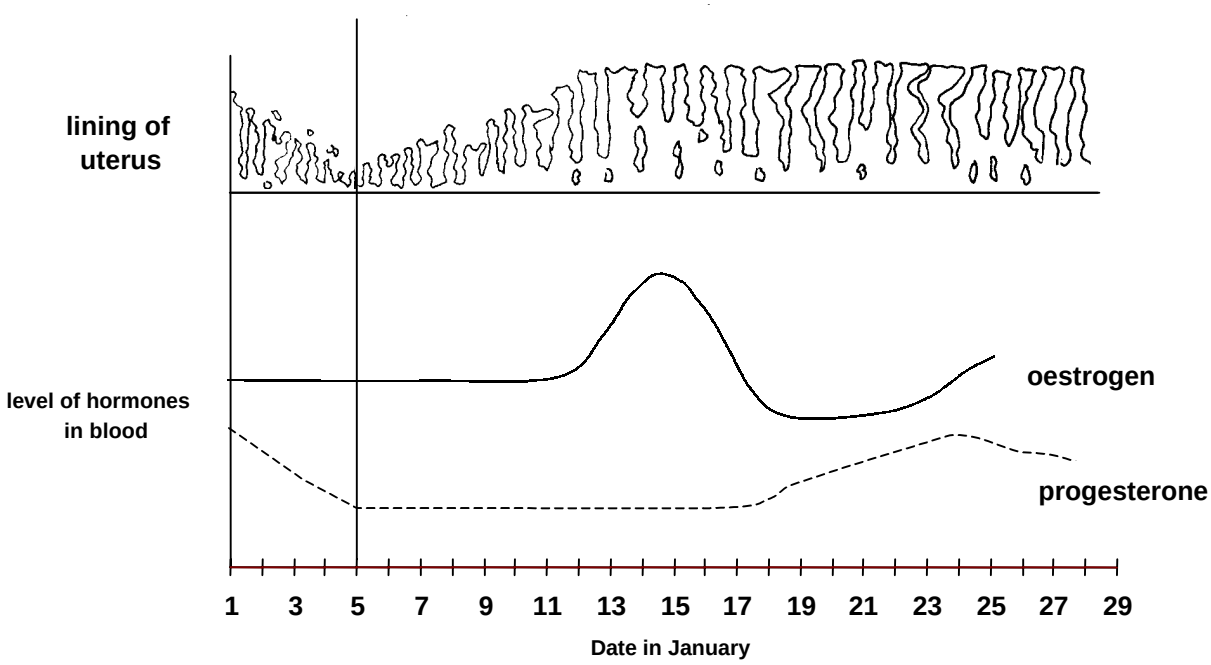
.....

.....[2]

TOTAL / 10

Medium Demand Questions QUESTIONSHEET 7

The diagram shows some of the changes that occur during the menstrual cycle.



Answer the following questions using only the information in the diagram.

(a) Between which dates did menstruation take place?

.....

.....[2]

(b) What happened to the lining of the uterus during menstruation?

.....[1]

(c) What happened to the level of progesterone during menstruation?

.....[1]

(d) On which date did ovulation take place?

.....[1]

(e) What is the relationship between the level of oestrogen and ovulation?

.....[1]

(*Continued…*)

QUESTIONSHEET 7 CONTINUED

(f) What happened to the levels of

(i) oestrogen in the 6 days after ovulation?

.....

.....[2]

(ii) progesterone in the 6 days after ovulation?

.....

.....[2]

(g) What will happen to the lining of the uterus after January 28?

.....[1]

TOTAL / 11

Medium Demand Questions QUESTIONSHEET 8

The diagram shows the developing foetus.

(a) Name the structures labelled A, B, C and D.

.....

.....

.....

.....[4]

(b) State the function of the amniotic fluid.

.....[1]

(c) (i) Name **two** substances which pass from the mother to the foetus along structure B.

.....

.....[2]

(ii) Name **two** substances which pass from the foetus to the mother along structure B.

.....

