FUKIEN SECONDARY SCHOOL

S5 First Term Uniform Test (2020-2021)

Biology

(1 hour)

Date: 19th October 2020 Name:_____

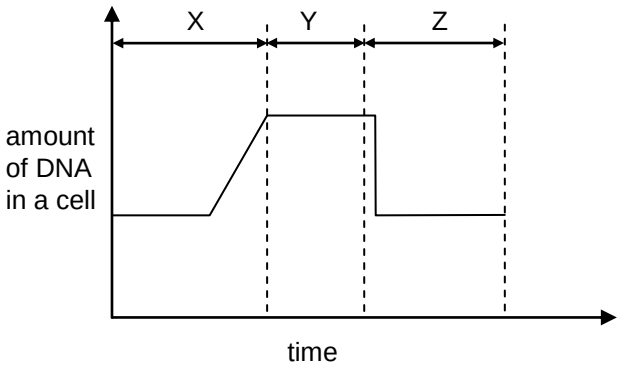
Time: 10:30a.m. - 11:30a.m. Class: _____ No.: _____

Instructions to students:

1. Write your name, class and class number on both the question paper and the answer sheets.
2. Answer ALL questions.
3. Write down all the answers on the answer sheets.
4. Hand in the question paper and the answer sheets at the end of the examination.
5. The total mark of the paper is 60.

I. Multiple Choice Questions (20 marks)

1. The graph below shows the change in the amount of DNA in a cell during one cell cycle.



Which of the following statements about the events that occur in periods X, Y and Z is/are correct?

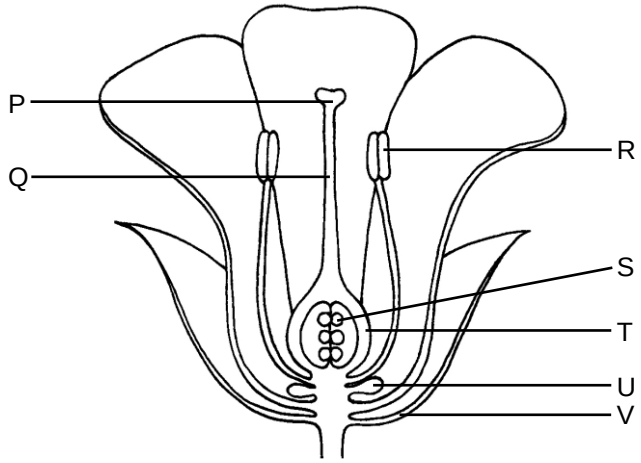
(1) During period X, new organelles are synthesized.
(2) During period Y, crossing over may occur.
(3) During period Z, homologous chromosomes separate and move to the opposite poles of the cell.

A (1) only
B (2) only
C (3) only
D (1) and (3) only

2. If the amount of DNA in a body cell of an organism at prophase of cell division is 1 unit, what is the amount of DNA in a sperm of this organism?
   A 1 unit
   B 1/2 unit
   C 1/3 unit
   D 1/4 unit

3. Anaphase I in meiosis is different from anaphase in mitosis, because anaphase I involves
   A replication of chromosomes to form sister chromatids.
   B replication of chromosomes to form homologous pairs.
   C separation of sister chromatids which then move to opposite poles of the cell.
   D separation of homologous chromosomes which then move to opposite poles of the cell.

Directions: Questions 4 to 6 refer to the diagram below. The diagram shows a longitudinal section of a flower.



4. Pollination of this plant is carried out with the help of
   A insects.
   B wind.
   C water.
   D humans.

5. Fertilization takes place in
   A P.
   B Q.
   C R.
   D S.

6. The parts that continue to develop after fertilization are

A P and R only.
B S and T only.
C T, U and V only.
D P, Q, S and T only.

