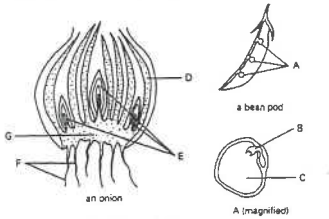
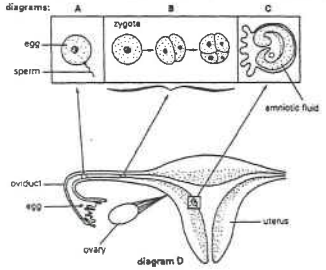
Past HKCEE Questions
Reproduction
Paper I

1. The diagram below shows longitudinal sections of an onion, a bean pod and a magnified part of the pod:
(The parts are not drawn to the same scale.)



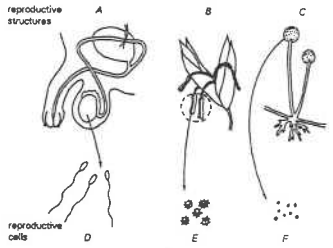
(i) Name B, C, E and G.
(ii) State one function each for B and C.
(iii) Using the letters in the diagram, indicate the part of the onion which serves the same function as
(1) B.
(2) C.
(iv) State the type of cell division that must have occurred in the parent plant to give rise to the genotypes of
(1) A.
(2) E.
(v) If A and E were to develop into new plants, compare the genotypes among the new plants developed from
(1) A.
(2) E.
(vi) The new plants developed from E may face a problem which does not occur with those developed from A. What is this problem? (HKCEE 1984)

2. The diagrams below show some of the stages of foetal development and their corresponding locations in the female reproductive system of a mammal.
(The parts are not drawn to the same scale.)



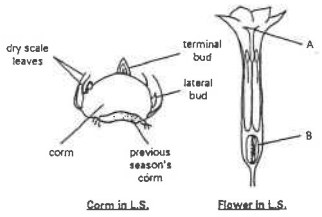
(i) State how the sperm moves in the sperm fluid.
(ii) State how the egg, within the oviduct, reaches the site of fertilization.
(iii) Compare the chromosome number of the zygote with that of the sperm.
(iv)
(1) Name the type of cell division taking place in the stages shown in diagram B.
(2) What is the significance of such cell division on the chromosome number?
(v) State one change in the uterine wall before the attachment of the embryo.
(vi) What structure is developed for the attachment of the embryo to the uterine wall?
(vii) At the birth of the foetus, what is the role played by
(1) the amniotic fluid?
(2) the uterine wall?
(HKCEE 1986)

3. The following diagrams show three different reproductive structures A, B and C, and the respective reproductive cells D, E and F formed from them:



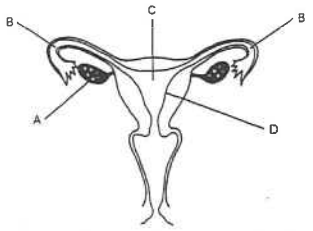
(i) In what medium is
(1) D
(2) F
released from its reproductive structure? Describe how each travels from one place to another after its release. (4 marks)
(ii) D, E and F are always produced in large numbers. What is the advantage of this feature? (1 mark)
(iii) State ONE feature of B; as shown in the diagram, which helps the spreading of E. (1 mark)
(iv) What different roles are played by E and F in reproduction? (4 marks)
(HKCEE 1988)

4. The diagrams below show the longitudinal section (L.S.) of two reproductive structures from the same type of plant:



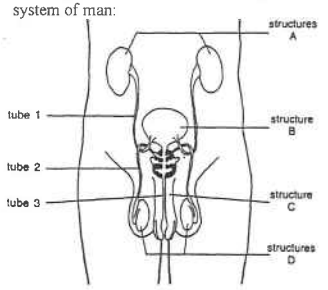
(i) A corm is an underground vegetative structure. Describe the natural process by which it may propagate vegetatively. (4 marks)
(ii) State another function of the corm that is important for the survival of the plant. (1 mark)
(iii) State whether the flower shown above is wind-pollinated or not. Give ONE reasonyou're your answer. (2 marks)
(iv) What will be the fates of structures A and B after fertilization? (2 marks)
(v)
(1) Explain why gardeners often use corms to produce new plants for flowers.
(2) Give ONE advantage of using seeds instead. (3 marks)
(HKCEE 1989)

5. The diagram below shows the human female reproductive system:



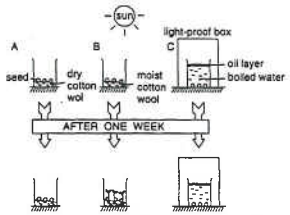
(i) State TWO functions of A. (2 marks)
(ii)
(1) What is meant by fertilization? (1 mark)
(2) Using the letters in the diagram, state where it takes place. (1 mark)
(iii) Some women are not able to have children if structure B is blocked. It is now possible to remedy this situation by "in vitro fertilization". The woman is given hormones in order to increase egg production. The eggs are then removed from the body and fertilized by sperms in a culture solution. Three days after fertilization, an embryo is transferred onto structure D; and if successful, a "test-tube baby" will develop.
(1) Explain why a woman cannot become pregnant if structure B is blocked. (1 mark)
(2) Give a reason why it is necessary to wait for three days before transferring the embryo onto structure D. (1 mark)
(3) Describe the role of structure D in the further development of the embryo. (3 marks)
(4) According to the procedure outlined above, explain why the term "test-tube baby" is inappropriate. (1 mark)
(HKCEE 1990)

6. The diagram below shows the urinogenital system of man:



(i) Which tube (1, 2 or 3) is involved in both reproduction and excretion? State its role in both processes. (2 marks)
(ii) Name structure D. (1 mark)
(iii) Explain why a man can survive without structures D but not structures A. (3 marks)
(iv) In a healthy person, which two structures (A, B, C or D) can change in size according to his physiological state? State the importance of these changes. (4 marks)
(HKCEE 1992)

7. In order to study the conditions necessary for seed germination, a student designed three experimental set-ups (A, B and C). These set-ups were put under the sun as shown below:



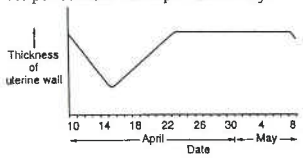
(i) What conclusion(s), if any, can be drawn by comparing the results in
(1) set-ups A and B only?
(2) set-ups B and C only?
Explain how you arrive at your answer. (5 marks)

(ii) Give two reasons why the condition studied in (i) (1) is important in seed germination. (4 marks)

(iii) After one week, there was a decrease in the dry mass of the seeds in set-up B. Explain why this occurred. (2 marks)

(HKCEE 1993)

8. The following graph shows the changes in the thickness of the uterine wall of a woman during the period from 10th April to 8th May:



(i) On which date was fertilization most likely to take place? Explain your answer. (2 marks)

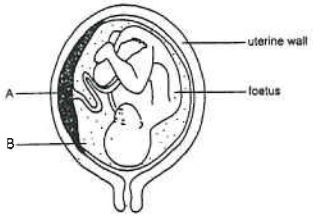
(ii) On which dates was menstruation occurring?
Explain your answer. (2 marks)

(iii) What is the significance of the increase in thick ness of the uterine wall during the period from 15th April to 22nd April? (1 mark)

(iv) In one method of birth control, a surgical operation is done on the oviducts. Briefly describe how the operation is performed and explain whether the secondary sexual characteristics of the woman would be affected after the operation. (4 marks)

(HKCEE 1993)

9. The diagram below shows a foetus inside the uterus of a woman just before birth:



(i) Describe how the foetus obtains nutrients for growth. (3 marks)

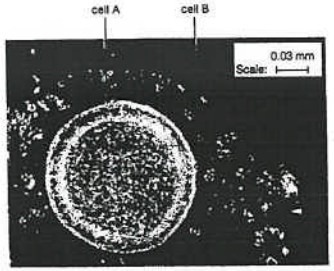
(ii) Name the fluid in B. State two functions of the fluid in B during the development of the foetus. (3 marks)

(iii) Explain what will happen to structure A shortly after the birth of the baby. (2 marks)

(iv) Explain why a woman should drink more milk during pregnancy. (4 marks)

(HKCEE 1994)

10. The photograph below shows two types of human cells, A and B:



(i)
(1) Using the scale given, calculate the diameter of cell A. (2 marks)
(2) Account for the large size of cell A. (1 mark)

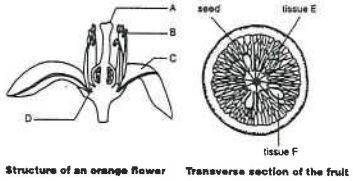
(ii) Name the organ that produces
(1) cell A.
(2) cell B. (2 marks)

(iii)
(1) State the biological process that might take place when cell B meets cell A. (1 mark)
(2) What is the significance of this process? (2 marks)

(iv) Cell B is found in a fluid called semen. Describe how semen is transferred from a man to a woman. (3 marks)

(HKCEE 1995)

11. Pollen grains from a flower of an orange tree were transferred to a flower of another orange tree. After some time, a fruit was formed. The diagrams on the opposite show the structure of an orange flower and the transverse section of the fruit.