.....[2]

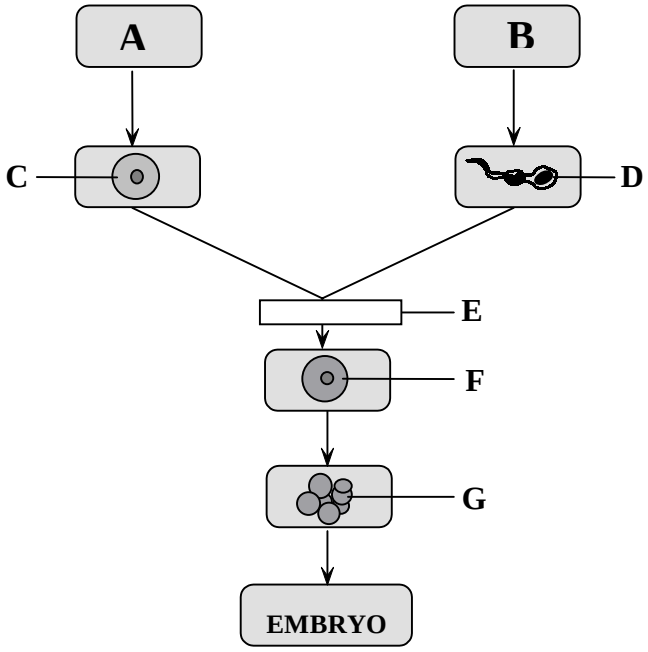
(d) Which structure contracts strongly to force out the baby at birth?

.....[1]

TOTAL / 10

Medium Demand Questions QUESTIONSHEET 9

The diagram shows some of the stages in the development of a human embryo.



(a) Name the organs A and B.

.....

.....[2]

(b) Name the cells C and D.

.....

.....[2]

(c) (i) Name the process represented by E.

.....[1]

(ii) What happens during this process?

.....

.....[2]

(d) Name the type of cell division which produces the ball of cells labelled G.

.....[1]

(e) Give the number of chromosomes present in the cells labelled

(i) C.....[1]

(ii) F.....[1]

TOTAL / 10

Medium Demand Questions QUESTIONSHEET 10

(a) The bog bilberry is a plant that grows in damp soils. Normally the plant produces fruits which are very similar to each other. Bog bilberry plants that grow near radioactive uranium deposits near the Great Bear Lake in Canada produce fruits that show great variation in shape and size.

(i) Explain why bog bilberry plants growing near uranium deposits show variation in the shape and size of fruits.

.....

.....

.....[3]

(ii) When seeds are collected from the bog bilberry plants growing near the uranium deposits and grown in other places, their fruits still show the same variation. Explain why this is.

.....

.....

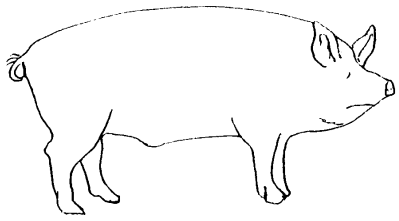
.....[3]

(iii) The characteristics of the bog bilberry plants can also be affected by changes in the environment. Suggest **two** environmental factors that could affect the bog bilberry plants.

.....

.....[2]

(b) The large White is a breed of pig reared extensively by pig farmers. This breed does not occur naturally in the wild and has been bred by man for its useful characteristics. It has been bred for the quality of its bacon and its ability to produce large numbers of young.



(i) What name is given to the process of breeding particular characteristics into an animal?

.....[1]

(ii) Suggest **two** other characteristics pig breeders might want to breed into their pigs.

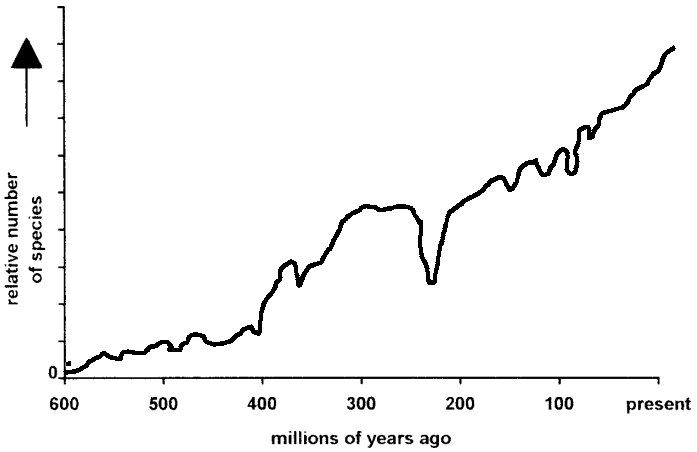
.....

