Sacred Heart Canossian College
Mock Examination (2020-2021)

S6 Biology Paper 1

Time allowed: 2 hours 30 minutes
Total: 120 marks

General instructions:

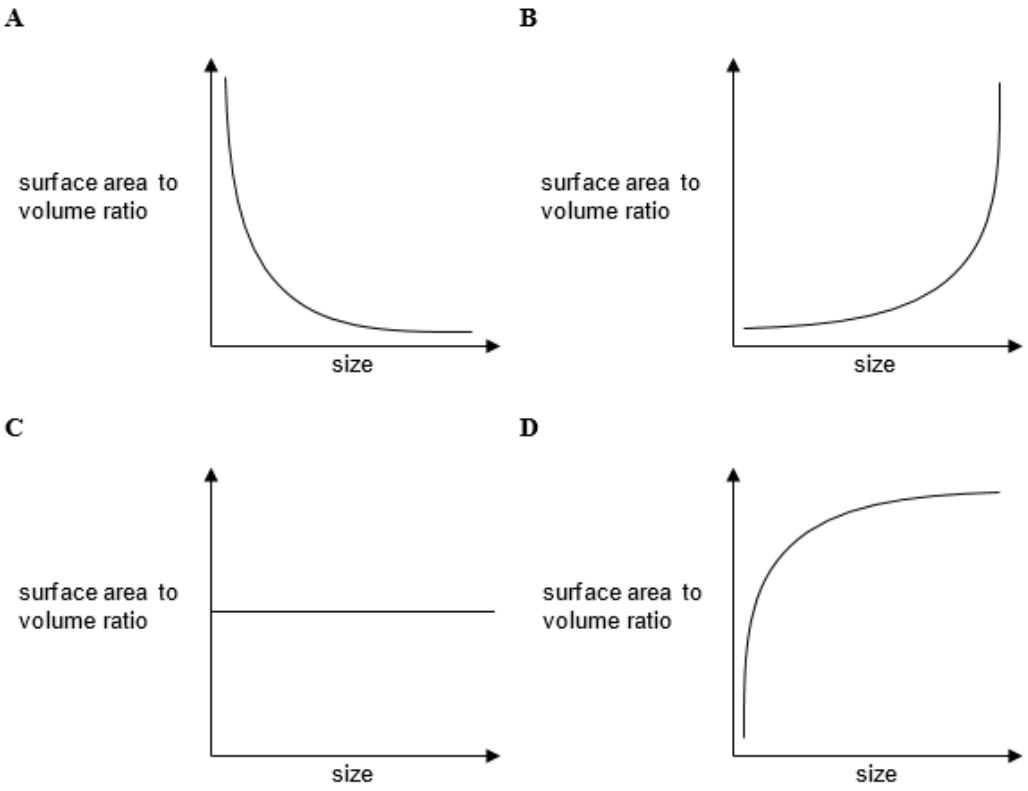
1. *There are **TWO** sections, A and B, in this paper.*
2. *Section A consists of multiple-choice questions in this question paper and Section B contains conventional questions in Question-Answer Set B.*
3. *Answers to Section A should be marked on the Multiple-choice Answer Sheet while answers to Section B should be written in the spaces provided in Question-Answer Set B. **The Multiple-choice Answer Sheet for Section A and the Question-Answer Set B for Section B will be collected separately at the end of the test/examination**.*
4. *Write your name, class and number in the spaces provided on the Multiple-choice Answer Sheet for Section A and the Question-Answer Set for Section B. No extra time will be given after the 'Time is up' announcement.*

Instructions for Section A:

1. *Read carefully the instructions on the Multiple-choice Answer Sheet.*
2. *When told to check this question paper, you should make sure 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 are advised to use an **HB pencil** to mark all the answers on the Multiple-choice 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.*

<u>Section A</u>: Multiple-choice Questions (36 marks)

1. Which of the following graphs correctly shows the relationship between the size and the surface area to volume ratio of a cell?