7. Which of the following descriptions of pollen grains is/are correct?

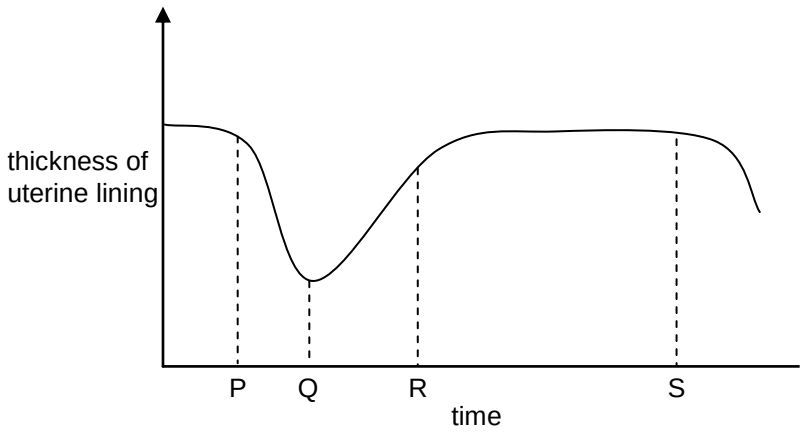
(1) They are male gametes.
(2) They are produced in stamens.
(3) They are all rough and sticky.

A (1) only
B (2) only
C (1) and (2) only
D (2) and (3) only

8. Which of the following is ***not*** an example of asexual reproduction?

A binary fission of bacteria
B formation of coconut fruits
C cutting of African violets
D vegetative propagation of onions

9. The graph below shows the change in the thickness of the uterine lining of a woman in a month.



Ovulation most probably occurs at

A P.
B Q.
C R.
D S.

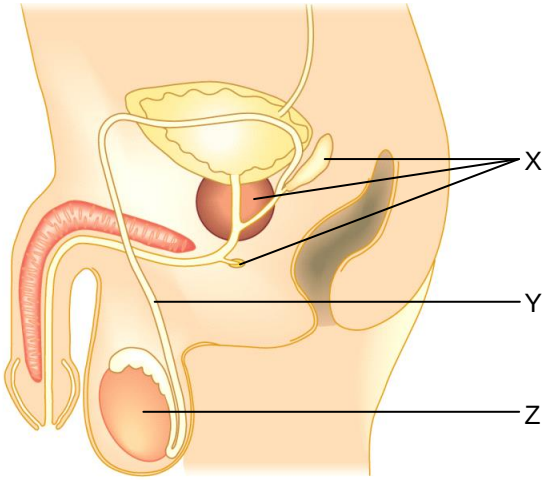
10. The calendar for January is shown below.

Week	Sun	Mon	Tue	Wed	Thur	Fri	Sat
1		1	2	3	4	5	6
2	7	8	9	10	11	12	13
3	14	15	16	17	18	19	20
4	21	22	23	24	25	26	27
	28	29	30	31			

A woman's menstruation starts on 30th January. In which week does ovulation most likely occur?

A week 1
B week 2
C week 3
D week 4

Directions: Questions 11 and 12 refer to the diagram below. The diagram shows the side view of the male reproductive system in humans.



11. Which of the following are the functions of the fluid secreted from the three structures labelled X?

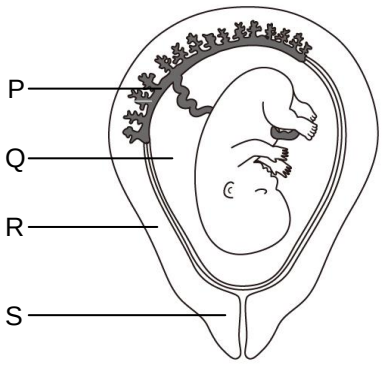
(1) To provide a medium for sperms to swim in
(2) To stimulate the production of sperms in Z
(3) To provide nourishment for sperms

A (1) and (2) only
B (1) and (3) only
C (2) and (3) only
D (1), (2) and (3)

12. Which of the following statements is correct if Y on both sides of the body are tied and cut?
    A Both male sex hormones and sperms cannot be produced in Z.
    B Both male sex hormones and sperms can still be produced in Z.
    C Sperms, but not male sex hormones, can be produced in Z.
    D Male sex hormones, but not sperms, can be produced in Z.