.....[2]

TOTAL / 10

Medium Demand Questions QUESTIONSHEET 11

The graph shows the relative numbers of different species of organisms present on the Earth from 600 million years ago to the present time.



(a) (i) What is the general trend in the number of species from 600 million years ago to the present?

.....[1]

(ii) Describe what happened to the number of species between 300 and 200 million years ago.

.....

.....

.....[3]

(iii) Suggest **two** reasons why species become extinct.

.....

.....[2]

(b) When animals and plants die they are usually eaten or decay.
In certain circumstances organisms can be preserved as fossils because one or more of the conditions needed for decay are absent.
State **one** condition needed for decay which was absent in the following:

(i) a baby mammoth found frozen in Siberia.

.....[1]

(ii) a mummified mammal found in a desert.

.....[1]

(iii) an insect found sealed in amber (a solidified resin from a tree).

.....[1]

(c) What term is used to describe the series of gradual changes that occur in a species over many generations?

.....[1]

TOTAL / 10

Medium Demand Questions QUESTIONSHEET 12

In 1791 an unusual ram was born on Seth Wrights' farm. This male sheep was similar to other sheep except that it had short, crooked legs which meant it could not jump out of its enclosure. Seth Wright decided to breed a flock of these sheep which were called Ancon sheep.

(a) What determines the characteristics of living things?

.....[1]

(b) Explain how the Ancon ram had been born with short, crooked legs.

.....

.....[2]

(c) Describe the steps Seth Wright would have to carry out to produce a flock of Ancon sheep.

.....

.....

.....

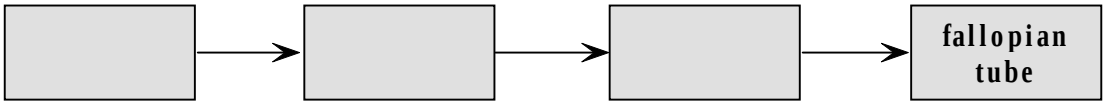
.....

.....[5]

TOTAL / 8

High Demand Questions QUESTIONSHEET 13

(a) Complete the following diagram to show the structures, in the correct sequence, through which sperm pass after leaving the penis until they reach the egg in the fallopian tube. [3]



(b) One common cause of infertility in women is blockage of the fallopian tubes.
Explain how this causes infertility.

.....

.....[2]

(c) Usually blocked fallopian tubes cannot be treated and embryo transplantation is a method which can be used to help a woman become pregnant.
Describe the stages involved in embryo transplantation.

.....

.....

.....

.....

.....

.....[6]

TOTAL / 11

High Demand Questions QUESTIONSHEET 14

Cystic fibrosis is an inherited disease. The allele for cystic fibrosis (**c**) is recessive to the normal allele (**C**). Approximately one person in every 25 are carriers of the recessive allele.

(a) Using the symbols **C** and **c** give the genotypes of the following:

(i) a person who suffers from cystic fibrosis.

.....[1]

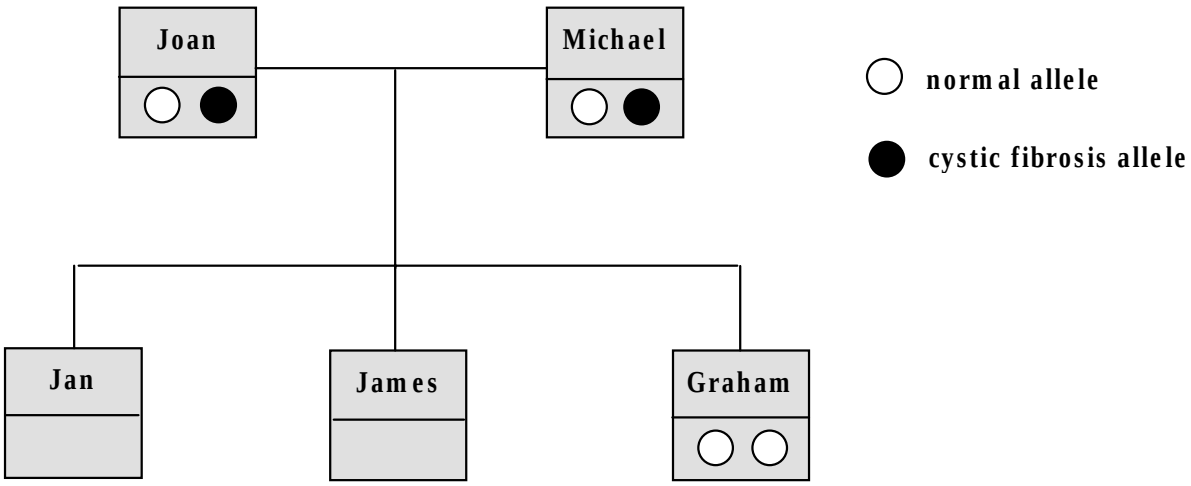
(ii) a healthy person who carries the allele.

