2018-DSE
BIO (Mock)
PAPER 1A

Form Six Mock Examination 2017-2018

DSE BIOLOGY PAPER 1

Date: 5th Feb. 2018
8:25 am – 10:55 am (2 hours 30 minutes)
This paper must be answered in English

Candidate number: _____

GENERAL INSTRUCTIONS

1. There are **TWO** sections, A and B, in this paper. You are advised to finish Section A in about 35 minutes.

2. Section A consists of multiple-choice questions in this question book. Section B contains conventional questions printed separately in Question-Answer Book B.

3. Answers to Section A should be marked on the Multiple-choice Answer Sheet while answers to Section B should be written in the spaces provided in Question-Answer Book B. **The Answer Sheet for Section A and the Question-Answer Book for Section B must be handed in separately at the end of the examination.**

INSTRUCTIONS FOR SECTION A (MULTIPLE-CHOICE QUESTIONS)

1. Read carefully the instructions on the Answer Sheet. Insert the information required in the spaces provided.

2. When told to open this book, you should check that all the questions are there. Look for the words "**END OF SECTION A**" after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS.** You should use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured.

5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6. No marks will be deducted for wrong answers.

7. The diagrams in this section are **NOT** necessarily drawn to scale.

Not to be taken away before the end of the examination

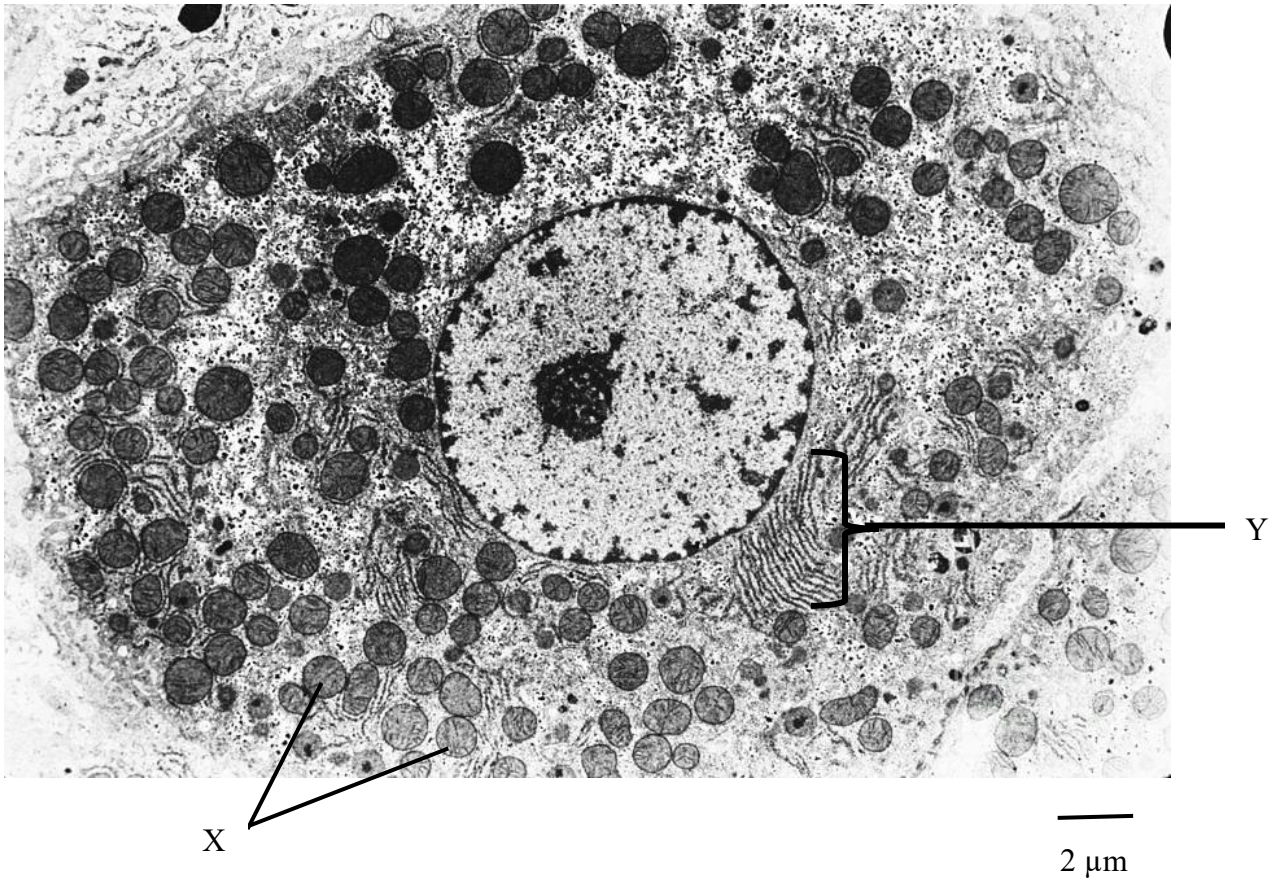
There are 36 questions in this section.
The diagrams in this section are not necessarily drawn to scale.