Structure of an orange flower **Transverse section of the fruit**

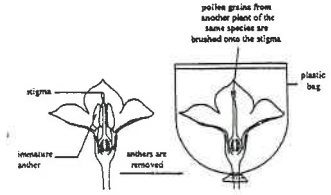
(i) With reference to the diagram,
(1) state the agent involved in the transfer of pollen grains between the orange flowers under natural conditions. (1 mark)
(2) explain one way in which the structure of the flower is adapted to this mode of pollination. (2 marks)

(ii)
(1) State the dispersal mechanism of orange seeds. (1 mark)
(2) Explain one way in which the fruit helps in this dispersal mechanism. (2 marks)

(iii) Explain why the genetic composition of cells in tissue E is different from that in tissue F (3 marks)

(HKCEE 1997)

12. The diagrams below show some of the steps carried out by a farmer in the reproduction of a certain species of plant



(i) What is the purpose of
(1) removing the anthers. (1 mark)
(2) covering the flower with a plastic bag ? (1 mark)

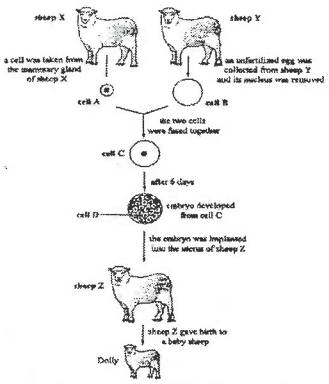
(ii) Describe the events that lead to the formation of the zygote after pollen grains are brushed onto the stigma. (3 marks)

(iii) Suggest the advantage of employing the procedure shown in the above diagrams for reproducing the plant. (2 marks)

(iv) This species of plant is usually reproduced by means of its stem tubers. Give two reasons to explain why farmers prefer to grow the plant from its tubers. (4 marks)

(HKCEE 1998)

13. Scientists can now propagate mammals by a method called cloning. The diagram below outlines how a sheep named Dolly was produced by using this method:



(i) Does cell C contain a haploid or diploid set of chromosomes? Explain your answer. (3 marks)

(ii) Explain why cell D is much smaller in size than cell C. (2 marks)

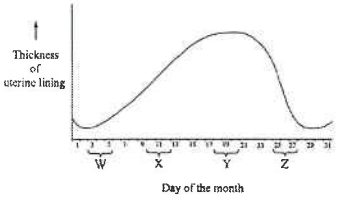
(iii) Dolly shows the same characteristics as one of the three parents. Which parent is this? Explain your answer. (3 marks)

(iv) Is Dolly produced by a sexual process? Give a reason for your answer. (2 marks)

(HKCEE 1999)

14.
(i) State the function of the uterus during the birth of a baby. (3 marks)

(ii) The graph below shows the changes in the thickness of the uterine lining of a woman in a certain month:

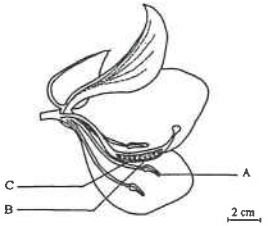


State the period (W, X, Y or Z) during which sexual intercourse might have a good chance of leading to pregnancy. Explain your answer. (4 marks)

(iii) One method of contraception is to avoid having sexual intercourse during the period stated in the answer to (ii). Suggest two reasons why this method of contraception may not be so reliable. (2 marks)

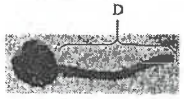
(HKCEE 1999)

15. The diagram below shows the structure of a flower:



(i) With reference to the diagram, state two observable features that suggest this flower is insect-pollinated. (2 marks)

(ii) Some tiny grains from structure A were put in a 15% sugar solution. After 2 hours, the grains were observed under the microscope. The photograph below shows one of these grains:

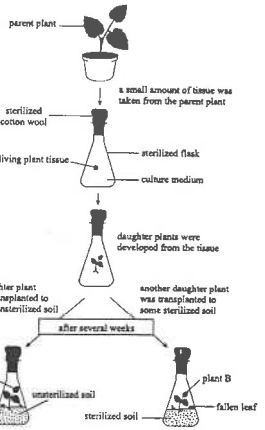


(1) Name structure D. (1 mark)

(2) What is the function of structure D? (2 marks)

(iii) What structures are formed from B and C respectively after fertilization? Describe the roles of these structures in reproduction. (5 marks)

16. Some plants can be propagated vegetatively using tissue culture. In this method, the culture medium is sterilized before use and it provides essential materials for plant growth. The diagram below shows an outline of an investigation involving tissue culture. The whole process is conducted in the presence of light.



(i) Sugar is one of the essential components of the culture medium. Explain why sugar must be added. (3 marks)

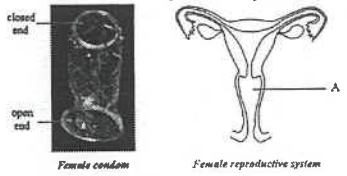
(ii) Compare the genetic make-up of the daughter plants with that of the parent plant. Give a reason for your answer. (2 marks)

(iii) After several weeks, plant B showed signs of yellowing while plant A remained green. Based on the information provided, suggest an explanation for the yellowing of plant B. (3 marks)

(iv) Give two advantages of this method of plant propagation over the propagation using seeds. (2 marks)

(HKCEE 2002)

17. The following photograph shows a female condom while the diagram on the right shows the human female reproductive system:



Female condom *Female reproductive system*

(i) The female condom is placed in A during sexual intercourse. How does the female condom contribute to contraception? (2 marks)

(ii) Give an example of an infectious disease that can be prevented by wearing the condom. (1 mark)

(iii) Another contraceptive method is to tie and cut both the oviducts. State whether or not menstruation will still occur in a young

woman who has received this operation. Explain your answer with reference to the physiological processes involved. (4 marks)

(iv) The following is a simplified diagram of a cell which is undergoing cell division to form an ovum. (Only two pairs of homologous chromosomes are shown in the diagram.)

Based on the above diagram, make a drawing of the ovum formed showing the chromosomes contained inside. (3 marks)

18. The cartoon below shows a foetus crying for help inside the mother's body:

(i) Smoking during pregnancy is hazardous to the foetus. The foetus may be affected in a number of ways, such as a reduced supply of oxygen and the entry of toxic chemicals.

(1) Suggest an explanation for the reduced oxygen supply to the foetus. (2 marks)

(2) Using a flowchart, show the route by which nicotine in cigarette smoke is transported from the mother's lungs to the foetus. Indicate only the major organs and blood vessels involved. (3 marks)

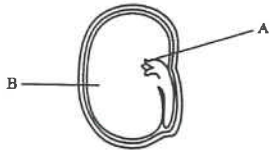
(ii)

(1) An early sign of the birth process is the breaking of the amnion. What is the significance of this event in the birth process? (2 marks)

(2) Describe what happens afterwards that leads to the birth of the baby. (3 marks)

(HKCEE 2003)

19. The diagram below shows a section of a seed



(i)

(1) Name structure A. (1 mark)

(2) What organs will A develop into during seed germination? (2 marks)

(ii) During germination, amylase activity is detected in region B. Explain the importance of amylase activity to the growth of the seedling. (4 marks)

(iii) The dry mass of the seedling decreases in the initial stage of germination but starts to increase after one week. Explain the increase in dry mass of the seedling in the later stage. (3 marks)

(HKCEE 2004)

20. The table below shows the average number of pregnancies for women adopting different contraceptive methods:

Contraceptive method	Pregnancies per 100 women in 12 months
Condom	15
Diaphragm	13
Intra-uterine device (IUD)	2
Rhythm method	25

(i) The use of condoms and diaphragms are based on the same principle in bringing about contraception. What is this principle? (1 mark)

(ii) How can an IUD prevent pregnancy to occur? (1 mark)

(iii)

(1) Explain the biological basis of the rhythm method. (3 marks)

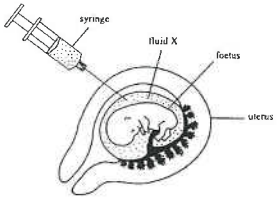
(2) Why does this contraceptive method have a high rate of failure? (1 mark)

(iv) Even though some couples do not use any contraceptive methods and have regular intercourse, the wives fail to become pregnant. Suggest *two* reasons for this. (2 marks)

(v) A man received an operation for contraception and had his sperm ducts tied and cut. Explain why his secondary sexual characteristics will not be affected after this operation. (3 marks)

(HKCEE 2004)

21. The diagram below shows how the fluid surrounding the foetus (fluid X) can be collected j using a syringe. The fluid collected contains some foetal cells. These cells are cultured for several weeks and then examined under the microscope to determine whether the foetus has certain genetic disorders.