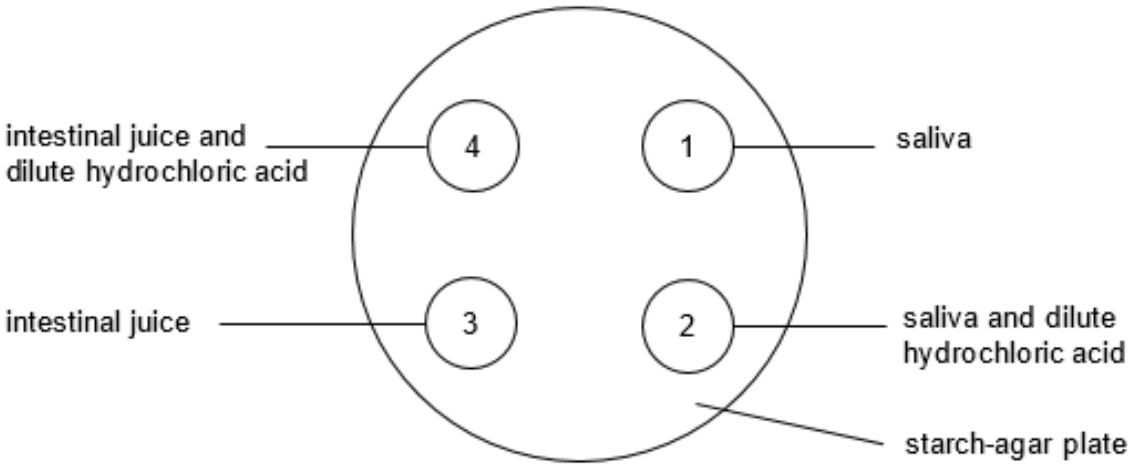
2. Which of the following biochemical pathways use energy from ATP?
   (1) conversion of glucose to triose phosphate in glycolysis of respiration
   (2) regeneration of 4-C compound in the Krebs cycle of aerobic respiration
   (3) regeneration of carbon dioxide acceptor in the Calvin cycle of photosynthesis

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

3. Which of the following statement(s) about codons is/are correct?
   (1) Codons consist of the bases A, C, G and T.
   (2) Some codons code for the same amino acids.
   (3) All codons are 3 base-long.

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

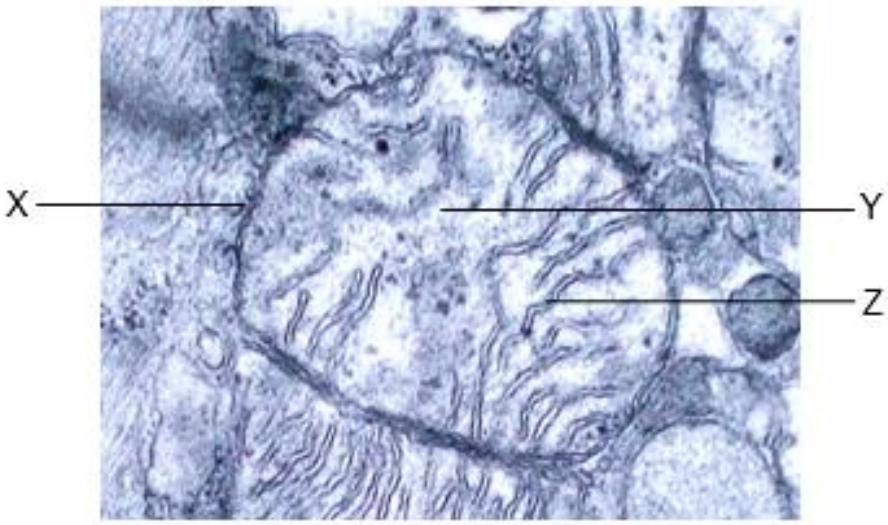
4. A scientist used a starch-agar plate to study the actions of human digestive juices. He made four wells on the plate and filled the wells with different mixtures, as shown in the diagram below.



After one hour of incubation at 35°C, the mixtures were discarded and the plate was flooded with iodine solution. After rinsing off the excess iodine solution, a clear zone could be observed around

A. well 1 only.
B. well 4 only.
C. wells 1 and 3 only.
D. wells 2 and 4 only.

5. The electron micrograph below shows an organelle in an animal cell.



Which of the following statements about the labelled structure is correct?

A. Structure X is a single layer.
B. Glycolysis takes place at Z.
C. Oxygen is produced at Z.
D. Enzymes are present at Y.

6. Which of the following is the final hydrogen acceptor in lactic acid fermentation?

A. water
B. pyruvate
C. lactic acid
D. ethanol

Directions: Questions 7 and 8 refer to the table below, which shows the compatibility for blood transfusion among three members of a family, X, Y and Z.