1. When using a microscope for high power observation, we should focus on the specimen with a low power objective before using the high power objective. It is because

(1) the interested part for magnification can be located first.
(2) the light intensity is higher under low power magnification.
(3) it is easier to focus on the specimen if we start from a low power objective.

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

Directions: Answer questions 2 and 3 with reference to the electron micrograph showing a liver cell.



2. What is the magnification of the liver cell in the electron micrograph?

A. 500 X
B. 5000 X
C. 50000 X
D. 500000X

3. Which of the following is the correct evidence and explanation to show that the liver cell is highly metabolically active?

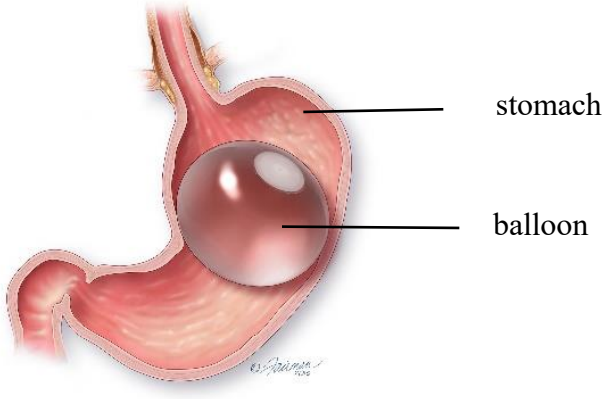
	evidence	*explanation*
A.	Large nucleus	A large amount of secretory proteins can be synthesized.
B.	Numerous organelle X	A large amount of secretory products are packed.
C.	Numerous organelle X	A high rate of aerobic respiration can be supported.
D.	Extensive network of organelle Y	A large amount of secretory proteins can be synthesized.

4. A student carried out DCPIP test on boiled lemon juice and raw lemon juice to find out whether boiling will destroy vitamin C. Which of the following are assumptions for the investigation?

(1) Vitamin C can be destroyed by high temperature.
(2) The DCPIP solution can only be decolorized by vitamin C.
(3) There is no reducing sugar present in the lemon juice.

A. (1), (2) and (3) only
B. (1) and (3) only
C. (2) and (3) only
D. none of the above

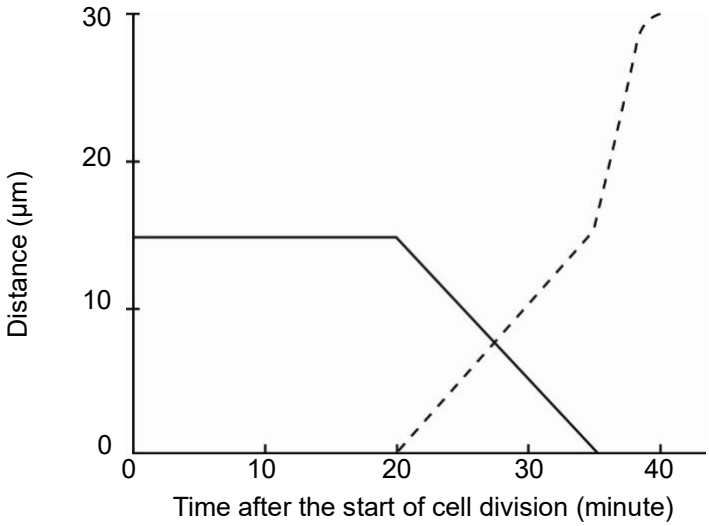
5. A gastric balloon helps severely obese people to lose weight. The diagram below shows the placement of such a balloon in the stomach.



Which of the following must occur after the surgery?

A. no production of gastric juice
B. the reduction in the capacity of the stomach
C. the reduction in the amount of daily food intake
D. the amount of energy intake will be smaller than the amount of energy required

Directions: Questions 6 and 7 refer to the graph below which is concerned with mitosis.