(i) (1) Name the membrane that surrounds fluid X. (1 mark)
(2) Give two reasons why fluid X is important to the foetus during its development. (2 marks)

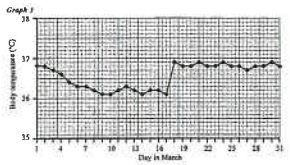
(ii) Suggest why it is necessary to culture the foetal cells for several weeks before they are examined under the microscope. (2 marks)

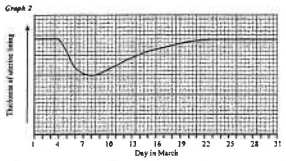
(iii) If microscopic examination shows that the foetus has Down Syndrome, the parents will have to decide whether to continue with the pregnancy or to end the pregnancy by abortion. Which choice do you support? Justify your answer. (2 marks)

(iv) Explain how we can find out the sex of the foetus through microscopic examination of the cultured cells. (2 marks)

(HKCEE 2005)

22. Lily is a healthy young woman. She adopts the 'safe period' method for contraception. In order to do so, she measures her body temperature every morning when she wakes up. Graph 1 below shows the body temperature recorded in March and Graph 2 shows the change in the thickness of her uterine lining in the same month:





(a) Identify the period that corresponds to menstruation. Give *one* piece of evidence from the information provided to support your answer. (2 marks)

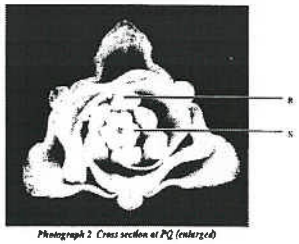
(b) Referring to the graphs, state the period in which there will be a high chance of pregnancy if sexual intercourse occurs. Explain your answer. (4 marks)

(c) The 'safe period' method is not very reliable for contraception because it can only predict part of the fertile period. Explain why it cannot predict the whole fertile period. (2 marks)

(HKCEE 2006)

23. The photographs below show the structure of a lily flower:

Photograph 1 Whole flower with one petal removed



Photograph 2 Cross section at PQ (enlarged)

(i) Label the following structures: (2 marks)
R: S:

(ii) State the method of pollination for this flower. Support your answer with two observable features from Photograph 1. (3 marks)

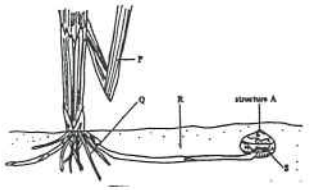
(iii) After pollination, describe how the male gamete meets the female gamete. (4 marks)

(iv) The lily plant can also reproduce asexually. What is this type of asexual reproduction? (1 mark)
(HKCEE 2007)

Past HKCEE Questions
Reproduction
Paper II

90-22
Which of the following statements about binary fission in amoeba is INCORRECT?
A. Two daughter amoebae are formed in each fission.
B. The daughter amoebae are Identical in their genetic contents.
C. The chromosome number of the daughter amoebae is half of that of the parent.
D. The newly-formed daughter amoebae are smaller in size than their parent.

90.
Directions: Questions 43 and 44 refer to the diagram below which shows the underground structures of a flowering plant

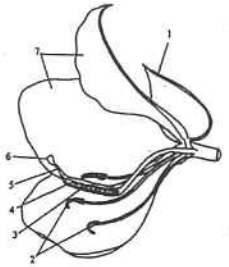


90-43
The daughter plant developed from structure A
(1) possesses the same genotype as the parent plant.
(2) has the same chromosome number as the parent plant.
(3) can carry out sexual reproduction.
A. (1) only
B. (3) only-
C. (1) and (2) only
D. (1), (2) and (3)

90-44
Which of the following provides the major source of food for the development of the daughter plant from structure A?
A. P
B. Q
C. R
D. S

90-52
Which of the following is/are true for sexual reproduction?
(1) It always involves two different parents.
(2) The resulting offspring are genetically different.
(3) The resulting offspring are always healthy.
A. (1) only
B. (2) only
C. (1) and (2) only
D. (2) and (3) only

91.
Directions: Questions 31 to 33 refer to the diagram below which shows a section of a flower:



91-31
Structures 1 and 5 are

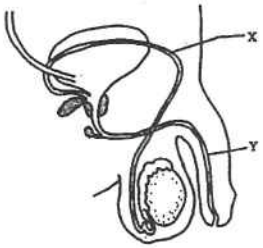
	Structure 1	Structure 5
A.	sepal	style
B.	petal	stigma
C.	sepal	stigma
D.	petal	style

91-32
Which of the following characteristics shown in the diagram indicate that the flower is insect-pollinated?
(1) Structures 2 and 6 are enclosed within structure 7.
(2) Structure 4 occurs in small numbers.
(3) Structure 7 is large and conspicuous.
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

91-33
Which structures will usually wither after fertilization?
A. 1, 2, 3 and 5
B. I, 3, 6 and 7
C 2, 5. 6 and 7
D. 3, 5, 6 and 7

91-34
The following events are involved in the process of giving birth to a baby:
(1) The placenta is detached and expelled from the uterus.
(2) The umbilical cord is tied and cut.
(3) The cervix dilates.
(4) The baby is pushed out.
(5) The uterus contracts rhythmically causing the amniotic membrane to rupture.
Which of the following is the correct order?
A. (1), (3), (4), (5), (2)
B. (1), (5), (3), (4), (2)
C. (3), (4), (5),(2), (1).
D. (5), (3), (4), (2), (1).

91.
Directions: Question 35 end 36 refer to the diagram below which shows part of the male urinogenital system of man:



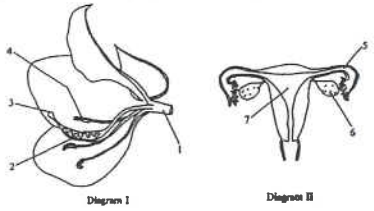
91-35
Structures X and Y are

	Structure X	Structure Y
A.	Sperm duct	Urethra
B.	Urethra	Sperm duct
C.	Ureter	Sperm duct
D.	Sperm duct	Ureter

91-36
If duct X is blocked, which of the following is true?
A. no urination
B. no sperm in the semen
C. no sperm production
D. no sex hormone production

92-36
Which of the following are advantages of seed dispersal?
(1) It reduces competition.
(2) It prevents the spread of diseases.
(3) It increases the chances of genetic variations.
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

92.
Directions: Questions 37 and 38 refer to the diagrams below. Diagram II shows a longitudinal section of a flower. Diagram II shows a section of the human female reproductive system.



92-37
Where dots fertilization normally occur?

	Diagram I	Diagram II
A.	3	5
B.	2	5
C.	3	7
D.	2	7

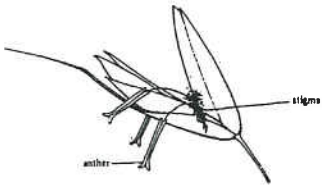
92-38
Which structure of the flower is comparable to structure 6 in humans?
A. 1
B. 2
C. 3
D. 4

92-40
One of the functions of the placenta of a mammal is to
A. expel the foetus during childbirth.
B. protect the foetus from mechanical injury.
C. allow the mother's blood to flow into the capillary network of the foetus.
D. allow metabolic wastes to pass from the foetal circulation to that of the mother.

92-41
The conditions necessary for germination for all kinds of seeds are
(1) light
(2) water
(3) oxygen
(4) a suitable temperature
A. (1) and (2) only
B. (1), (3) and (4) only
C. (2), (3) and (4) only
D. (1), (2), (3) and (4)

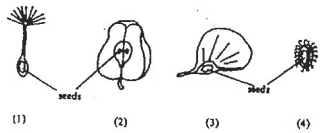
93-44
Which of the following is a male secondary sexual characteristic in humans?
A. production of sperms
B. development of the testis
C. widening of the hip girdle
D. development of stronger muscles

93-45



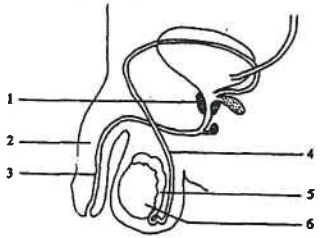
With reference to the above diagram, which of the following characteristics indicates that this flower is adapted to wind pollination?
A. It is s bisexual flower.
B. Its stigma hangs outside the flower.
C. Its anthers lie below the stigma.
D. Its anthers produce numerous pollen gains.

93-46
The diagram below shows sections of four different fruit:



Which of the above fruits carry seeds that are dispersed by animals?
A. (1) and (2)
B. (1) and (3)
C. (2) and (4)
D. (3) and (4)

94-40
The diagram below shows part of the male urinogenital system of man:



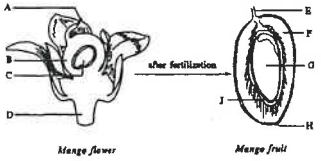
Which of the following is correct?

	Structure for the production of seminal fluid	Structure for transmitting urine	Structure for the production of gametes
A.	1	3	5
B.	2	4	5
C.	1	3	6
D.	2	4	6

94-41
Which of the following statements about birth control methods is correct?
A. A condom can prevent the entry of sperms into the uterus.
B. Cutting the sperm duct / can stop the production of sperms.
C. Contraceptive pills can prevent the implantation of the embryo.
D. The 'natural rhythm' method involves avoiding copulation after menstruation.

94-43
Pollen grains are usually produced to large numbers so that
A. the species can explore new environment:
B. competition among the new plants can be reduced.
C. they can help the dispersal of new plants.
D. they can have a grater chance of reaching other flowers.

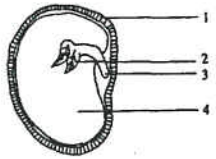
94.
Directions: Questions 44 and 45 refer to the diagrams below which show the flower and the fruit of a mango plant:



94-44
Which of the following statements is correct?
A. E is developed from D.
B. F is developed from C.
C. G is developed from B.
D. H is developed from A.

94-45
Which of the following features helps the dispersal of G?
A. F is fleshy and juicy.
B. G can be carried by the wind.
C. H can stick to the fur of mammals.
D. J is hairy.

94.
Directions: Questions 46 and 47 refer to the diagram below which shows a longitudinal section of a broad bean seed:



94-46
Which of the following occurs when the seed germinates?
A. Structure 1 carries out photosynthesis.
B. Structure 2 is the first part that grows out through structure 1.
C. Structure 3 shows positive geotropism.
D. Structure 4 undergoes rapid growth.