		Donor		
		Individual X	***Individual Y***	***Individual Z***
Recipient	***Individual X***		incompatible	incompatible
	Individual Y	compatible		incompatible
	Individual Z	compatible	compatible	

7. Which of the following can be deduced from the above table?
(1) The blood group of individual X is O.
(2) The blood group of individual Y is A.
(3) The blood group of individual Z is AB.

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

8. Which of the following is/are the possible relationship(s) among individuals X, Y and Z?
(1) Y and Z are the parents and X is the child.
(2) X and Y are the parents and Z is the child.
(3) X and Z are the parents and Y is the child.

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

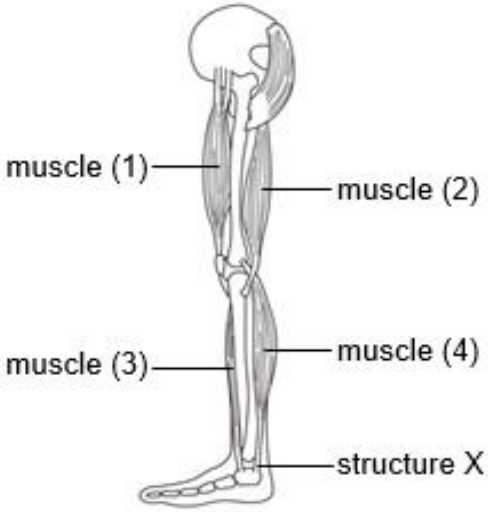
9. Which of the following shows the correct sequence of events in the development of insecticide resistance in insects?
(1) natural selection
(2) use of insecticide
(3) mutation of insects
(4) predomination of insecticide-resistant insects

A. (1) → (3) → (2) → (4)
B. (2) → (3) → (1) → (4)
C. (3) → (2) → (4) → (1)
D. (3) → (2) → (1) → (4)

Directions: Questions 10 and 11 refer to the diagrams below. Diagram I shows an athlete practising high diving. Diagram II shows some structures in a human leg.

Diagram I

Diagram II



10. In maintaining the posture shown in Diagram I, which of the labelled muscles in Diagram II are contracting?

    A. Muscles (1) and (3)
    B. Muscles (1) and (4)
    C. Muscles (2) and (3)
    D. Muscles (2) and (4)

11. Which of the following statements about structure X shown in Diagram II is correct?

    A. The athlete will not be able to maintain the posture shown in Diagram I if structure X is broken.
    B. The athlete will not be able to flex her foot if structure X is broken.
    C. It prevents dislocation of the ankle joint during movement.
    D. It is elastic.

12. Which of the following pairs of structures have the same genotype?

    A. Pollens of the flower — Stigma
    B. Seeds of the fruit — Fruit wall
    C. Leaves of the potato plant — Potato tubers
    D. Zygote inside the ovule — Filament

13. Which of the following is not required for natural selection to take place?

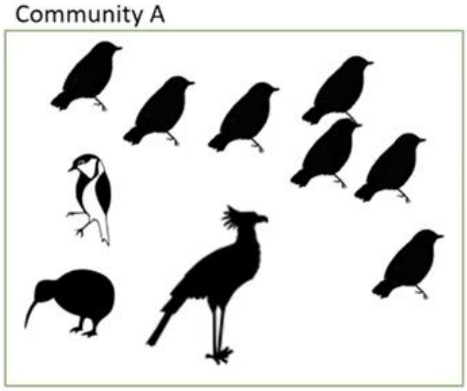
    A. Interspecfic competition
    B. Intraspecfic competition
    C. Phenotypic variation among a population
    D. Environmental change

14. Which of the following organisms share similar major composition of their cell walls?
(1) Ferns (2) Mosses (3) Eubacteria (4) Fungi

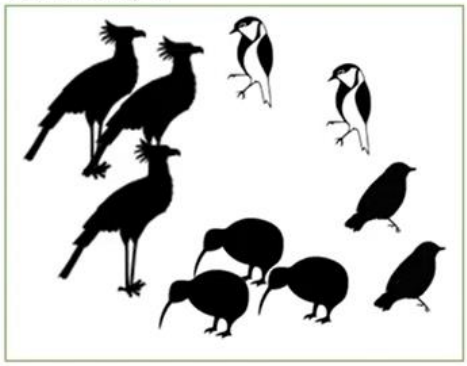
A. (1) and (2) only
B. (3) and (4) only
C. (1), (2) and (3) only
D. (1), (2) and (4) only

15. The diagrams below show the number of individuals of four bird species in communities A and B respectively.

Community A



Community B



Which of the following statement(s) is/are correct?
(1) Communities A and B have same species richness.
(2) Communities A and B have same relative abundance of each species.
(3) Community B has higher species diversity than community A.