13. Which of the following are the advantages of breast-feeding?
    (1) Breast milk contains antibodies which protect the baby from pathogens.
    (2) Breast milk contains all the nutrients for the baby.
    (3) Breast-feeding promotes the bonding between the mother and the baby.
    A (1) and (2) only
    B (1) and (3) only
    C (2) and (3) only
    D (1), (2) and (3)

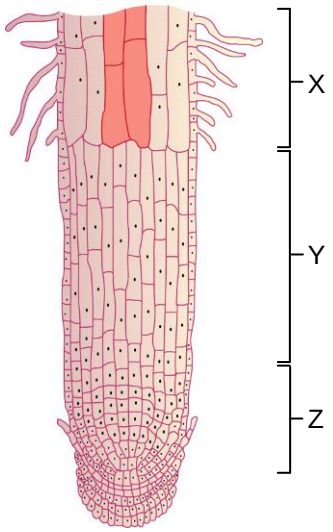
14. The diagram below shows a foetus in the uterus of a woman in the last month of her pregnancy.



    In structure P, the blood systems of the foetus and the mother are separate. What is the importance of this?
    (1) To prevent the high blood pressure of the mother from damaging the fine blood vessels of the foetus
    (2) To avoid mixing the blood of the foetus and the mother
    (3) To prevent viruses from entering the blood of the foetus
    A (1) and (2) only
    B (1) and (3) only
    C (2) and (3) only
    D (1), (2) and (3)

15. The waste products that pass from the foetus into the mother's blood include
    A carbon dioxide and urea.
    B carbon dioxide and faeces.
    C urine and sweat.
    D faeces and urine.

Directions: Questions 16 and 17 refer to the diagram below. The diagram shows a longitudinal section of a root tip.



16. In which region(s) can mitotic cell division be observed?
    A X only
    B Y only
    C Z only
    D Y and Z only

17. Which of the following correctly describe(s) what happens in region X?
    (1) New cells are produced by mitotic cell division.
    (2) Cells differentiate into different shapes.
    (3) More cellulose fibres are made and added to the cell walls.
    A (1) only
    B (3) only
    C (2) and (3) only
    D (1), (2) and (3)

18. The photographs below show a plant and some plant parts.

X

Y

Z

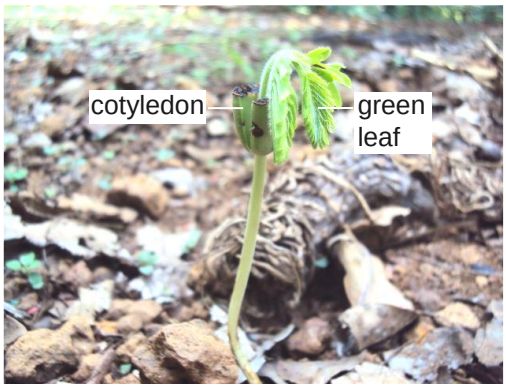
Which of the following shows the parameters that are most suitable for measuring the growth of the above plant or plant parts?

	X	Y	Z
A	volume	volume	mass
B	mass	surface area	surface area
C	length of root	mass	volume
D	length of shoot	surface area	volume

19. Which of the following comparisons between primary growth and secondary growth in flowering plants is ***not*** correct?

