St. Stephen's Girls' College
Final Examination 2016-2017

Form 6 **Biology Paper 1** **KFL, LYL**
65 students **Time allowed: 2 hours 30 minutes**

F.6__ Class no.: _____
Name: _____

GENERAL INSTRUCTIONS

1. There are TWO sections, A and B, in this Paper. Section A carries 36 marks and Section B carries 84 marks. You are advised to finish Section A in about 35 minutes.

2. Section A consists of multiple-choice questions in this question paper. Section B contains conventional questions printed separately in Question-Answer Paper 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 Paper B. The Answer Sheet for Section A and the Question-Answer Paper for Section B must be handed in separately at the end of the examination.

SECTION A (MULTIPLE-CHOICE QUESTIONS)

INSTRUCTIONS FOR SECTION A

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

2. All questions carry equal marks.

3. **ANSWER ALL QUESTIONS.** You are advised to 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.

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

5. No marks will be deducted for wrong answers.

Section A: Multiple-Choice Questions

1. Which of the following cellular components can be found in both prokaryotic and eukaryotic cells?

   A. rough endoplasmic reticulum B. chloroplasts
   C. ribosomes D. mitochondria

2. Which of the following substances contain(s) nitrogen atoms?

   (1) ATP (2) tRNA (3) haemoglobin

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

3. What is the property and function of ligaments in humans?

	Property	Function
A.	elastic	join bones together
B.	elastic	join muscles to bones
C.	inelastic	join bones together
D.	inelastic	join muscles to bones

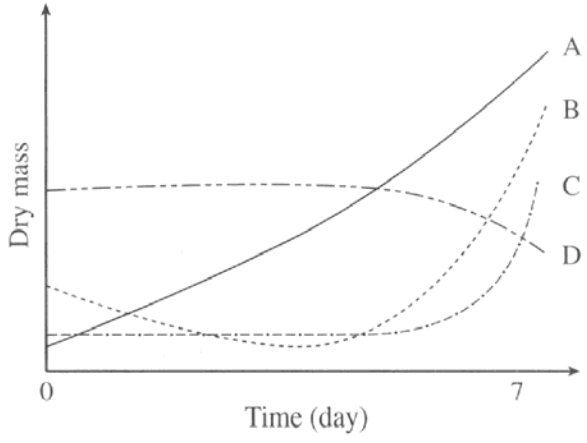
4. The table below shows the energy flow through a cow grazing in a grassland:

Process	Energy (kJ)
Grasses consumed	4 500
Used for respiration	1 800
Used for growth	380
Loss in faeces	2 300
Loss in urine	20

   The total amount of energy permanently lost from the grassland through this cow is:

   A. 1 800 kJ B. 2 300 kJ C. 2 320 kJ D. 4 120 kJ

5. Which of the following curves correctly represents the changes in the dry mass of the radicle of a germinating seed in the first 7 days?



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

6. Which of the following tissues in the wall of arterioles is/are responsible for regulating blood flow to organs?

   (1) muscle (2) elastic tissue (3) fibrous tissue

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

7. The electron micrograph below shows part of a cell of an organism.

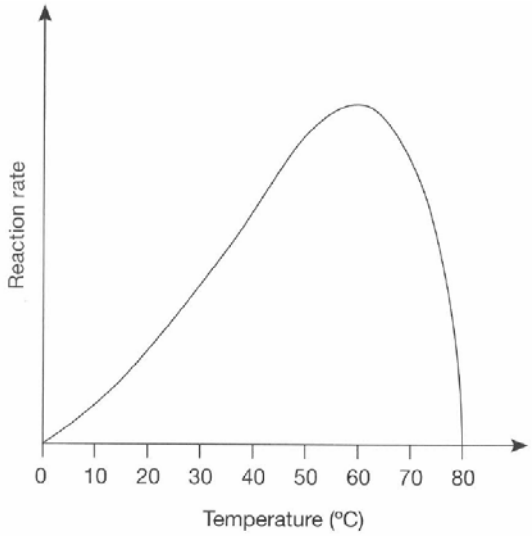
x20 000

Which of the following organisms does the cell possibly belong to?

(1) *E. coli* (2) *Amoeba* (3) Yeast

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

Directions: Questions 8 and 9 refer to the graph below, which shows the effect of temperature on the activity of enzyme X.