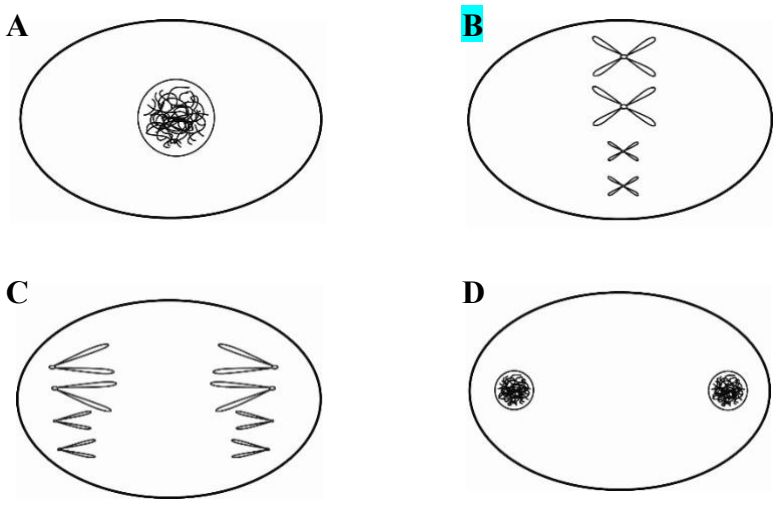


——————— the distance between daughter chromosomes and the poles towards which the chromosomes are moving.

- - - - - - - - - - the distance between daughter chromosomes.

6. How long after the start of cell division do the chromosomes split into two daughter chromosomes and begin their movement towards the poles?
   A. 0 minutes
   B. 20 minutes
   C. 27.5 minutes
   D. 35 minutes

7. Which of the following diagrams shows the arrangement of the chromosomes at the 15th minutes?



8. Which of the following statements about the contraceptive methods is ***incorrect***?

A. Intrauterine devices can prevent ovulation.
B. Diaphragms can prevent sperms from reaching the ovum.
C. After vasectomy, the semen ejaculated does not contain sperms.
D. The use of condoms can prevent the spread of AIDS.

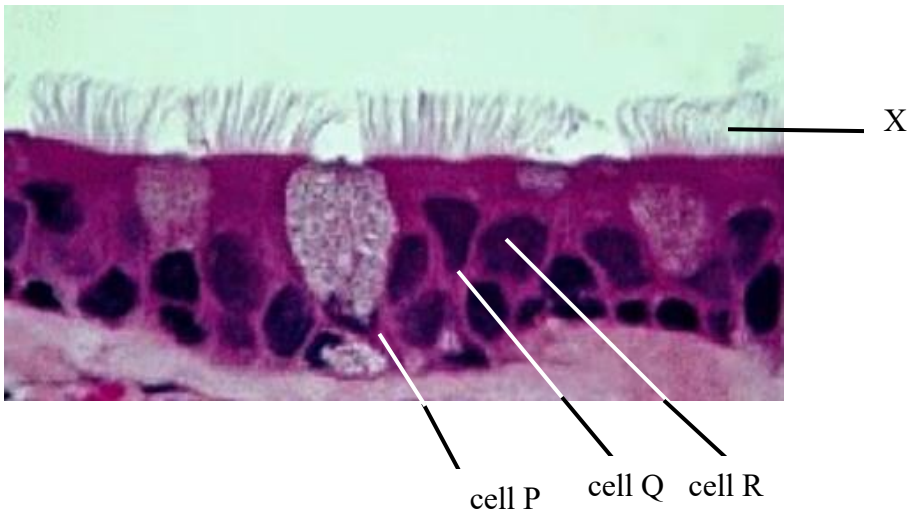
9. The foetus is surrounded by the amniotic fluid. Which of the following is ***not*** a function of the fluid?

A. It acts as a shock absorber.
B. It lubricates the vagina during labour.
C. It supplies nutrients to the foetus.
D. It allows the foetus some freedom of movement.

10. What type of immunity does a foetus acquired as maternal antibodies pass through the placenta and enter the foetal blood?

A. natural active immunity
B. natural passive immunity
C. artificial active immunity
D. artificial passive immunity

11. The photomicrograph below shows a section of the inner lining of the respiratory tract of human:



Which of the following can protect the human body against bacterial invasion?

(1) Structure X traps bacteria.
(2) Cell P secretes mucus.
(3) Cells Q and R are tightly packed.

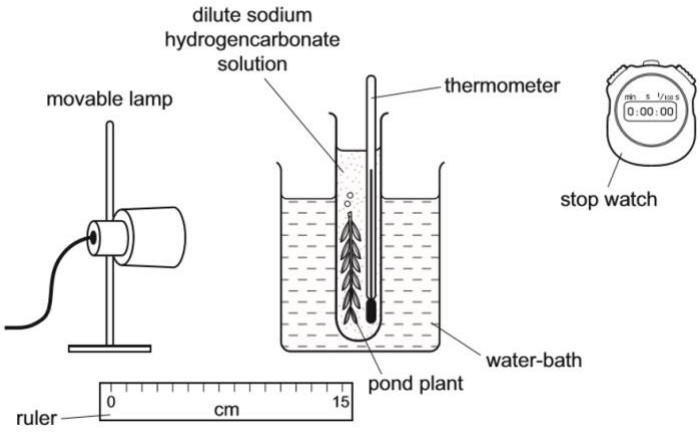
A. (2) only
B. (1) and (2) only
C. (2) and (3) only
D. (1), (2) and (3)

12. Two men, X and Y were injured in an accident. A doctor conducted a tests on them to check if there was any damage done to their nervous systems. While X and Y were blindfolded, the doctor tapped below their knee caps of their right legs. X kicked his leg but he was unaware of the tapping and the kicking. Y felt the tapping but he did not kick his leg.