.....[1]

(iii) a normal person.

.....[1]

(b) The diagram shows a family tree.



(i) What is the genotype of Joan and Michael?

.....[1]

(ii) What is the genotype of Graham?

.....[1]

(iii) What is the probability of Jan having cystic fibrosis?

.....[1]

(Continued...)

QUESTIONSHEET 14 CONTINUED

(iv) What is the probability of James being a carrier of the cystic fibrosis allele?

.....[1]

(c) (i) Name **one** person in this family who is homozygous.

.....[1]

(ii) What is the phenotype of Graham?

.....[1]

TOTAL / 9

High Demand Questions QUESTIONSHEET 15

(a) Give the number of chromosomes present in each of the following human cells:

(i) a sperm cell.

.....[1]

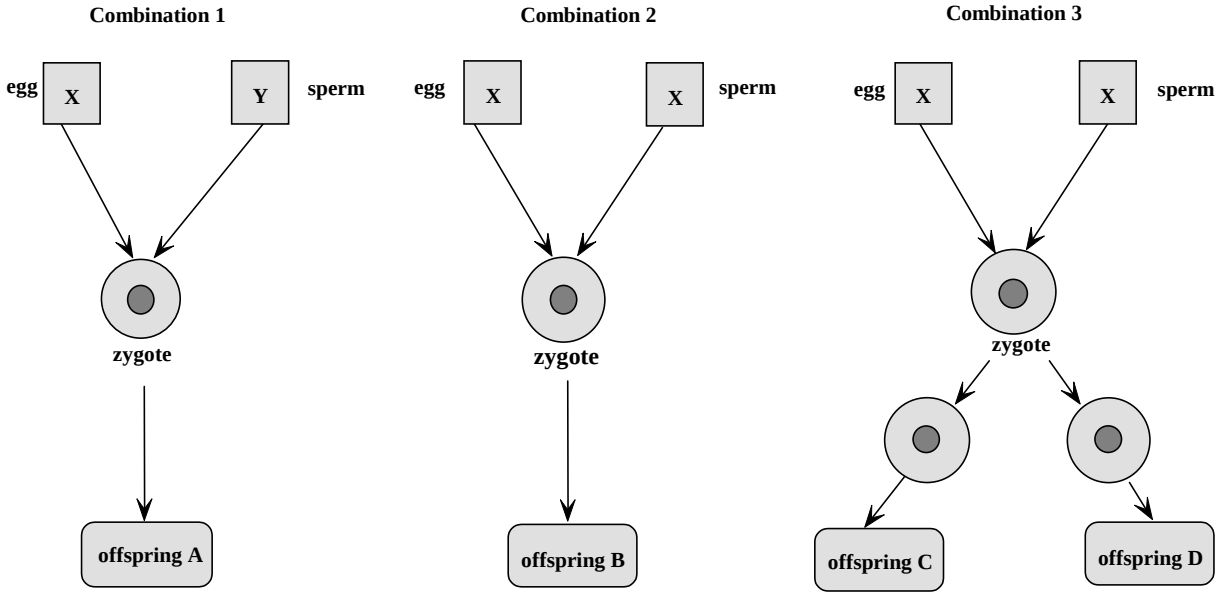
(ii) a fertilised egg cell.

.....[1]

(iii) a cell from the stomach wall of a developing foetus.

.....[1]

(b) The diagrams show some possible combinations of eggs and sperm at fertilisation.



(i) What do the letters X and Y on the diagram represent?

.....[1]

(ii) Which of these combinations would give rise to a single female?

.....[1]

(iii) Which of these combinations would give rise to a single male?

.....[1]

(Continued...)