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

16. Arrange the following cells in increasing order of their activity of transcription in nucleus.
(1) Mature red blood cells
(2) Rod cells on retina
(3) Insulin-producing cells in the pancreas

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

17. Why are some gene mutations harmless to the organisms?
(1) The mutated gene is not expressed.
(2) The gene mutation does not alter the amino acid sequence of the protein it codes for.
(3) The gene mutation does not alter the tertiary structure of the protein it codes for.

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

18. Symbiotic bacteria found in the root nodules of bean plants are able to convert

A. nitrogen gas to ammonium ions.
B. nitrogen gas to nitrate ions.
C. organic nitrogenous compounds to nitrate ions.
D. nitrite ions to nitrate ions.

19. Which of the following is an incorrect description of the relationship between organisms X and Y?

	Organism X	*Organism Y*	*Relationship*
A.	Tapeworm	Human	Parasitism
B.	Sheep	Cow	Competition
C.	Barnacle	Hermit crab	Mutualism
D.	Sea anemone	Hermit crab	Mutualism

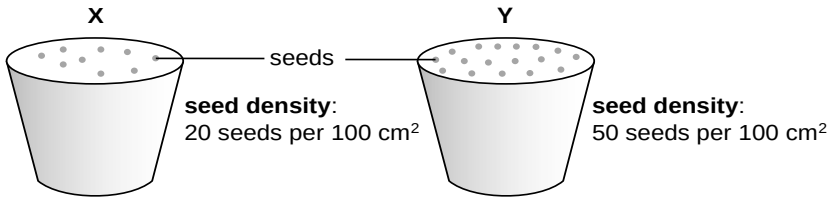
20. Which of the following comparisons between a pioneer community and a climax community in ecological succession is incorrect?

	Pioneer community	*Climax community*
A.	Smaller biomass	Larger biomass
B.	Simple food webs	Complex food webs
C.	Fewer number of species	Greater number of species
D.	Less sensitive to environmental changes	More sensitive to environmental changes

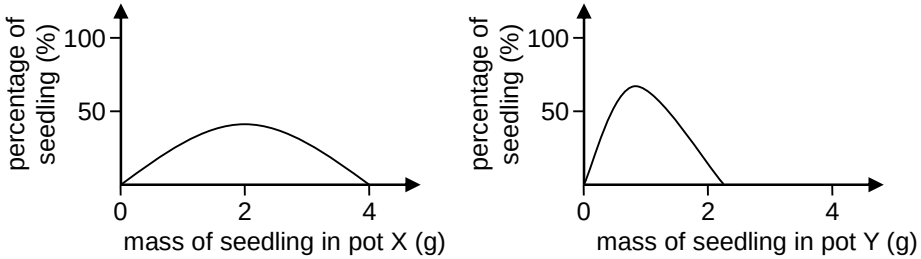
21. Which of the following is/are excretory product(s) from our bodies?
(1) carbon dioxide (2) bile pigment (3) faeces

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

22. Peter carried out an investigation to find out the effect of seed density on the growth of the seedlings. He planted different number of seeds into two identical pots (X and Y). He then put the two pots in the same environment and watered the pots regularly. The diagram below shows the set-up



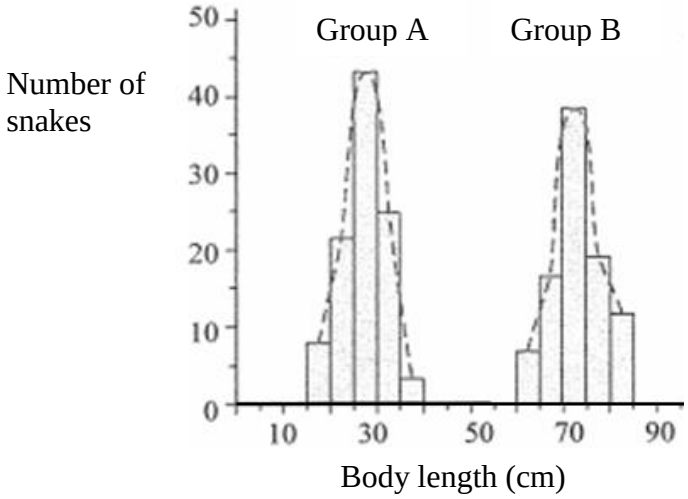
After 10 days, Peter measured the mass of each seedling in the pots. The graphs below show the results:



Which of the following conclusions can be drawn from the results?