Which part of the nervous system was most likely damaged in X and Y respectively?

	X	***Y***
A.	Interneurone to the brain	Motor neurone
B.	Interneurone to the brain	Sensory neurone
C.	Sensory neurone	Interneurone to the brain
D.	sensory neurone	motor neurone

13. Directions: Questions 13 and 14 refer to the set- up below which shows an investigation to find out the effect of carbon dioxide concentration on the rate of photosynthesis of an aquatic plant.



Which of the following are the necessary assumptions of this experiment?

(1) The rate of respiration remains constant throughout the experiment.
(2) The rate of bubble formation can be used to indicate the change of photosynthetic rate.
(3) The effect of background light intensity is constant in the experiment.

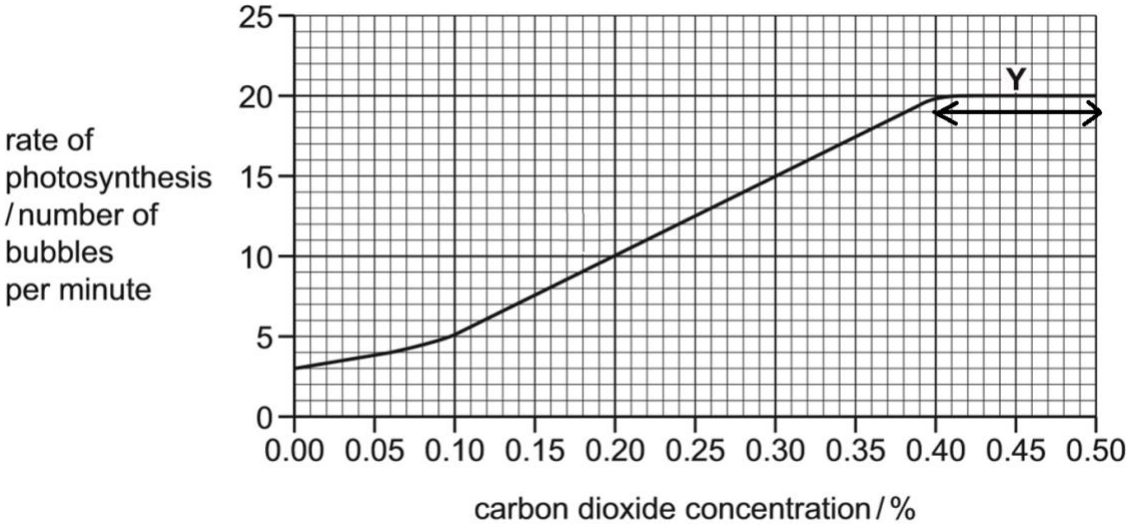
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3)

14. Which of the following are used to keep the controlled variables constant in the experiment?

(1) Put a thermometer in the set-up
(2) Put the pond plant into the water bath
(3) Put the movable lamp in a fixed position

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

15. The graph below shows the results obtained by the student.



Which of the following is/ are possible limiting factors of photosynthetic rate in region Y?

(1) Temperature of the set up
(2) Light intensity of the set up
(3) Carbon dioxide concentration of the set up

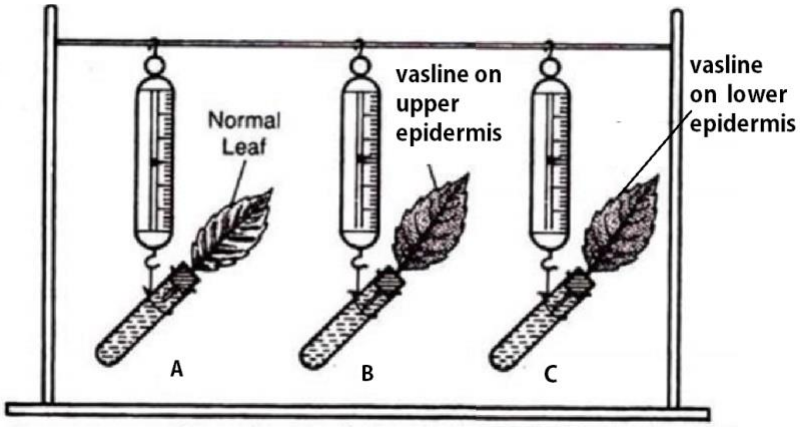
A. (1) only
B. (3) only
C. (1) and (2) only
D. (2) and (3) only

16. The photomicrograph below shows a cross section of a leaf from a woody flowering plant.

Which of the following cells contribute to supporting the leaf in the plant?