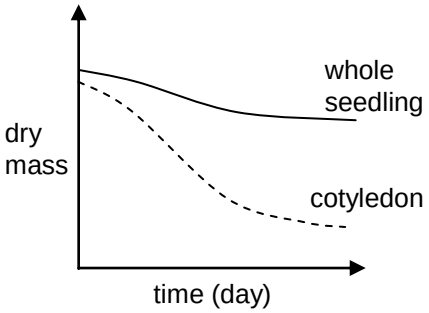
	Primary growth	Secondary growth
A	produces xylem, phloem and thin-walled cells	produces xylem only
B	increases the length of roots and shoots	increases the thickness of roots and shoots
C	is due to the activity of apical meristem	is due to the activity of lateral meristem
D	occurs in root tips and shoot tips	occurs in the periphery of roots and stems

20. The photograph below shows a seedling.

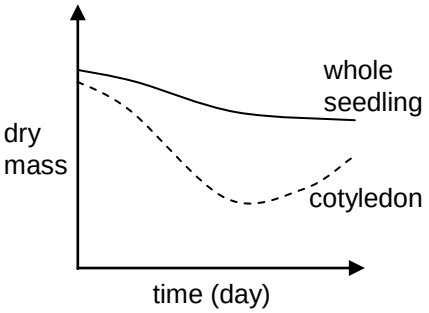


Which of the following graphs shows the changes in the dry mass of the whole seedling and the cotyledon from the first day of seed germination to the stage shown above?