94-47
When the broad bean seed germinates, which of the following is incorrect?
A. the dry mass increase
B. the fresh mass increases
C. the length of the stem increases
D. the length of the root increases

95-42
Which of the following is an example of reproduction involving fertilization?
A. binary fission in amoeba
B. production of spores; in bread mould
C. formation of stem tubers in potato
D. formation of seeds is maize

95.
Directions: Questions 43 and 44 refer to the experiment below which attempted to study the conditions for seed germination. Equal numbers of broad bean seeds were placed in three different pots of soil. The conditions of the pots and the results were as follows:

Pot	Condition			Results after one week
	Water supply	Light	Temperature	
1	✓	✓	25°C	germination occurred
2	x	✓	5°C	no germination
3	x	✓	25°C	no germination

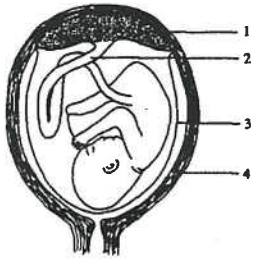
Key : ✓ indicates the presence of the factor concerned
x indicates the absence of the factor concerned

95-43
Based on the above results, germination of broad bean seeds requires
A. water.
B. warmth.
C. water and warmth.
D. water, light and warmth.

95-44
In pot 1, some seeds failed to germinate. What is the most probable reason for this?
A. The seeds were dead.
B. These seeds could not carry out photosynthesis.
C. There was not enough light.
D. The temperature was too high.

95-45
Which of the following is an advantage of vegetative propagation in flowering plants?
A. The daughter plants will develop more rapidly.
B. The daughter plants will show more genetic variation.
C. The daughter plants will not get diseases from the parent.
D. The daughter plants will be better adapted to a changing environment.

95.
Directions: Questions 48 and 49 refer to the diagram below which shows a foetus in the mother's body:



95-48
When the baby is born, which structures will be expelled from the mother's body?
A. 1 and 2 only
B. 3 and 4 only
C. 1, 2 and 3 only
D. 2, 3 and 4 only

95-49
Which structures are responsible for removing waste from the foetus?
A. 1 and 2
B. 1 and 3
C. 2 and 4
D. 3 and 4

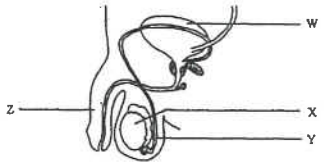
96-39
If both oviducts of a woman are tied up and cut, which of the following is correct?

	Ovulation	Menstruation
A.	✓	✓
B.	X	X
C.	✓	X
D.	X	✓

Key: ✓ - occurs
X - does not occur

96-40
Which of the following birth control methods is the least reliable?
A. using condoms
B. the rhythm method
C. using contraceptive pills
D. tying up the sperm ducts

96.
Directions: Questions 41 and 42 refer to the diagram below which shows part of the urinogenital system of a man:



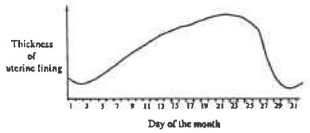
96-41
Which of the following correctly shows the function of structures W, X and Y?

	W	X	Y
A.	Produces urine	Produces sperms	Transfers urine
B.	Produces urine	Produces hormone	Transfers sperms
C.	Stores urine	Produces sperms	Transfers urine
D.	Stores urine	Produces hormone	Transfers sperms

96-42
Which structure increases significantly in size during sexual intercourse?
A. W
B. X
C. Y
D. Z

96-43
Which of the following cannot pass from the maternal blood to the foetal blood through the placenta?
A. antibodies
B. oxygen
C. red blood cells
D. sugars

96.
Directions: Questions 44 and 45 refer to the diagram below which shows the changes in the thickness of the uterine lining of a woman in a certain month:

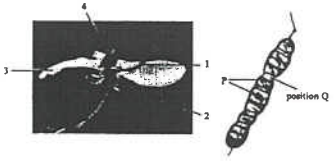


96-44
Menstruation is likely to have occurred during.
A. the 3rd - 7th day.
B. the 10th - 14th day.
C. the 20th - 24th day.
D. the 26th - 30th day.

96-45
Pregnancy might have resulted if sexual intercourse took place during
A. the 3rd - 7th day.
B. the 10th - 14th day.
C. the 20th - 24th day.
D. the 26th - 30th day.

96-46
In which of the following does meiosis occur?
(1) the ovaries
(2) the uterus
(3) the placenta
A. (1) only
B. (3) only
C. (1) and (2) only
D. (2) and (3) only

96.
Directions: Questions 47 to 49 refer to the photographs below which show a flower and a fruit of a local plant:

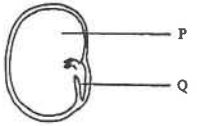


96-47
Which parts of the flower produce gametes?
A. 1 and 3
B. 1 and 4
C. 2 and 3
D. 2 and 4

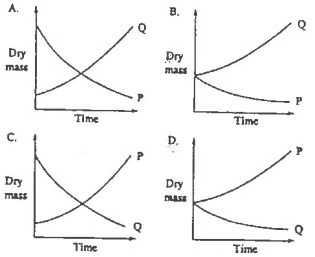
96-48
The fruit develops from part
A. 1.
B. 2.
C. 3.
D. 4.

96- 49
Structure P is not found at position Q. Which of the following are the possible reasons for this?
(1) There was no ovule at position Q.
(2) The ovule at position Q was not fertilized.
(3) The pollen grains did not reach position Q.
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

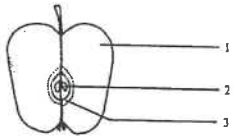
96-50
The diagram below shows the longitudinal section of a bean seed:



Which of the following graphs correctly shows the changes in dry mass of structures P and Q during germination?



96-51
The diagram below shows the vertical section of an apple



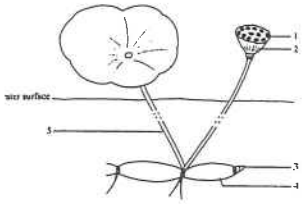
Which of the following structures contain(s) stored food for seed germination?
A. 1 only
B. 2 only
C. 1 and 2 only
D. 1, 2 and 3

97-39
Which of the following are the advantages of seed dispersal?
(1) to reduce competition within a species
(2) to allow the species to explore new environments
(3) to enable the species to become more adaptable to a changing environment
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

97-40
Which of the following combinations is incorrect?

	Human structure	*Function*
A.	ovary	to produce eggs
B.	testis	to produce hormones
C.	seminal vesicle	to store sperms
D.	mammary gland	to produce milk

97.
Directions: Questions 42 and 43 refer to the diagram below which shows part of a lotus plant:

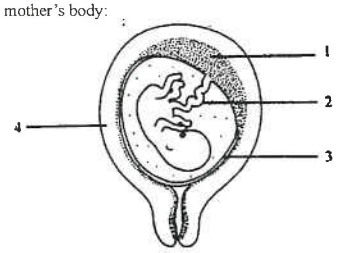


97-42
Both structures 1 and 3 can give rise to new plants. Which of the follow following comparisons between the two ways of reproduction is incorrect?

	Reproduction by structure 1	*Reproduction by structure 3*
A.	results in genetic variations	no genetic variation
B.	relies on external agent	does not need external agent
C.	both can prevent overcrowding of offspring	
D.	both can enable the plant to survive adverse conditions	

97-43
Which structures store food for the development of new plants?
A. 1 and 4
B. 1 and 5
C. 2 and 4
D. 2 and 5

97.
Directions: Questions 44 and 45 refer to the diagram below which shows a foetus in the mother's body:



97-44
Which of the following are the functions of structures 1, 2 and 3?

	Structure 1	Structure 2	Structure 3
A.	food supply	gaseous exchange	protection
B.	protection	food supply	gaseous exchange
C.	food transport	protection	gaseous exchange
D.	gaseous exchange	food transport	protection

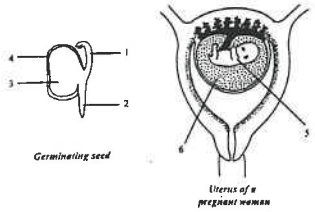
97-45
Which structures have the same genotype in their cells?
A. 2 and 3 only
B. 2 and 4 only
C. 3 and 4 only
D. 2, 3 and 4

97-46
Which of the following comparison of the two birth control methods used by women is correct?

	Contraceptive pills	Tying up of oviducts
A.	ovulation occurs	no ovulation
B.	no implantation of embryo	implantation of embryo occurs
C.	no menstruation	menstruation occurs
D.	easy to cancel its contraceptive effect	hard to cancel its contraceptive effect

97-47
Arrange the following events of the birth process in the correct sequence.
(1) expulsion of placenta
(2) breaking of amnion
(3) dilation of cervix
(4) expulsion of foetus
(5) cutting of umbilical card
(6) onset of labour
A. (3), (2), (6), (4), (1), (5)
B. (3), (6), (4), (2), (1), (5)
C. (6), (2), (4), (3), (5), (1)
D. (6), (3), (2), (4), (5), (1)

98.
Directions: Questions 35 and 36 refer to the diagrams below which show a section of a germinating seed and the uterus ore pregnant woman:



98-35
Which structures of the germinating seed are comparable to structure 5?
A. 1 and 2
B. 2 and 3
C. 3 and 4
D. 4 and 1

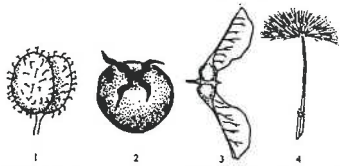
98-36
Which of the following correctly states the function of structure 3 and fluid 6 at the stage of development shown above?