QUESTIONSHEET 15 CONTINUED

(c) (i) What is the sex of offspring C and D?

.....[1]

(ii) Give a reason for your answer.

.....[1]

(d) Explain how non-identical twins are formed.

.....

.....

.....[3]

TOTAL / 9

High Demand Questions QUESTIONSHEET 16

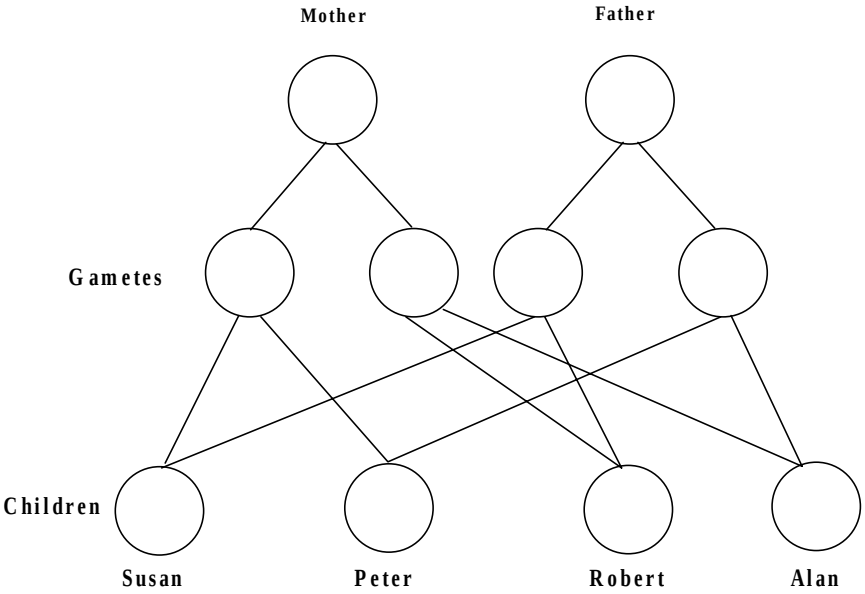
Huntington's chorea is an inherited disease of the nervous system.
Symptoms of the disease usually only appear between the ages of 30 and 40.
The condition is caused by an allele (**H**) which is dominant to the normal allele (**h**).

(a) Give the **two** possible genotypes of a sufferer from Huntington's chorea.

.....

.....[2]

(b)(i) Complete the following genetic diagram in which the father is heterozygous and suffers from the disease and the mother is normal. [3]



(ii) What is the ratio of normal children to sufferers from Huntington's chorea in the children?

.....[1]

(c) What is the probability of two heterozygous sufferers from Huntington's chorea having a normal child?

.....[1]

TOTAL / 7

High Demand Questions QUESTIONSHEET 17

Read the following passage and answer the questions.

The speckled moth (Biston betularia) normally exists as a speckled grey form. This moth spends much of its time resting on the lichen-covered bark of trees where its colour provides good camouflage from birds. Occasionally, a black form of the moth appears but rarely survives. During the Industrial Revolution in the nineteenth century coal came into widespread use and many trees became covered with soot from the chimneys.
By the end of the nineteenth century the black form of the moth made up 98% of the moth population.
Since the 1950's Britain's air has become much cleaner and the speckled form of the moth is now the most common.

(a) What caused the first black form of the moth to appear?

.....[1]

(b) Explain why, prior to the Industrial Revolution, the black form of moth did not survive for long.

.....

.....[2]

(c) Explain how the black form of the moth came to make up 98% of the moth population.

.....

.....

.....

.....

.....[5]

(d) The change in the populations of speckled and black moths is an example of evolution.
What process had caused this evolution?

.....[1]

TOTAL / 9

High Demand Questions QUESTIONSHEET 18

(a) During pregnancy the placenta develops in the uterus.

(i) How is the developing foetus connected to the placenta?

.....[1]

(ii) Describe how the developing foetus is provided with nutrients.

.....

.....

.....[3]

(iii) The placenta also acts as an excretory organ removing waste products from the foetus. Why is this important?