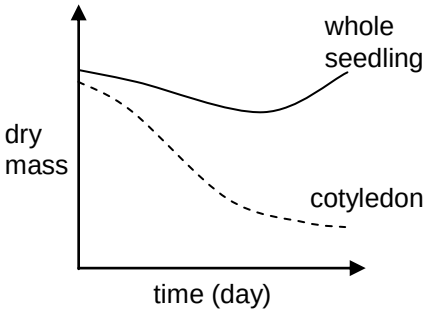
A



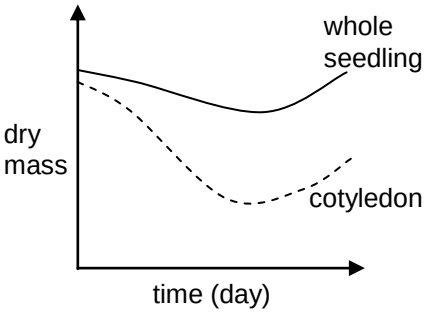
B



C



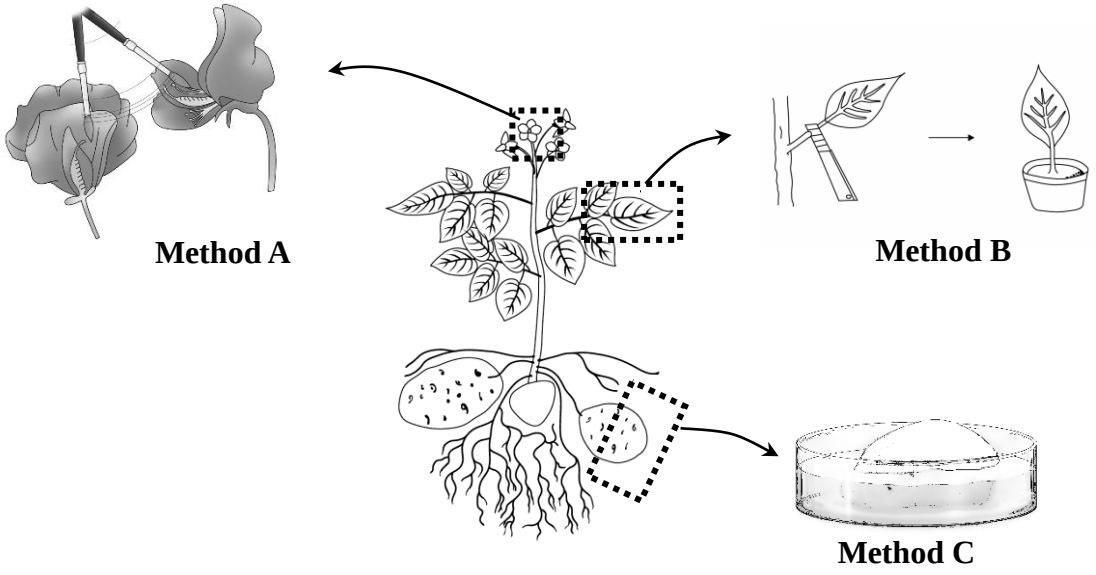
D



End of Section I

II. Structured Questions (40 marks)

1. A farmer would like to cultivate potatoes with high starch content. Potato plants could be cultivated artificially by the methods shown in the diagrams below. At the beginning, the farmer used **Method A** to propagate potato plants.



(a) (i) Give ***one*** advantage with reason of using Method A to propagate potato plants instead of using Methods B and C. (2 marks)

(ii) After several trials, the farmer found that potato plants produced by cross-pollination showed a higher degree of variety. Suggest the procedures he should do to ensure cross-pollination. (2 marks)

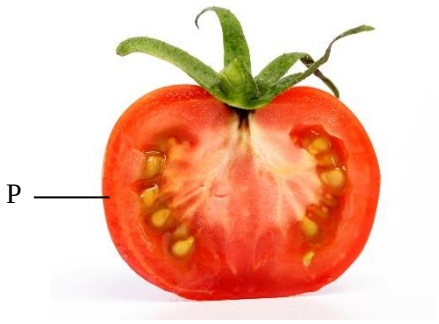
(b) After cultivating many potato plants, the farmer finally produced a potato plant with very high starch content. Then he propagated this potato plant using Method C.

Explain why he used Method C to propagate this potato plant instead of using

(i) Method A. (2 marks)

(ii) Method B. (2 marks)

2. The photographs below show the fruits of two different species of plants, tomato and sugar maple.



Tomato

Sugar maple

(a) From what floral part is structure P developed? (1 mark)

(b) Describe and explain how the seeds of these fruits are dispersed away from their parents. (4 marks)

(c) Why it is important that seeds and fruits are transported far away from their parent plants? State ***two*** reasons. (2 marks)

3. Read the passage below and answer the questions that follow.

What is *in vitro* fertilisation?

In Hong Kong, about one out of every six couples has trouble getting pregnant. Some of these couples may consider the technique of *in vitro* fertilisation (IVF) to increase their chance of pregnancy.

Before IVF, a woman receives hormone injection to stimulate the development of a large number of egg cells. Several mature egg cells are then collected from the ovaries. They are transferred to a Petri dish containing a culture solution and semen for fertilisation to occur. The fertilised eggs are allowed to develop into embryos in the laboratory. Three to five days later, several embryos are transferred into the woman's uterus.

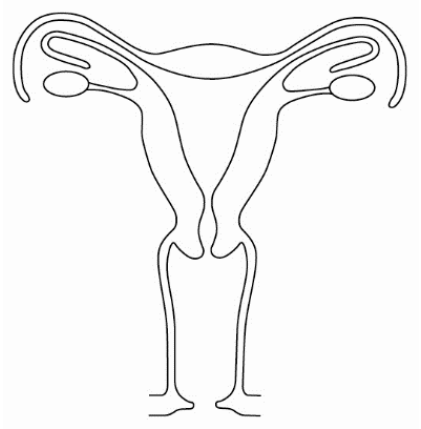
(a) Suggest ***one*** difference in the process of IVF and the natural reproductive process in humans. (2 marks)

(b) Describe how the egg cell changes upon the entry of a sperm nucleus during fertilisation and explain the significance of this. (2 marks)