8. With reference to the graph above, which of the following combinations is correct?

	Dependent variable	Independent variable	Control variable
A.	reaction rate	pH	temperature
B.	temperature	reaction rate	pH
C.	reaction rate	temperature	pH
D.	reaction rate	pH	temperature

9. Which of the following statements about enzyme X is correct?

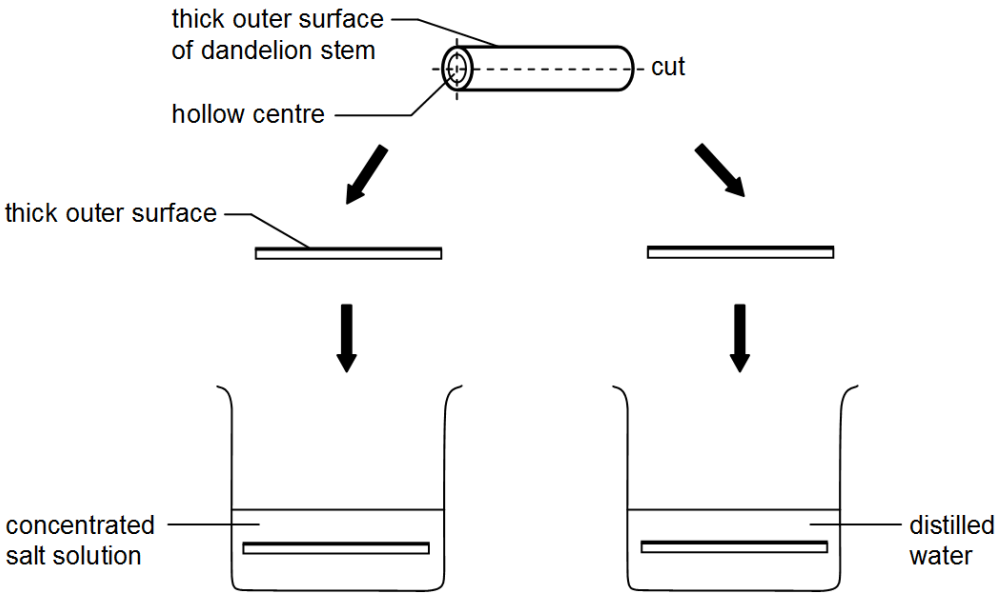
A. It is denatured at 0°C.

B. It is most active at 60°C.

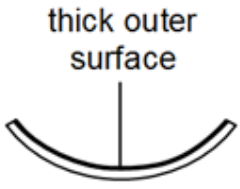
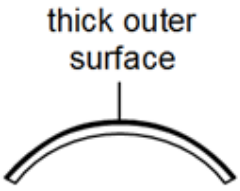
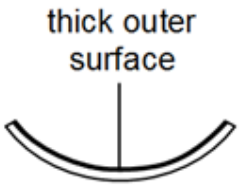
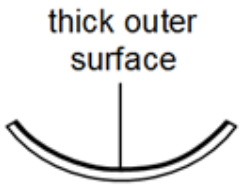
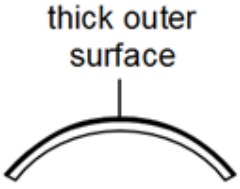
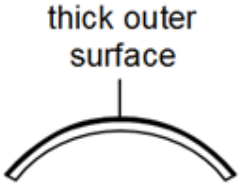
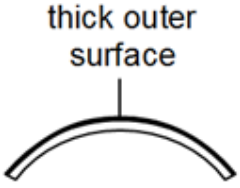
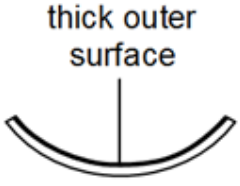
C. Its activity increases continuously with a rise in temperature.

D. It is killed at 80°C.

10. A student performed an experiment to study osmosis. He cut a section of dandelion stem vertically into four strips. He then put one strip into concentrated salt solution and one strip into distilled water. The diagram below shows the steps of the experiment.