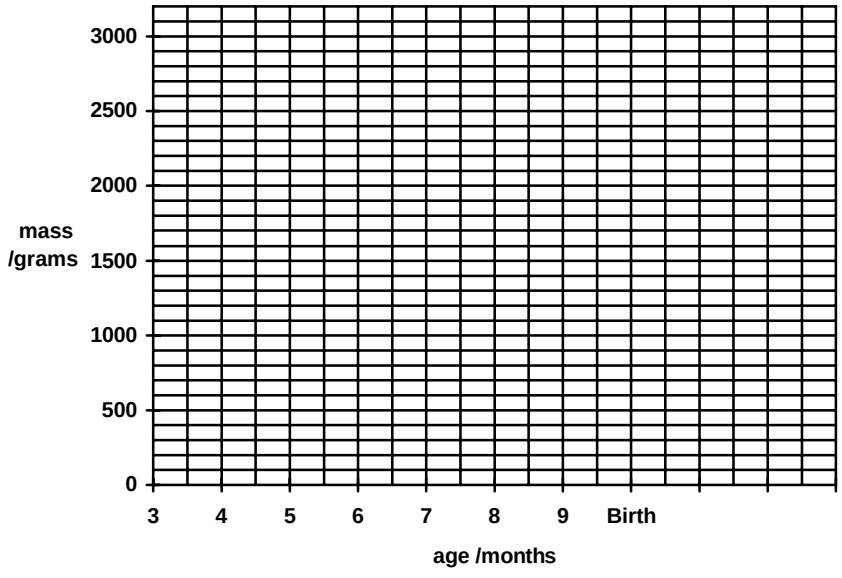
.....

.....[2]

(b) The table shows the mass of a developing foetus from 3 months until birth.

Age /months	Mass /grams
3	50
4	150
5	300
6	600
7	1100
8	1600
9	2100
Birth	3150

(i) Plot a line graph of these figures. [4]



(Continued...)

QUESTIONSHEET 18 CONTINUED

(ii) What was the increase in mass of the foetus between month 4 and 7?

.....[1]

(iii) Between which two consecutive months did the foetus increase in mass the most?

.....[1]

(iv) What was the percentage increase in mass between months 3 and 4? Show your working.

.....

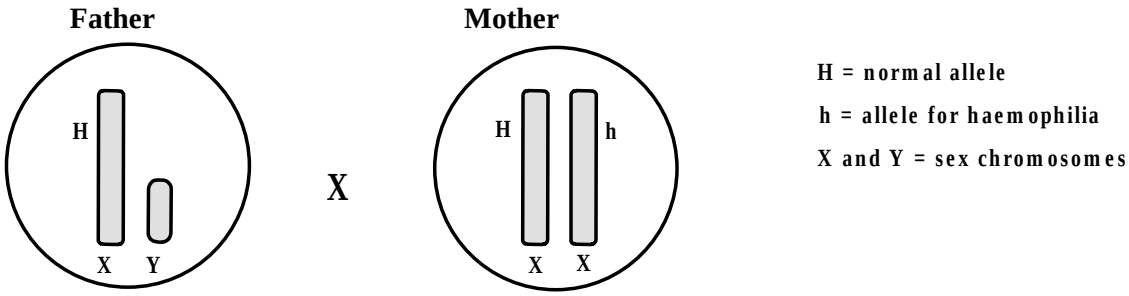
.....[2]

TOTAL / 14

High Demand Questions QUESTIONSHEET 19

Haemophilia is an inherited condition in which the blood clotting time is greatly increased.
The condition is caused by a recessive allele (**h**) which is carried on the X chromosome.
The allele for normal blood clotting (**H**) is also carried on the X chromosome.

(a) The diagram shows the genotypes of a husband and wife with respect to haemophilia.



(i) The mother is a carrier.
What is meant by a carrier of haemophilia?

.....

.....[2]

(ii) If the mother and father had children what are the four possible genotypes that could result?

.....

.....

.....

.....[4]

(b) Explain why haemophilia is more common in men than women.