	Structure 3	*Fluid 6*
A.	for protection	for gaseous exchange
B.	for supplying food	for gaseous exchange
C.	for protection	for protection
D.	for supplying food	for protection

98-37
Arrange the following processes of human reproduction in the correct sequence:
(1) copulation
(2) fertilization
(3) meiosis
(4) pregnancy
A. (2), (1), (4), (3)
B. (2), (3), (1), (4)
C. (3), (1), (2), (4)
D. (3), (2), (1), (4)

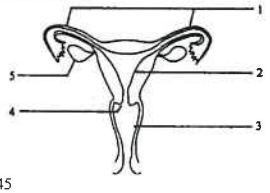
98-40
Which of the following organisms can produce offspring from a single parent?
(1) bread mould
(2) African violet
(3) yeast
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D: (1), (2) and (3)

98-42
The diagram below shows four types of fruits:



Which fruits above carry seeds that are dispersed by animals?
A. 1 and 2
B. 2 and 3
C. 3 and 4
D. 4 and 1

98.
Directions: Questions 45 and 46 refer to the diagram below which shows the human female reproductive system:

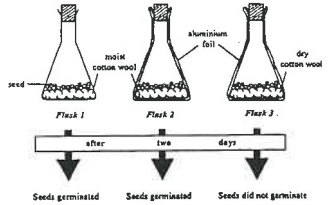


98-45
Which of the following combinations of birth control methods and their site of action is correct?

	Birth control method	Site of action
A.	female condom	2
B.	contraceptive pills	3
C.	diaphragm	4
D.	sperm-killing chemicals	5

98 - 46
If both structures labelled 1 are tied up and cut, which of the following will not occur?
(1) fertilization
(2) menstruation
(3) formation of ova
A. (1) only
B. (3) only
C. (1) and (2) only
D. (2) and (3) only

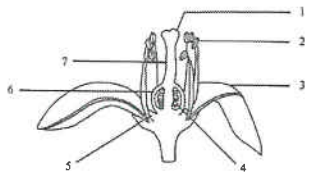
98.
Directions: Questions 47 and 48 refer to the diagram below which shows three flasks set up by a student to investigate the conditions necessary for seed germination. The flasks were kept at 30°C.



98-47
What conclusion can be drawn from the results above?
A. Light is necessary for germination.
B. Water is necessary for germination.
C. 30°C is the optimum temperature for germination.
D. No conclusion can be drawn.

98-48
The seedlings in flask 2 died after one week. Which of the following are possible reasons for this?
(1) The stored food is used up.
(2) The seedlings cannot carry out photosynthesis.
(3) Auxins in the seedlings are destroyed in darkness.
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

99. Directions: Questions 41 to 43 refer to the diagram below, which shows the longitudinal section of a flower:

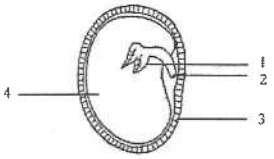


99-41
Meiosis occurs in
A. 1 and 4.
B. 1 and 6.
C. 2 and 4.
D. 2 and 6.

99-42.
Fertilization may take place in
A. 1.
B. 4.
C. 6.
D. 7.

99-43
Which structures would be reduced or absent in a wind-pollinated flower?
A. 1 and 2
B. 1 and 3
C. 2 and 5
D. 3 and 5

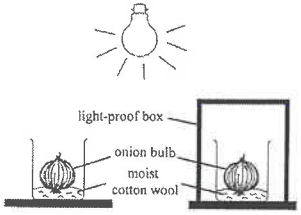
99.
Directions: Questions 44 and 45 refer to the diagram below, which shows a section of a broad bean:



99-44
Which parts of the broad bean are formed from the fertilized egg?
A. 1 and 2 only
B. 3 and 4 only
C. 1, 2 and 4 only
D. 1, 2, 3 and 4

99-45
Which part of the broad bean would be stained blue-black by iodine solution?
A. 1
B. 2
C. 3
D. 4

99
Directions: Questions 47 to 49 refer to the diagram below, which shows a set-up used by Eric in an experiment. After one week, he noted whether the onion bulb in each beaker had germinated into a new plant.



99-47
This experiment was designed to find out whether the development of new plants from the onion bulbs required
A. light.
B. water.
C. light and water.
D. light or water.

99-48
If the onion bulbs in both beakers germinate after one week, what conclusion can be drawn?
A. Light is not necessary for the germination of onion bulbs.
B. Water is not necessary for the germination of onion bulbs.
C. Either light or water is necessary for the germination of onion bulbs.
D. No conclusion can be drawn.

99-49
If the onion bulbs in both beakers do not germinate after one week, what conclusion can be drawn?
A. Light is not necessary for the germination of onion bulbs.
B. Water is not necessary for the germination of onion bulbs.
C. Besides light and water, other factors are necessary for the germination of onion bulbs.
D. No conclusion can be drawn.

00-16
What would happen to a man if his sperm ducts were tied and cut?
A. No sperms would be produced.
B. No sex hormones would be produced.
C. His voice would become high-pitched.
D. He would become sterile.

00.
Directions: Questions 37 to 39 refer to the passage below:

Test tube babies

Some couples are unable to have children. This problem may now be solved by the technique of in vitro fertilization (IVF).

Before undergoing the IVF, a woman is given hormones to stimulate a large number of eggs to develop and mature simultaneously in her ovaries. Several eggs are then collected by suctioning through a hollow needle. They are transferred to a petri dish with a nutrient solution and a sample of semen. The fertilized eggs are allowed to develop for two to three days, by which time they have reached the eight- or sixteen-cell stage. Several of these embryos are then placed into the woman's uterus.

00-37
Which of the following are the possible causes of infertility in married couples?
(1) The sperm count is low.
(2) The oviducts are blocked.
(3) The duration of the menstrual cycle is not constant.
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

00-38
In IVF, fertilization occurs in
A. the oviduct.
B. the uterus.
C. the needle.
D. the petri dish.

00-39
The doctor has to wait for two to three days before transferring the embryos into the woman's uterus. This is to
A. allow time for fertilization to occur.
B. allow the embryos to obtain sufficient nutrients.
C. make sure that the uterus is ready for the implantation of the embryos.
D. ensure that the embryos to be placed into the uterus are developing normally.

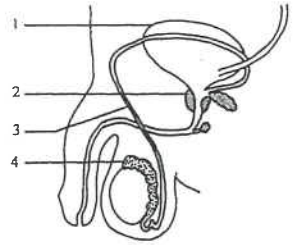
00-51
Potato plants can be reproduced by seeds or by stem tubers. Stem tubers are organs for vegetative propagation. Which of the following comparisons between these two methods of reproduction is correct?

		Seed	Stem tuber
A.	Genetic variation in offspring	less	more
B.	Chromosome number of the cells of offspring	haploid	diploid
C.	Chance of dispersal of offspring	smaller	greater
D.	Chance of passing infectious diseases to offspring	smaller	greater

00-54
Which of the following are the functions of the amniotic fluid in humans?
(1) It acts as a shock absorber.
(2) It provides nutrients to the embryo.
(3) It protects the embryo from desiccation.
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

01-21
A fertilized ovum differs from an ovum in that it
A. has two cells.
B. is double in size.
C. divides by meiosis.
D. contains more DNA.

01.
Directions: Questions 33 and 34 refer to the diagram below, which shows part of the urinogenital system of a man:



01-33
Which of the following structures contribute to the content of semen?
A. 1 and 3
B. 1 and 4
C. 2 and 3
D. 2 and 4

01-34
Which of the following may still occur after structure 3 on both sides of the body are tied up and cut?
(1) production of sperms
(2) production of seminal fluid
(3) production of male sex hormone
A. (1) and (2) only
B. (1) and (3) only

C. (2) and (3) only
D. (1), (2) and (3)

01-35
Which of the following can pass from the maternal blood to the foetal blood through the placenta?
(1) antibody
(2) nicotine
(3) red blood cell
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

01-36
The foetus in the uterus obtains oxygen through
(1) its lungs.
(2) the amnion.
(3) the placenta.
A. (1) only
B. (3) only
C. (1) and (3) only
D. (2) and (3) only

01-37
What is the function of contraceptive pills?
A. to prevent ovulation
B. to increase the thickness of the uterine lining
C. to stimulate the development of the mammary glands
D. to maintain a high level of sex hormones in the blood

02-18
Which of the following is a similarity between a human sperm and a male gamete of a flowering plant?
A. Both are motile.
B. Both have a tail.
C. Both are haploid.
D. Both determine the sex of the offspring.

02-20
Which of the following comparisons between the reproductive methods of yeast and Bauhinia is incorrect?

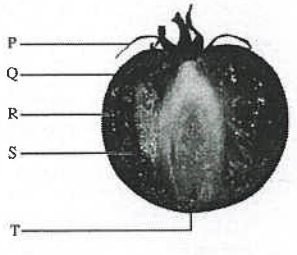
	Budding of yeast	Seed formation in Bauhinia
A.	involves only one sex	involves two sexes
B.	meiosis not involved	meiosis involved
C.	involves one type of gametes	involves two types of gametes
D.	offspring genetically identical to parents	offspring genetically different from parents

02-24
Just before undergoing binary fission, an amoeba will
(1) store a lot of water.
(2) duplicate the chromosomes.
(3) double the amount of cytoplasm.
A. (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

02-25
Normally, a woman discharges bloody fluid from her uterus for several weeks after giving birth. Which of the following is the reason for this?
A. The remaining amniotic fluid is released from the uterus.
B. The blood of the woman cannot clot properly.
C. Menstruation re-starts after giving birth.
D. The thickened uterine lining is shed.