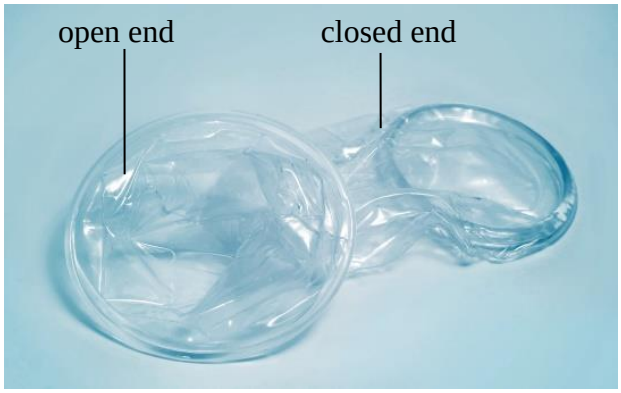
(c) Why should the embryos only be transferred into the woman's uterus three to five days after fertilisation but not immediately after fertilisation? (2 marks)

(d) Some couples cannot achieve pregnancy even after receiving IVF. Suggest ***one*** problem that prevents these couples from getting pregnant. (1 mark)

4. The diagram on the left shows the human female reproductive system, while the photograph on the right shows a female condom.



Female reproductive system



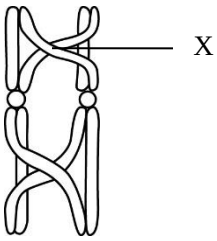
Female condom

(a) (i) Into which structure of a female is the female condom put during sexual intercourse? (1 mark)

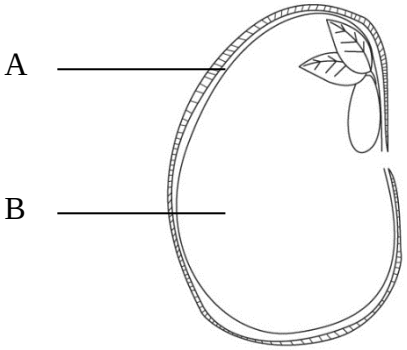
(ii) How does the female condom provide contraception? (2 marks)

(b) Another contraceptive method is to tie and cut both oviducts. A 28-year-old woman has just received this operation. State whether or not this woman will still have menstruation. Explain your answer. (4 marks)

(c) The diagram below shows part of the process that a cell undergoes to form an ovum. X is a feature of this process. Explain how this feature results in genetic variations among the ova formed. (2 marks)



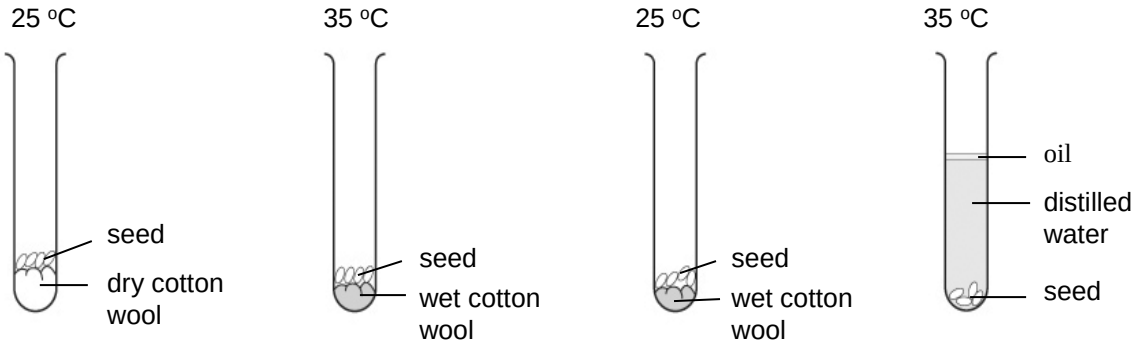
5. The diagram below shows a section of a mung bean seed.



(a) Name structure A and state its function. (2 marks)

(b) What is the main type of food stored in structure B? How can you test for its presence? (3 marks)

(c) A student carried out an experiment to investigate the condition necessary for seed germination.



A **B** **C** **D**

In which tube would the seeds germinate first? Explain your answer. (4 marks)

End of Paper