A. The optimum density for seed germination is 20 seeds per 100 cm^2.
B. High seed density in the pot inhibits seed germination.
C. The seedlings grow slower at a higher seed density.
D. More water is needed for the growth of seedlings at a higher seed density.

Directions: Questions 23 and 24 refer to the following graph, which shows the variations in the body length of two groups of snakes, A and B, found in the same habitat.



23. Which of the following is most likely an explanation to the above graph?

    A. The body length of snakes is controlled by a pair of alleles.
    B. The body length of snakes displays the properties of continuous and discontinuous variations.
    C. The two groups of snakes belong to the same species.
    D. The two groups of snakes belong to two different species.

24. Which of the following factors contributes least to the variation shown?

    A. the body length of the parent snakes
    B. the independent assortment of chromosomes
    C. temperature of the environment
    D. the genotype of the snakes

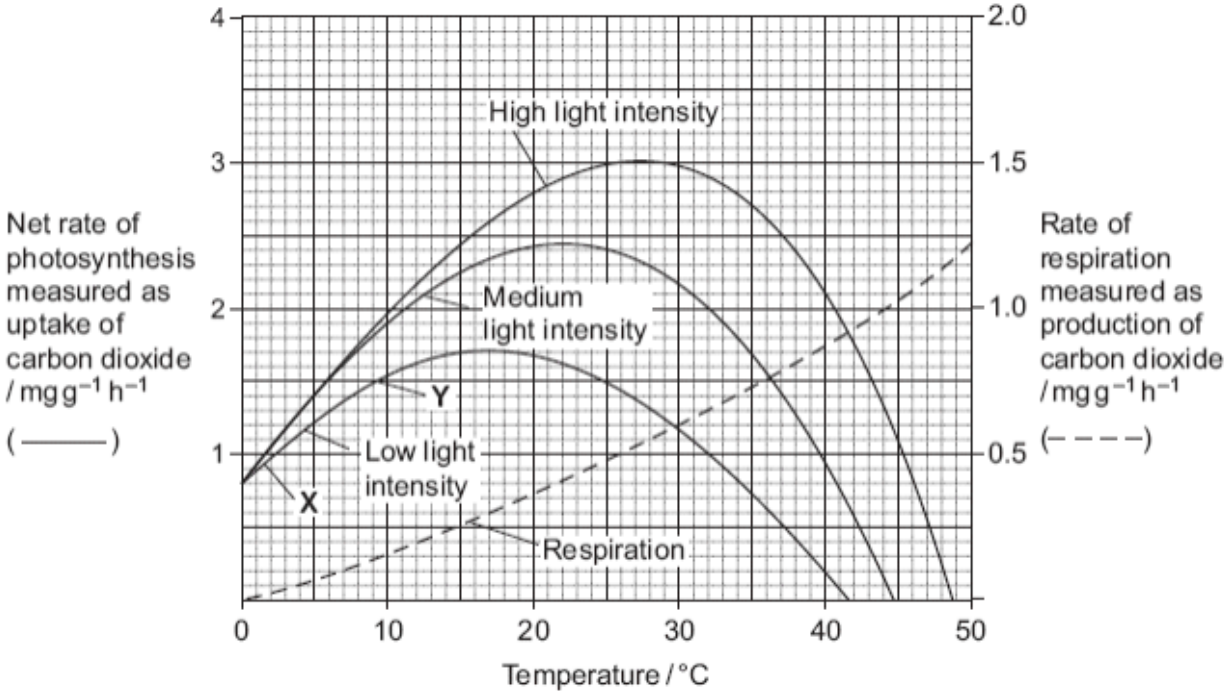
25. Which of the following cells can carry out anaerobic respiration?
    (1) skeletal muscle cells
    (2) red blood cells
    (3) yeast cells

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

Directions: Questions 26 to 28 refer to the following graph, which shows the results of two investigations. The objective of each investigation is listed below:

Investigation I:
To study the effect of temperatures on the photosynthetic rates of a plant species at three different light intensities.