A. Cells A and B
B. Cells A and C
C. Cells B and C
D. Cells A, B and C

Directions: Questions 17 and 18 refer to the following experiment which is used to investigate the effect of environmental factors on the rate of transpiration. Three leaves freshly collected from woody flowering plant, leaves A, B and C, were put into water- filled test tubes and attached to a spring balance to measure the change in weight after 5 hours.



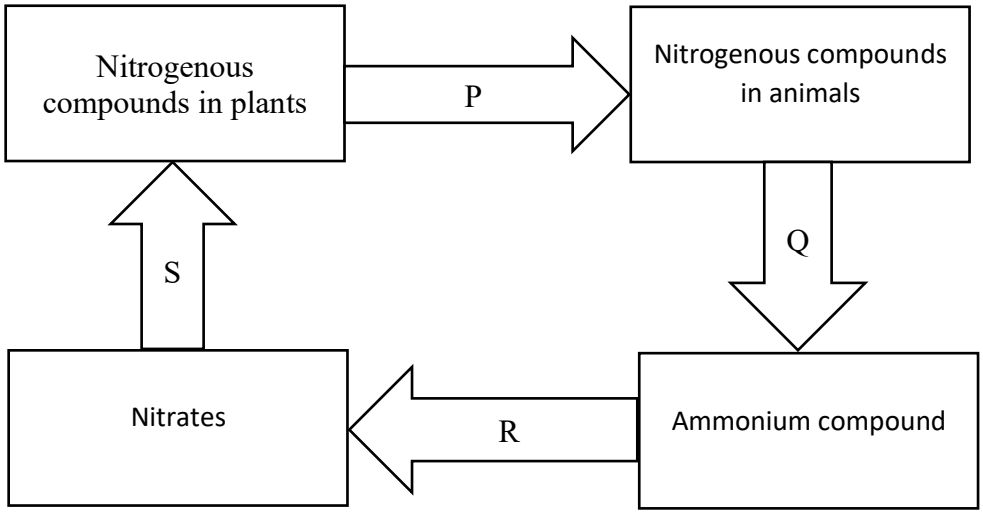
17. Which of the following is the correct comparison between the change of weight in each set up after 5 hours?

A. A> B> C
B. A> C> B
C. C> B> A
D. B> C> A

18. Which of the following combinations of environmental factors will cause the smallest change in weight in Leaf A?

	Humidity (%)	*Temperature (°C)*
A.	30	15
B.	60	15
C.	30	25
D.	60	25

Directions: Questions 19 and 20 refer to the diagram shows part of the nitrogen cycle.



19. Which stages involve bacteria?

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

20. Which stages can be slowered down by reducing oxygen supply?

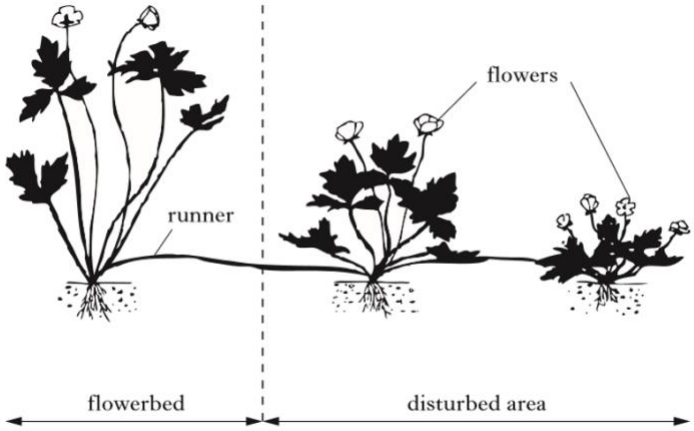
A. P and S only
B. Q and R only
C. Q, R and S only
D. P, Q, R and S

21. Which of the following is/ are (a) correct description(s) of the process in pollination?

(1) Pollen grain secretes digestive enzyme to develop pollen tube.
(2) Pollen grain stimulates the stigma to develop pollen tube with the secretion of sugary fluid.
(3) Pollen tube is developed from the pollen grain.