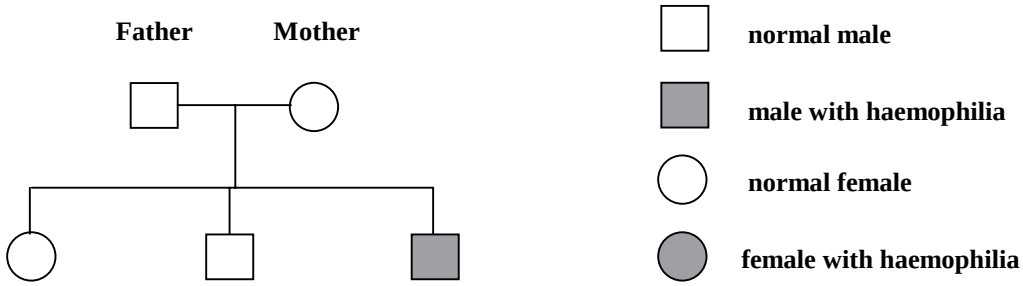
.....

.....[2]

(Continued...)

QUESTIONSHEET 19 CONTINUED

(c) The diagram shows a family tree in which one of the children has haemophilia.



The mother has a genotype of $\mathbf{X}^{H}\ \mathbf{X}h$.
How can this be deduced from the family tree?

.....

.....

.....

.....[4]

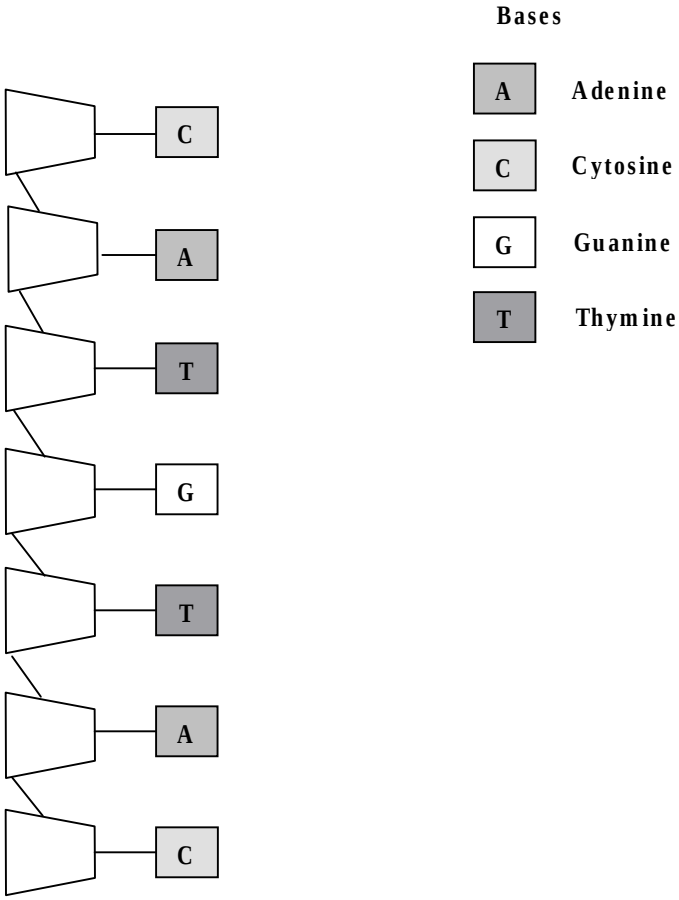
TOTAL / 12

High Demand Questions QUESTIONSHEET 20

(a) Where is most DNA found in a cell?

.....[1]

(b) The diagram shows a part of a single strand of DNA.



(i) Using the letters A, C, G and T only, list the bases in the sequence in which they would appear when this strand of DNA replicated itself.

.....

.....[2]

(ii) How does the information in a DNA molecule form a code for the production of protein molecules?

.....

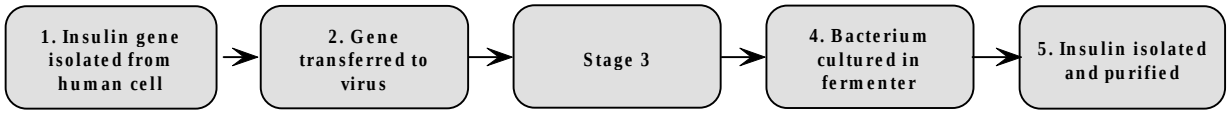
.....

.....[3]

(Continued...)

QUESTIONSHEET 20 CONTINUED

(c) The diagram shows some of the stages in the production of human insulin by genetic engineering.



(i) What happens in stage 3 ?

.....[1]

(ii) Explain why the bacterium is able to produce human insulin.

.....[1]

(iii) Why is the bacterium cultured in a fermenter?

.....[1]

TOTAL / 9