Investigation II:
To study the effect of temperatures on the respiration rates of a plant species.



26. How many independent variable(s) was/were being studied in Investigation I?

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

27. What is/are the limiting factor(s) of photosynthetic rate between X and Y?

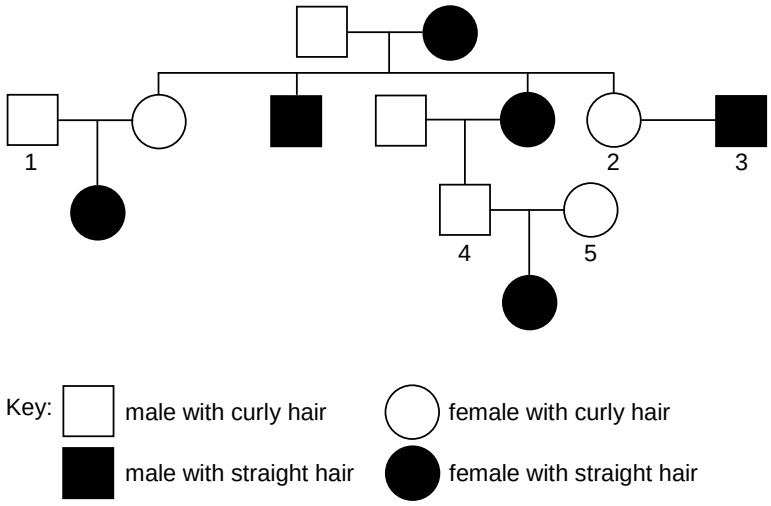
(1) Temperature
(2) Light intensity
(3) Carbon dioxide concentration

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

28. Under which of the following condition(s) does the plant show positive growth?
(1) at 20 ^{o}C under medium light intensity
(2) at 30 ^{o}C under low light intensity
(3) at 45 ^{o}C under high light intensity

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

Directions: Questions 29 and 30 refer to the pedigree below, which shows the inheritance of curly and straight hair in a family. The allele for curly hair is dominant to the allele for straight hair.



29. Which of the following statements about the inheritance of curly and straight hair by individuals 1 and 2 is correct?

    A. They have the same phenotypes and genotypes.
    B. They have the same phenotypes but different genotypes.
    C. They have the same genotypes but different phenotypes.
    D. They have different phenotypes and genotypes.

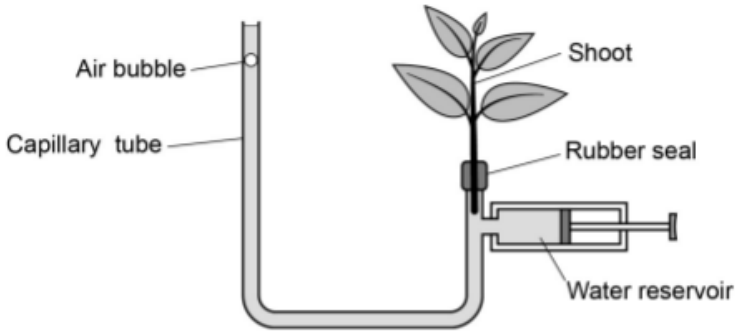
30. Which of the following statements about individuals 4 and 5 is correct?

    A. They are both heterozygous.
    B. They are both homozygous dominant.
    C. They are both homozygous recessive.
    D. Their genotypes cannot be determined.

31. Some newborn babies stop breathing if they are in deep sleep. Healthcare workers need to wake them up frequently to prevent this from happening. The reason why newborn babies stop breathing during their sleep is probably because

    A. they are too tired.
    B. their lungs are not well-developed.
    C. their breathing muscles are not strong enough.
    D. their medulla oblongata is not well-developed.

Directions: Questions 32 and 33 refer to the diagram below which shows a potometer used for the measurement of water absorption by the shoot of a plant.



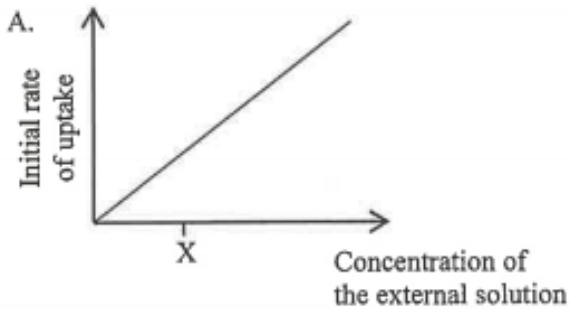
32. Which of the following is not a precaution for the above set-up?