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

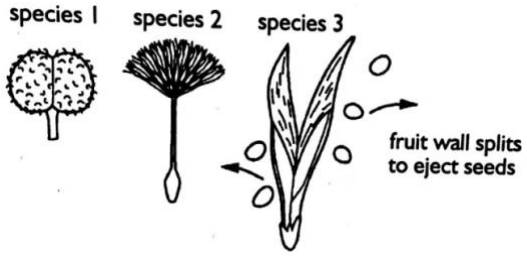
22. The spread of a buttercup plant, *Ranunculus repens,* from an established flowerbed into a nearby disturbed area is shown in the diagram below.



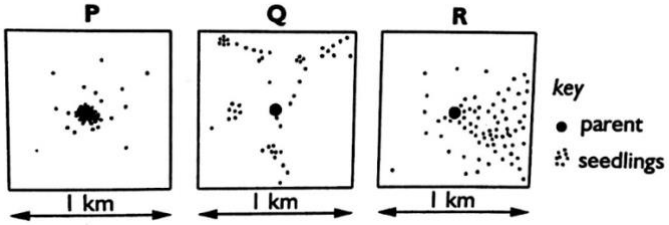
Which of the following is the correct description of the reproductive strategy of *Ranunculus repens* using runner and its significance for survivorship?

	Type of reproduction	***Significance***
A.	Asexual	Genetically identical to parents
B.	Asexual	Rapid colonization of the population with desirable characteristics
C.	Sexual	Genetically different from parents
D.	Sexual	Increase the chance of getting desirable characteristics in offspring

23. The diagram shows the fruits of three species of plant.



P, Q and R are maps showing where the parent plants and their seedlings are growing.



Which map relates to each species?

	Species 1	***Species 2***	***Species 3***
A.	P	Q	R
B.	P	R	Q
C.	Q	R	P
D.	R	Q	P

Question 24 refer to the diagrams below which show the cross sections of tomato fruit and flower.

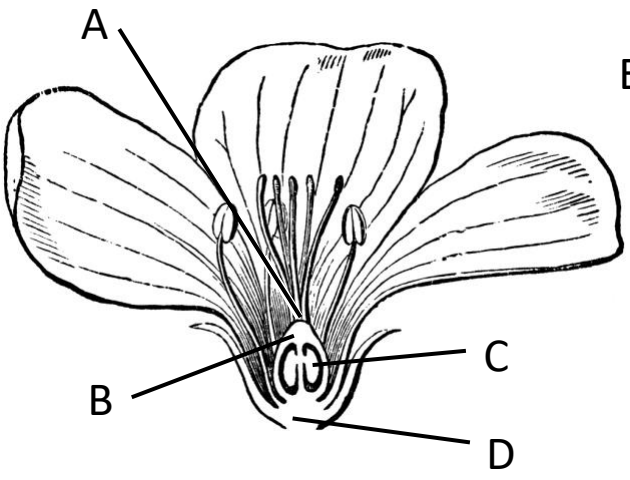


Diagram 1 Cross section of tomato flower

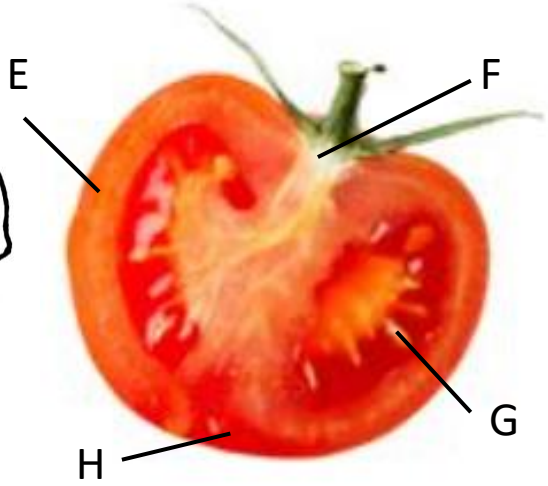


Diagram 2 Cross section of tomato fruit

24. Which of the following correctly identifies structures in diagram 1 from which structures in diagram 2 developed?

	Structure E	*Structure F*	*Structure G*	*Structure H*
A.	B	D	C	A
B.	B	A	C	D
C	C	D	B	A
D.	C	A	B	D

25. NAD^+ are used in aerobic respiration

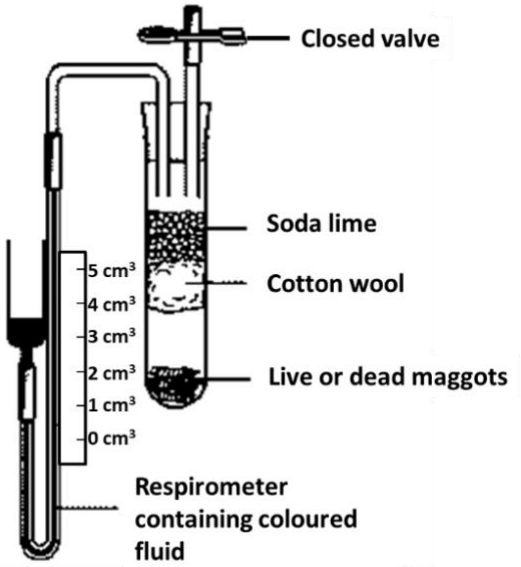
A. to provide hydrogen ions for the formation of water
B. to provide energy for the formation of ATP
C. to carry hydrogen ions released from Krebs cycle intermediates
D. to carry phosphate ions released from hydrolysis of ATP