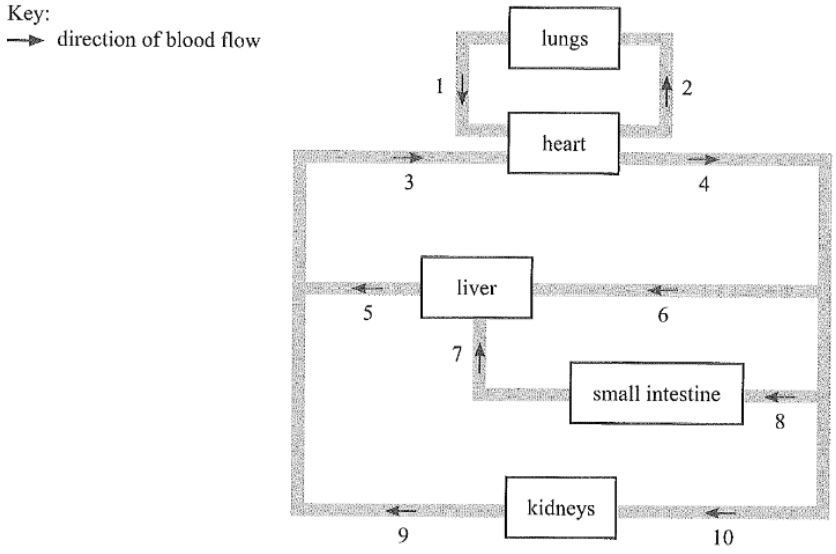
After 30 minutes, he observed the appearance of the strips. Which of the following shows their appearance?

	Strip in concentrated salt solution	***Strip in distilled water***
A.		
B.		
C.		
D.		

11. A man with blood group B and a woman with blood group A have a baby boy. Which of the following is/ are the possible blood group(s) of the boy?
    (1) blood group A (2) blood group B
    (3) blood group AB (4) blood group O

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

Directions: Questions 12 and 14 refer to the schematic diagram below, which shows the blood vessels (1 to 10) that connect the heart, lungs, liver, small intestine and kidneys in humans:



12. Which of the following descriptions about the composition of the blood in the labelled blood vessels is correct?
    A. The blood in vessel 1 contains no carbon dioxide.
    B. The blood in vessel 5 contains the highest concentration of urea among all the labelled blood vessels.
    C. The blood in vessel 8 contains no glucose after fasting for 2 days.
    D. The blood in vessel 9 contains no urea.

13. Which of the following descriptions about the blood flow or blood pressure in the labelled blood vessels is correct?
    A. The blood in vessel 1 has the slowest blood flow among all the blood vessels in the body.
    B. The blood in vessel 2 has the highest blood pressure among all the blood vessels in the body.
    C. The blood in vessel 3 has the slowest blood flow among all the blood vessels in the body.
    D. The blood in vessel 4 has the highest blood pressure among all the blood vessels in the body.

14. After taking a meal rich in fats, in which labelled blood vessel will fat first appear?
    A. 3 B. 5 C. 7 D. 8

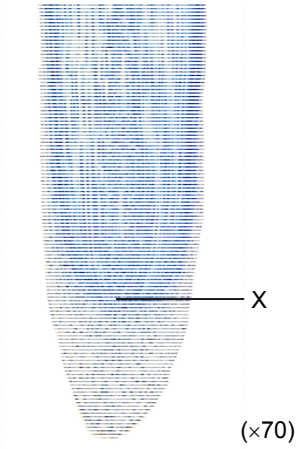
15. 5 cm^3 of amylase solution was added to 10 cm^3 of starch solution and mixed well. Which of the following chemical tests would give a negative result when used to test the reaction mixture after 5 minutes?

A. Benedict's test B. glucose test strip C. protein test strip D. iodine test

16. Which of the following processes is carried out by symbiotic bacteria inside the root nodules of a bean plant?

A. The conversion of nitrates into nitrogen gas
B. The conversion of ammonium compounds into nitrates
C. The conversion of ammonium compounds into nitrogen gas
D. The conversion of nitrogen gas into ammonium compounds

17. The photomicrograph below shows a section of an onion root tip.

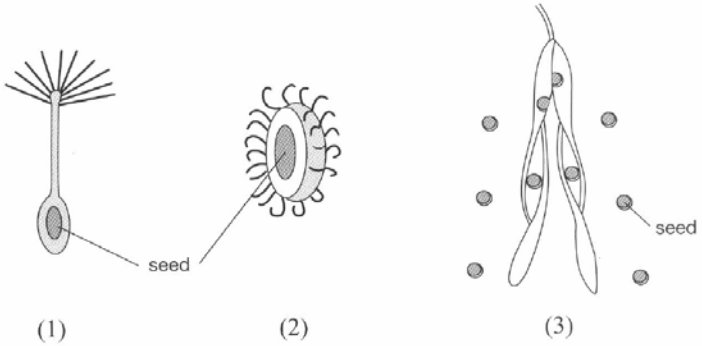


Which of the following statements about region X is/are correct?