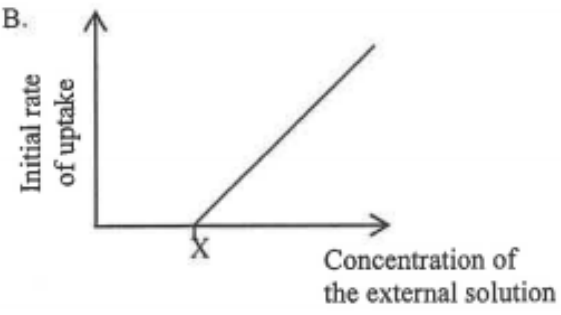
A. The leafy shoot and the rubber seal should be assembled under water.
B. The root should be cut under water.
C. All junctions should be smeared with vaseline.
D. The water reservoir should be filled completely before the experiment.

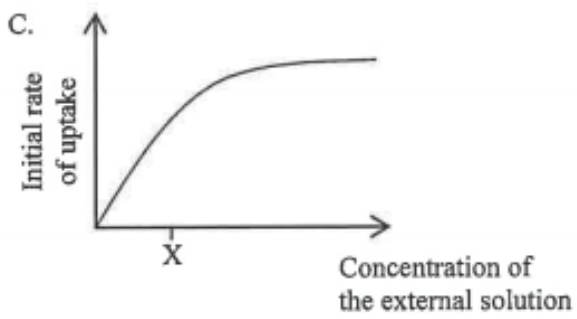
33. Which of the following condition(s) can speed up the rate of movement of the air bubble?
(1) increase the room temperature
(2) turn on the dehumidifier
(3) switch off the lights

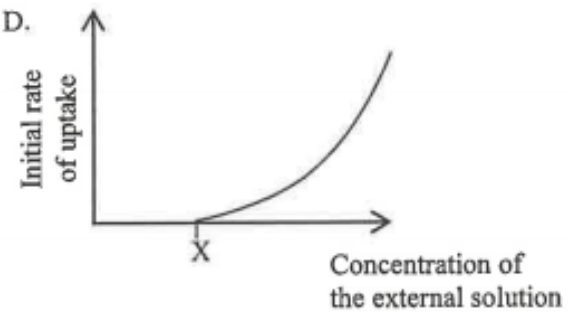
A. (1) only
B. (2) only
C. (1) and (2) only
D. (1) and (3) only

34. Solutions of different concentrations of a solute were prepared and some plant cells were immersed in each of the solutions. Which of the following graphs shows the initial rate of uptake of the solute by means of diffusion?
(Note: X is the concentration of the solute inside the plant cells.)

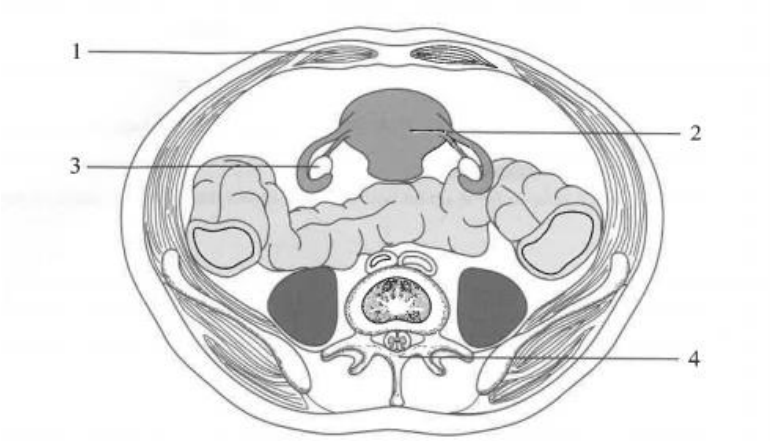
A.


B.


C.


D.


Directions: Questions 35 and 36 refer to the diagram below which shows a cross-section of the abdominal part of a female.



35. Which of the following labelled structures will help expel the foetus during labour?

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

36. Which of the following descriptions about structure 4 is incorrect?

    A. It has high calcium content.
    B. It protects the central nervous system.
    C. It provides surface for muscle attachment.
    D. It is covered by cartilage.

END OF SECTION A