26. Which of the following correctly describes the rate of respiration in a person holding his breath for 1 minute?

(1) aerobic respiration decreases
(2) lactic acid fermentation increases
(3) alcoholic fermentation increases

A. (1) only
B. (3) only
C. (1) and (2) only
D. None of the above

Directions: Questions 27 and 28 refer to the setup below which shows an experiment investigating the rate of oxygen uptake of live maggots. The setup containing dead maggots is used as a control:



	Initial Fluid Level	Fluid Level after 30 minutes
With live maggots	2.2 cm^3	3.8 cm^3
With dead maggots	2.3 cm^3	2.4 cm^3

27. What is the oxygen uptake rate of the live maggots?

A. 1.5 cm^3 O_2/hour
B. 1.6 cm^3 O_2/hour
C. 3.0 cm^3 O_2/hour
D. 3.2 cm^3 O_2/hour

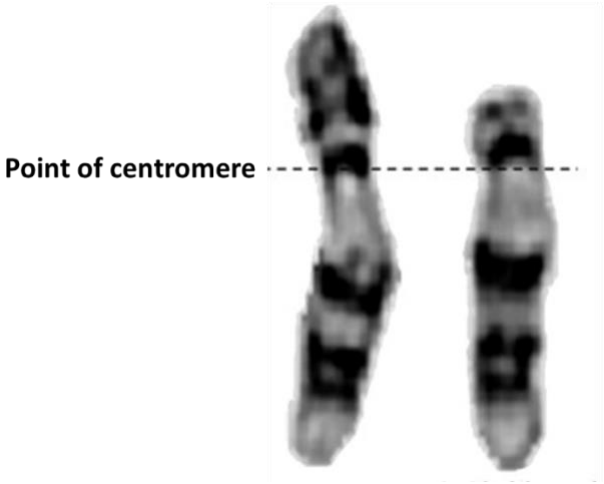
28. Which of the following is a necessary assumption in finding the rate of oxygen uptake of live maggots?

A. The friction of the capillary tube wall in the respirometer is assumed to be negligible.
B. Oxygen uptake by the microorganism on the maggots is assumed to be negligible.
C. The maggots used in the above experiment are assumed to be the same species.
D. The soda lime used in the above experiment is assumed able to absorb carbon dioxide.

29. Which of the following substances are synthesized during translation?
(1) proteins
(2) amino acids
(3) tRNAs-amino acid complex

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

30. The diagram below shows the karyotype of a pair of chromosomes. The chromosome on the right side is abnormal.

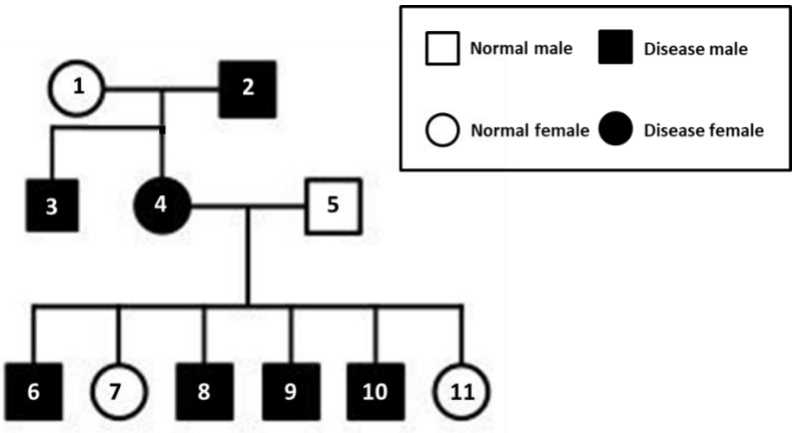


Which of the following can be observed or deduced from the karyotype?

(1) gene deletion occurs in the abnormal chromosome
(2) chromosomal deletion occurs in the abnormal chromosome
(3) chromosomal translocation occurs between the chromosome pair

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

Directions: Questions 31 and 32 refer to the following pedigree which shows the inheritance of a disease in a family. It is hypothesized the disease is inherited to be an autosomal dominant fashion. Assuming the disease is caused by only one gene:



31. Given that individual 1 and 5 are normal, which of the following evidence can be used to support the inheritance of the disease is **not** X-linked dominant?