02-55
Some pollen grains of a mango tree are transferred to the stigma of another mango tree. Which of the following statements about the pollen grains of the mango tree is/are correct?
(1) They are the male gametes.
(2) They help in the dispersal of mango plants.
(3) They help to transfer genetic materials from one mango tree to another.
A. (1) only
B. (3) only
C. (1) and (2) only
D. (2) and (3) only

02.
Directions: Questions 57 and 58 refer to the diagram below, which shows a section of a tomato:



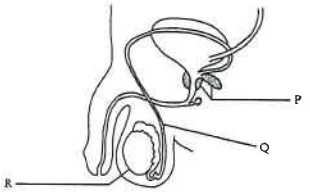
02-57
Which part(s) of the tomato helps in the dispersal of S?
A. P only
B. R only
C. P and Q only
D. P, Q and R

02-58
T is a scar on the surface of the tomato. Which of the following gives rise to T?
A. detachment of the flower stalls
B. detachment of the petals
C. detachment of the stamens
D. detachment of the style

03-18
Which of the following are genetically identical?
A. pollens of the same flower
B. seeds in the same fruit
C. stem cuttings from the same *Coleus* plant
D. maize grains on the same cob

03-42
A pair of identical twins are developed from
A. an egg which has fused with a sperm.
B. an egg which has fused with two sperms.
C. two eggs which have fused with a sperm.
D. two eggs which have fused with two sperms.

03.
Directions: Questions 44 and 45 refer to the diagram below, which shows part of the urinogenital system of a man:



03-44
The following statements describe the functioning of structures P and R at different stages of a man's life. Which one is correct?
A. At age 4, structures P start to secrete seminal fluid.
B. At puberty, structures P start to secrete male sex hormones.
C. From puberty to age 50, structure R releases sperms once a month.
D. After age 50, structure R still produces sperms.

03-45
Which of the following will occur after structure Q has been tied and cut?
A. The breasts will enlarge.
B. Structure R will shrink in size.
C. Pubic hair will become thinner.
D. The semen will contain no sperms.

03-54
Cross pollination is the transfer of pollens from one plant to another plant of the same species. It may be beneficial to the plant species because it leads to
A. greater genetic variation.
B. wider dispersal of the species.
C. the production of more seeds.
D. the elimination of alleles for undesirable characters.

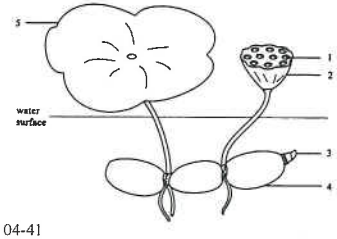
03.
Directions: Questions 58 and 59 refer to the diagrams below, which show the human female reproductive system and the carpel of a flower:

03-58
Which of the following pairs of structures and their roles in reproduction are correctly matched?

	Structures	*Role*
A.	1 and 8	the site of fertilization
B.	2 and 7	the site of gamete production
C.	3 and 7	for supplying food and oxygen to the embryo
D.	4 and 5	for protecting the male gametes

03-59
Which of the following parts will increase greatly in size after fertilization?
A. 1 and 8
B. 2 and 5
C. 3 and 7
D. 4 and 6

04.
Directions: Questions 41 and 42 refer to the following diagram of a lotus plant:

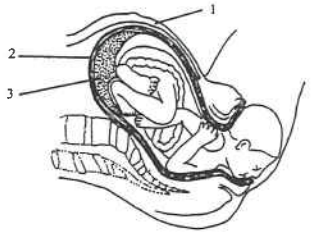


04-41
Among the following structures, which has a different genotype?
A. 1
B. 2
C. 3
D. 4

04-42
Which part of this plant produces food for the development of 3?

A. 1
B. 2
C. 4
D. 5

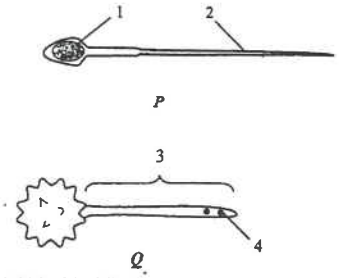
Directions: Questions 47 and 48 refer to the diagram below, which shows a foetus in the mother's body:



04-47
Which of the following help(s) to expel the foetus from the mother's body during birth?
A. 1 only
B. 2 only
C. 1 and 2 only
D. 1, 2and 3

04-48
Which of the following ***cannot*** pass through 3 from the mother's blood to the foetus?
A. alcohol
B. antibodies
C. haemoglobin
D. urea

04-55
P and Q in the diagram below are the reproductive structures of a mammal and a flowering plant respectively.



Which of the following comparisons between P and Q is correct?
A. Both P and Q are male gametes.
B. Both structures 1 and 4 carry the Y chromosome.
C. Both structures 1 and 4 contain the same number of chromosomes.
D. Both structures 2 and 3 enable the male gamete to meet the female gamete.

05-27
A human egg is much smaller than a chicken's egg. This is because
A. the human egg is fertilized inside the mother's body.
B. the human egg has to develop in the uterus after fertilization.
C. the human egg supplies food only for the early stage of embryo development.
D. the human embryo takes a much longer time to develop into a baby.

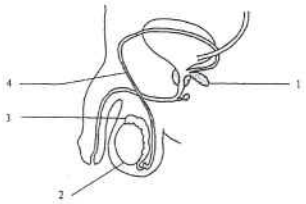
05-32
Some women have to take pills containing iron during pregnancy. The purpose is
A. to replace the iron lost during menstruation.
B. to ensure the mother's milk contains enough iron.
C. to supply iron for the development of the foetal skeleton.
D. to provide iron for the formation of foetal red blood cells.

05-34
The following is a calendar for the month of May:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

A woman predicts that her next menstrual flow will start on 25th May. She would have a higher chance of becoming pregnant if she has sexual intercourse between
A. 1st and 7th May.
B. 8th and 15th May.
C. 15th and 21st May.
D. 28th and 31st May.

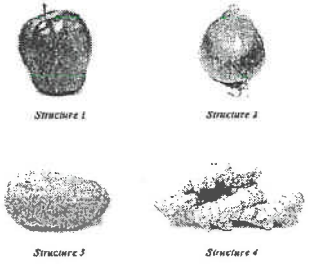
Directions: Questions 35 and 36 refer to the diagram below:



05-35
Which structure is responsible for the storage of mature sperms?
A. 1
B. 2
C. 3
D. 4

05-36
If structure 4 were tied and cut, which of the following would occur?
A. The semen would not contain any sperms.
B. The testes would stop producing sperms.
C. The voice of the man would become high-pitched.
D. The man would fail to ejaculate during sexual intercourse.

Directions: Questions 37 and 38 refer to the following photographs of four different plant structures:

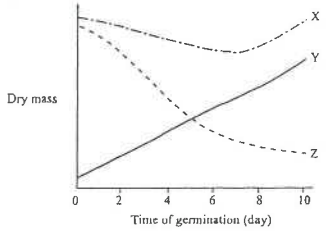


05-37
Which of these structures is *not* an organ for vegetative propagation?
A. 1
B. 2
C. 3
D. 4

05-38
All the four structures have
(1) buds.
(2) seeds.
(3) stored food.
A. (2) only
B. (3) only
C. (1) and (2) only
D. (1) and (3) only

05-49
Flowering plants may reproduce by forming stem tubers, rhizomes, bulbs or corms. These ways of reproduction are said to be asexual because
A. no fertilization takes place.
B. only one parent is involved.
C. they occur under favourable conditions.
D. they produce offspring that are similar to the parents.

Directions: Questions 53 and 54 refer to the graph below, which shows the changes in dry mass of a bean seedling, the cotyledons and the plumule of the same seedling during the early stages of germination:

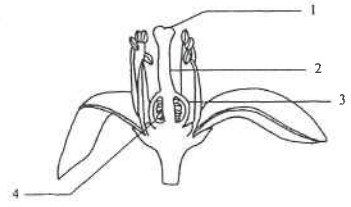


05-53
Which curves represent the changes in dry mass of the whole seedling and the cotyledons?

	Whole seedling	*Cotyledons*
A.	*X*	*Y*
B.	*X*	*Z*
C.	*Y*	*X*
D.	*Y*	*Z*

05-54
In which period is the photosynthetic rate of the seedling higher than its respiration rate?
A. day 1 to day 5
B. day 1 to day 10
C. day 5 today 10
D. day 7 today 10

Directions: Questions 55 and 56 refer to the diagram below, which shows a longitudinal section of a flower:

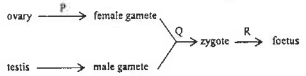


05-55
Fertilization occurs in structure
A. 1.
B. 2.
C. 3.
D. 4.

05-56
The flower produces numerous pollen grains. What is the importance of this?
A. to attract insects
B. to disperse the offspring
C. to increase the chances of fertilization
D. to increase the variation of the species

05-57
Which of the following are advantages of breast-feeding?
(1) Mother's milk contains the right amount of protein and fat.
(2) Mother's milk contains enzymes to help digesting the food.
(3) Mother's milk contains antibodies that provide immunity to the baby.
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

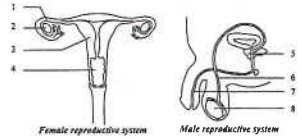
06.
06-29
The following flowchart shows the main processes involved in human reproduction:



The contraceptive methods used at P, Q and R for birth control could be

	P	Q	R
A.	contraceptive pills	condom	intra-uterine device
B.	intra-uterine device	contraceptive pills	spermicide
C.	contraceptive pills	spermicide	condom
D.	spermicide	condom	intra-uterine device

Directions: Questions 30 and 31 refer to the diagrams of the human reproductive systems below.