A. Daughters from individual 4 are normal
B. Most of the family members have the disease
C. Sons from individual 4 have the disease
D. Individual 3 has the disease

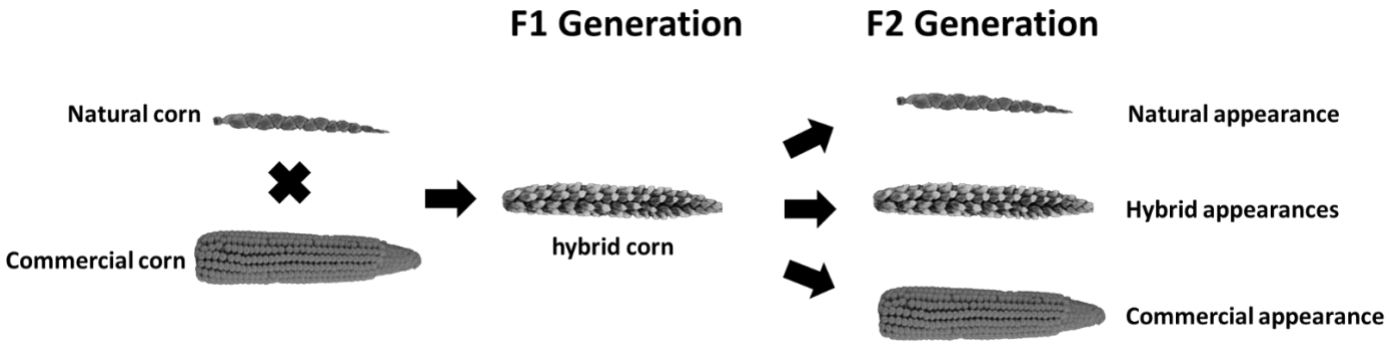
32. If the disease is inherited in an autosomal dominant fashion, what is the probability for individual 4 and 5 to give birth to another normal son?

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

33. Which of the following microscopic observations supports the Mendel's law of independent assortment?

A. Crossing over between a pair of homologous chromosomes in prophase I is independent to other homologous chromosome pairs.
B. Homologous chromosomes pair up and separate to opposite poles in meiosis I.
C. The arrangement of homologous chromosome pairing during metaphase I is random.
D. Sister chromatids separate to opposite poles to become independent chromosomes in meiosis II.

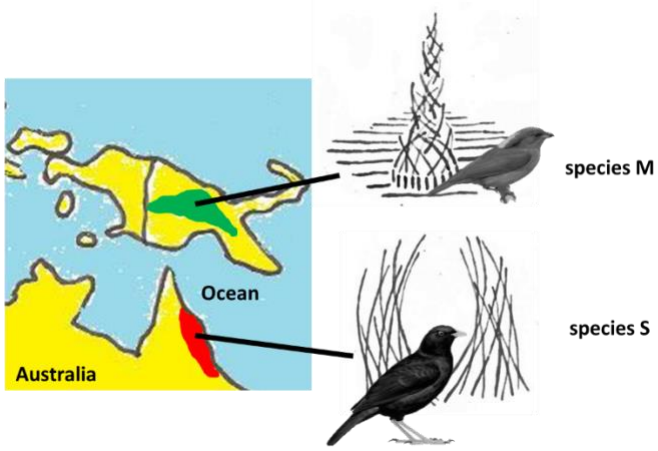
34. Over 9000 years, commercial corn is evolved from the natural corn. In order to investigate the number of mutations (assumed to be inherited recessively) that is required for the evolution of corn, both types of corn are interbred to produce F1 offspring with a range of hybrid appearances. The F1 offspring are then interbred to produce F2 offspring with different appearances.



If the frequency of F2 corn with commercial appearance occurrence is found to be 1/16, the number of mutations involved during the evolution is

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

Directions: Questions 35 and 36 refer to the diagram below. Bowerbird males build nests to attract females for mating. Species M and S of Bowerbird are originated from the same ancestor but eventually split into two species. They have different distribution, appearances and build different types of nest.



35. Which of the following processes were likely to have been involved in the formation of species M and S?

(1) mutation
(2) isolation
(3) natural selection

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

36. Thirty individuals of species M Bowerbird are forced to migrate to the habitat of species S but soon eliminated. Which of the following reasons is **least likely** to explain the observation?

A. They were out competed by species S.
B. They failed to adapt to the habitat.
C. They interbreed with species S to produce infertile offspring.
D. Their survival and reproductive ability decreases due to extensive inbreeding.

END OF SECTION A
Go on to Question-Answer Book B for questions on Section B