Female reproductive system

Male reproductive system

06-30
Which of the following structures serve similar functions?
A. 1 and 6
B. 2 and 5
C. 3 and 7
D. 4 and 8

06-31
Which of the following will be affected if 3 is removed?
(1) fertility
(2) ovulation
(3) implantation
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

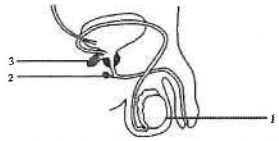
06-32.
Which of the following descriptions about tubal ligation and vasectomy (i.e. tying and cutting of oviducts and sperm ducts respectively) is correct?
A. Sperms are still produced after vasectomy.
B. Pregnancy is impossible after vasectomy.
C. There is no menstruation after tubal ligation.
D. The secondary sexual characteristics will be affected after tubal ligation.

06-57
Which of the following processes concerning reproduction in flowering plants will lead to variation in offspring?
(1) formation of gametes
(2) fusion of gametes from the same plant
(3) fusion of gametes from two plants of the same species
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

06-59
Which of the following descriptions about reproduction is correct?
A. Sexual reproduction must involve two parents.
B. Sexual reproduction must require a water medium for fertilization.
C. Asexual reproduction always produces more offspring than sexual reproduction.
D. Offspring produced by asexual reproduction are better adapted to their natural environment than those produced by sexual reproduction.

06-60
Which of the following correctly describes pollen grains and sperms?
A. They are motile.
B. They are haploid.
C. They are male gametes.
D. They both carry the Y chromosome.

07-15
The diagram below shows part of the urinogenital system of a man:



Which of the following structures contribute to the content of semen?

A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 1, 2 and 3

07-16
Which of the following is a female secondary sexual characteristic?
A. the growth of pubic hair
B. growing taller
C. menstruation
D. acne on face

07-17
Which of the following cannot help the sperm to get into the uterus during sexual intercourse?

A. contraction of the uterus
B. contraction of the sperm duct
C. beating action of the sperm tail
D. beating action of the cilia on the oviduct

07-18
Which of the following substances will diffuse from maternal blood to foetal blood through the placenta?

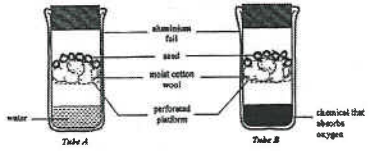
A. urea
B. oxygen
C. carbon dioxide
D. blood platelets

07-52
A couple, who have already had three children, decided not to have babies in the future. Which of the following contraceptive measures is most reliable?

A. restricting sexual intercourse to safe periods
B. tying and cutting the oviducts
C. using a diaphragm
D. using a condom

07-53
Amniotic fluid cannot provide protection to the foetus against
A. desiccation.
B. mechanical injury.
C. chemical poisoning.
D. sudden change in temperature.

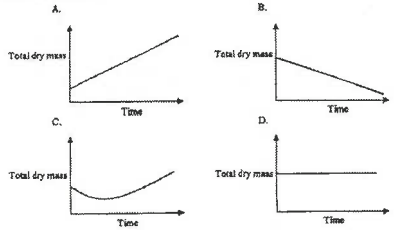
07
Directions: Questions 54 and 55 refer to the diagram below, which shows a set-up used to investigate the conditions for seed germination. The tubes were kept at 30°C. The seeds in tube A germinated while those in tube B did not.



07-54
Based on the design of the set-up, the investigation is to test whether

A. water is necessary for seed germination.
B. oxygen is necessary for seed germination.
C. soil is necessary for seed germination.
D. light is necessary for seed germination.

07-55
Which of the following correctly shows the change in the total dry mass of the germinating seeds in tube A?



Past HKCEE Questions
Reproduction
Suggested Answers

Paper I

1. (i) * B - plumule 0.5
* C - cotyledon 0.5
* E -buds 0.5
* G - stem 0.5

(ii) B - it develops into a new shoot 1
C - it stores / supplies food for developing new plant 1

(iii) (1) E (not named or with other letters) 1
(2) D (not named or with other Letters) 1

	(1) A	(2) E	
(iv) Cell division	meiosis	mitosis	1
(v) genotype	different	same	1,1

(vi) overcrowding / competition 1

2. (i) by active movement / movement of its tail 1

(ii) by passive movement / ciliary action / muscular contraction of oviduct 1

(iii)

Zygote	sperm
Diploid	Haploid
2n	n
Twice as many	Half as many

(any 1) 1

(iv) (1) mitosis 1
(2) maintain / preserve the chromosome number constant 1

(v) thickened / blood vessels increased (placenta formation NOT acceptable) 1

(vi) placenta 1

(vii) (1) reduces friction / lubricates passage 1
(2) expels foetus by contraction 1

3.

(i)

(1) D	(2) F	
water / seminal fluid	air	1,1
swims / propelled by muscular contraction of the genital tract	carried by air current / animals	1,1

(ii) this increases the chance of successful reproduction / compensates for loss 1

(iii) anthers hanging outside the flower 1

(iv) E - provide male gametes / are carriers of pollen grains for fertilization / sexual reproduction 1
F - are spores 1
which can develop directly into new organisms / for asexual reproduction 1

4. (i)
- with food supplied from the corm
- buds develop into aerial shoots
- carry out photosynthesis
- storage of excess food in base of stems
- to form daughters corms

any 4 (1 x 4) 4

(ii) food storage / pass over unfavourable periods (winter) / perennation 1

(iii) No 1
any 1 below: 1
- the stamens / stigma are not out
- the stigma is not feathery

(iv) A - dries up / withers / falls off 1
B - forms fruit wall / fruit 1

(v) (1) get flowers / new plants more easily / rapidly 1
maintain the desired quality of the flowers 1
(2) variation occurs / may give rise to flowers of a better quality 1

5. (i) production of eggs 1
secretion of hormones 1

(ii) (1) the union of male and female gametes 1
(2) B 1

(iii) (1) the egg and the sperms cannot reach each other 1
(2) Any 1 below: 1
- to ensure that the fertilized eggs develop into embryos
- to ensure that the embryo is ready for implantation
- to ensure that the uterine wall is ready for implantation

(3) to allow the formation of a placenta / for implantation of embryo 1
for gaseous exchange / nutrition / excretion of the embryo 1
and for protection of the embryo 1

(4) the baby is, in fact, developing inside the uterus of the mother for most of the time 1

6. (i) tube 3 1

(ii) is a passage for sperms / semen and urine 1

(iii) D is for reproduction / production of sperms 1
A is for excretion / osmoregulation which is essential for the maintenance of a constant internal environment / prevents accumulation of toxic materials 1

(iv) B 1
The elasticity of B enables the temporary stowage of urine 1
C 1
Erection of C facilitates the transfer of sperms / semen into the female reproductive tract 1

7. (i) (1) Water is necessary for seed germination 1
only the seeds in B germinate 1
B differs from A by the supply of water 1

(2) no conclusion can be drawn since C differs from B by the absence of oxygen and light
the 2 set-ups differ in more than one variable
(any 1)

(ii)
- to soften seed coat to facilitate emergence of the radicle
- to swell the seed to rupture seed coat
- to activate enzymes to hydrolyse (digest) stored food / speed up cellular activity
- as a medium for transport of food
- to hydrolyse stored food for transport

any 2 pairs (2 x 2) 4

(iii) the stored food is oxidized / respired to release energy for growth 1

8. (i) April 23 (+/-3 days) 1
because it was most likely that ovulation occurred on April 23 1
April 10 to April 14/15 (and May 8) 1

(ii) The uterine wall broke down / decreased in thickness 1

(iii) to repair the uterine wall / to prepare for the implantation of the embryo 1

(iv) The oviducts are tied and cut
no effect on secondary sexual characteristics 1
because sex hormones can still be produced by ovaries 1
and being transported by blood to the target organs to exert their effects 1

9. (i) Through placenta (structure A), 1
nutrients diffuse from the maternal blue into the foetal blood 1
and carried by the umbilical cord to the foetus 1

(ii) * amniotic fluid 1
any 2 (1, 1) 2
- act as shock absorber to protect the foetus from mechanical damage
- prevent desiccation of the foetus
- maintain a relatively constant environment around the foetus
- allow the foetus to move freely / support the foetus inside the uterus

(iii) A will be expelled out of the woman's body by the contraction of the uterus 1

(iv) Milk is rich in protein 1
which is important for the growth of the foetus 1
Milk is rich in vitamin D / calcium 1
which is important for the development of bones and teeth of the foetus 1

10. (i) (1) Diameter
= 5.3 (5.0 to 5.5) X 0.03mm 1
= 0.159 mm (0.150 mm to 0.165 mm) 1
(no unit, no mark)
(2) because cell A contains food store 1
(ii) (1) * ovary 1
(2) * testis 1
(iii) (1) fertilization
(2) any 2 points (1, 1) 2
- It forms a zygote
- which will develop into a new individual
- It combines the genes from both parents
- to result in genetic variation in the offspring
- It restores the diploid chromosome number
- which has been reduced to half by meiosis during gamete formation / so as to maintain the chromosome number of the species constant

(iv) The penis becomes-erect 1
and it is inserted into the vagina 1
Semen is then ejaculated 1

11. (i) (1) insect 1
(2) Any 2 points (1, 1) 2
- A is club-shaped/has a broad tip
- to receive pollen grains
- on the insect body
- Presence of nectary / D
- which produces sugary secretion / nectar to attract insects
- C is relatively large in size
- to attract insects

(ii) (1) Animal dispersal 1
(2)
- The fruit has fleshy portion / E is fleshy and juice
- The fruit has a good smell taste
- The outer skin of the fruit is in bright colour to attract animals to eat the fruit

Any 1 above 1

Because cells in tissue E are formed from cells/ovary wall of the mother plant only 1
while cells in tissue F are developed from the zygote 1
which contains a combination of genes from two parent plants 1
Communication skill (C) 1

12. (i) (1) to prevent self-pollination / fertilization 1
(2) to prevent any unwanted pollination / fertilization from 1
(ii) The pollen grains germinate and develop pollen tubes 1
which carry the male gametes towards the ovules 1
The male gamete fuses with the egg to form the e zygote 1
Communication skill (C) 1
(iii) Parents with selected characters are crossed 1
so that offspring with desirable characters can be produced 1
(iv) The desired quality of the plant can be maintained 1
because the daughter plants produced from the tubers are genetically identical to the parent 1
The daughter plants can develop faster / they have a greater chance to develop 1
as more food is available in the tuber for the development / the development is more independent of environmental conditions 1

13. (i) Cell C contains a diploid set of chromosomes 1
because is nucleus / chromosomes comes from cell A 1
which is a body / diploid cell 1
(ii) Because the cytoplasm of cell D is formed by repeated divisions 1
of the cytoplasm of cell C / without cell enlargement 1
(iii) Sheep X 1
Because the body characteristics of Dolly is determined by its genetic material, 1
which is derived from and identical to that in the body cell of sheep X 1
(iv) No 1
because the process does not involve the fertilization of gametes 1

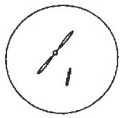
14. (i) The muscular wall of the uterus contracts I
rhythmically and powerfully 1
to push the baby out of the uterus 1
(ii) Period X 1
Ovulation occurred around period X 1
thus fertilisation might occur after sexual intercourse 1
Besides, around this period, the uterine lining is ready for the implantation of the embryo 1
(iii) The day of ovulation may vary from cycle to cycle 1
The duration of the menstrual cycle of a woman may vary 1

15. (i) any two (1,1) 2
- Presence of insect guide
- Large petals
- Stigma / anthers lie within the flower
- Broad / club-shaped stigma

(ii) (1) *pollen tube 1
(2) It carries the male gamete to meet the female gamete in the ovule 1
(iii) C will develop into the seed 1
which will form a new plant 1
B will develop into the fruit 1
which serves to protect the seeds 1
and helps in seed dispersal 1

16. (i) The plant tissue cannot carry out photosynthesis / produce its own sugar 1
So it needs an external supply of sugar for respiration to release energy 1
and as raw material for growth 1
Effective communication (C) 1
(ii) The genetic make-up of the daughter plants was the same as that of the parent plant 1
because the daughter plants were formed by mitosis of the parent tissue cells 1
(iii) For plant B, the sterilized soil had no microorganisms 1
for recycling the fallen leaves into minerals . 1
After several weeks, the minerals in the soil became exhausted, so insufficient chlorophyll was made 1
(iv) This method is a faster / surer way of producing daughter plants 1
The desirable characteristics of the parent can be retained in the daughter plants 1
(accept other reasonable answers)

17. (i) It forms a physical barrier 1
to prevent sperms from meeting the ovum 1
(ii) AIDS / hepatitis B, C or E / gonorrhea / syphilis (accept other correct answers) 1
(iii) Menstruation will still occur 1
because the operation does not affect the production of the female sex hormone by the ovary 1
and the transport of the hormone by blood 1
Under the influence of the female sex hormone, the uterine lining will get thicker and shed off later 1
Effective communication (C) 1
(iv) Title (T) 0.5
Drawing including cell outline (D) 0.5
Two chromosomes shown i.e. haploid, chromosomes as single thread (1+1) 2



The ovum

18. (i) (1) Tar in cigarette smoke deposits on the surface of the air sacs in the mother's lungs. 1
As a result, less oxygen can be absorbed into the mother's blood hence reducing the oxygen supply to the foetus. 1
(2) Mother's lung → pulmonary vein → heart → aorta → artery to uterus → placenta → umbilical vein → foetus 3
(ii) (1) This results in the discharge of the amniotic fluid 1
which lubricates the passage of the foetus through the vagina. 1
(2) The cervix continues to dilate. 1
The uterus and the abdominal muscles contract strongly to expel the foetus through the vagina. 1

19. (i) (1) Plumule
(2) Stem and leaf
(ii) Amylase hydrolyses the starch stored in 1
the seed into maltose / sugar, 1
which is used for forming new cells 1
and for respiration / release of energy for the growth of the 1
seedling.

(iii) The seedling has developed green leaves. 1
The rate of photosynthesis of the leaves is greater than the rate of respiration of the seedling, 1
so there is a net gain in the amount of organic substances / new cells are produced. 1

20. (i) Both of them are based on the use of a barrier / prevent the sperms from meeting the egg. 1
(ii) IUD prevents the implantation of the embryo. 1
(iii) (1) Egg and sperms are viable for only a few days once they are released. 1
The rhythm method is to avoid having intercourse around the time of ovulation, 1
so that sperms and egg will have no chance of meeting each other. 1
(2) Because it is hard to predict the time of ovulation accurately. 1
(iv) Any two: 2
- Time of intercourse does not necessarily fall in the period around ovulation.
- Gametes produced may not be viable / may be defective.
- Oviducts of some women may be blocked.
- The sperm count of the husbands is too low.

(v) This is because the development of secondary sexual characteristics is controlled by the male sex hormone, 1
which is still produced by the testes and transported in the blood after the operation. 1
1

21. (i) (1) *amnion 1
(2) Any 2 1,1
Fluid X helps to protect the foetus from mechanical shock) / It can prevent desiccation of the foetus / It allows movement of the foetus in the uterus / It can maintain a constant internal environment for the growth of the foetus
(ii) To allow time for obtaining enough foetal cells for analysis 1

(iii) Any 2 from the same set 1,1
Continue with pregnancy: (accept other reasonable answers)
- the foetus has life; we have no right to terminate the life of an individual)
- people with Down Syndrome can lead a quality and meaningful life
- abortion may have potential risk to the mother and may have psychological impact) on the mother

End pregnancy: (accept other reasonable answers)
- the child may become a burden to his / her parents / society as it needs more care
- the child may be discriminated due to his physical / mental disabilities

(iv) Under the microscope, if two X chromosomes are found / the sex chromosomes are identical, the foetus is a female 1
If an X and a Y chromosome are found / the sex chromosomes are different, the foetus is a male 1

22. (a) 4th to 8th March 1
There is a great drop in the thickness of the uterine lining in this period 1
(b) 12th to 21st March 1
The rise in body temperature indicates that / Uterine lining is thickened and ready for implantation 1
ovulation occurs at around day 17
Also, sperms and the egg can survive for a couple of days in the female reproductive tract 1
If sexual intercourse occurs in this period, there is a high chance of pregnancy 1
Effective Communication (C) 1
(c) This method only allows her to detect ovulation when there is a rise in the body temperature 1
But it fails to predict the fertile period before ovulation 1

23. (a) (i) R: * filament 1
S: * ovary / ovule 1
(ii) Insect pollination 1
Any 2 reasons below: 1+1
- Large / brightly coloured petal
- Anther / stigma located inside flower
- Presence of insect guide

(iii) Pollen grain develops to form a pollen tube 1
Pollen tube carries the male gametes 1
down the style to the ovary / and digests the tissues of the style 1
and releases the stale gametes into the ovule 1
(iv) Vegetative propagation 1

Paper II

90-22	C
90-43	D
90-44	D
90-52	B
91-31	A
91-32	B
91-33	C
91-34	D
91-35	A
91-36	B
92-36	A
92-37	B
92-38	B
92-40	D
92-41	C
93-44	D
93-45	B
93-46	C
94-40	C
94-41	A
94-43	D
94-44	A
94-45	A
94-46	C
94-47	A
95-42	D
95-43	A
95-44	A
95-45	A
95-48	C
95-49	A
96-39	A
96-40	B
96-41	D
96-42	D
96-43	C
96-44	D
96-45	B
96-46	A
96-47	B
96-48	A
96-49	A
96-50	A
96-51	B
97-39	A
97-40	C
97-42	C
97-43	A
97-44	D
97-45	A
97-46	D
97-47	D
98-35	A
98-36	D
98-37	C
98-40	D
98-42	A
98-45	C
98-46	A
98-47	B
98-48	A
99-41	C
99-42	B
99-43	D
99-44	C
99-45	D
99-47	A
99-48	A
99-49	D
00-16	D
00-37	A
00-38	D
00-39	D
00-51	D
00-54	B
01-21	D
01-33	D
01-34	D
01-35	A
01-36	B
01-37	A
02-18	C
02-20	C
02-24	A
02-25	D
02-55	B
02-57	B
02-58	D
03-18	C
03-42	A
03-44	D
03-45	D
03-54	A
03-58	A
03-59	C
04-41	A
04-42	D
04-47	C
04-48	C
04-55	D
05-27	C
05-32	D
05-34	B
05-35	C
05-36	A

05-37	A
05-38	B
05-49	A
05-53	B
05-54	D
05-55	D
05-56	C
05-57	B
06-29	A
06-30	A
06-31	B
06-32	A
06-57	D
06-59	Deleted
06-60	B
07-15	D
07-16	A
07-17	D
07-18	B
07-52	B
07-53	C
07-54	B
07-55	B