(1) X contains apical meristem.
(2) The cells in X have small vacuoles in the cytoplasm.
(3) Growth at X increases the length of the plant.

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

18. The diagrams below show three different fruits:

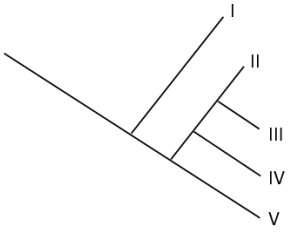


Which of the following combinations of fruits and their modes of dispersal is correct?

	(1)	**(2)**	**(3)**
A.	self-explosion	wind	animal
B.	wind	self-explosion	animal
C.	animal	wind	self-explosion
D.	wind	animal	self-explosion

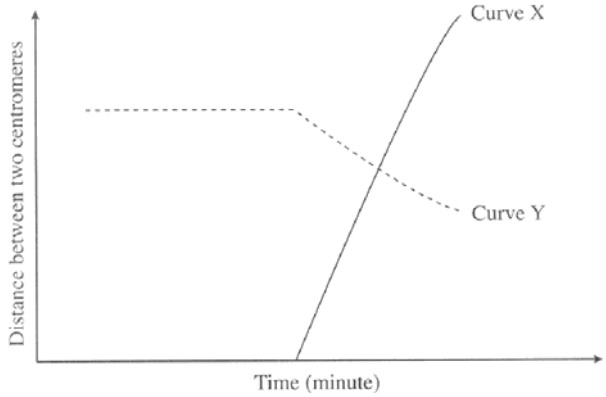
19. Which of the following processes may increase the genetic variation in an ecosystem?
(1) chromosome mutation
(2) independent assortment during meiosis
(3) random fertilization between male and female gametes
A. (1) only B. (1) and (2) only
C. (2) and (3) only D. (1), (2) and (3)

20. The diagram below shows the evolutionary tree of five species.



Which of the following pairs of species is the most closely related?
A. I and II B. II and III C. III and IV D. IV and V

21. The graph below shows the changes in distance between two pairs of centromeres during one cycle of mitotic cell division in a plant cell.



According to the above graph, which of the following correctly shows the corresponding curve and the location of the two centromeres in the nucleus?

	Curve	**Location of the two centromeres**
A.	X	centromeres on two members of homologous chromosomes during pairing
B.	X	centromeres on two sister chromatids
C.	Y	centromeres on two sister chromatids
D.	Y	centromeres on two members of homologous chromosomes during pairing

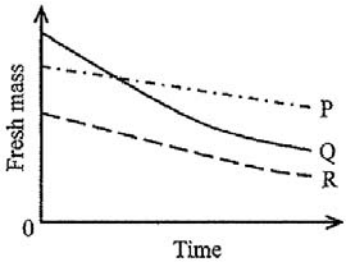
22. Support of young dicotyledonous plant and woody plant are mainly by:

	Young dicotyledonous	**Woody plant plant**
A.	turgidity of cells	turgidity of cells
B.	xylem	xylem
C.	turgidity of cells	xylem
D.	xylem	turgidity of cells

23. A person has not taken any food for 24 hours. Which of the following will increase in concentration in the blood?
A. glucagon B. glucose C. glycogen D. insulin

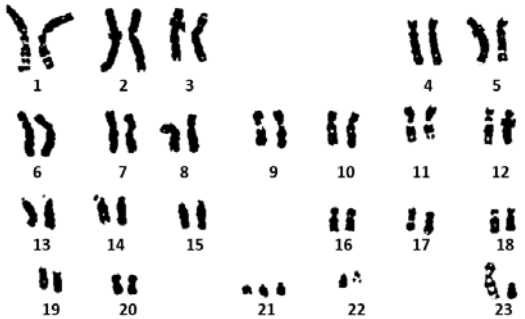
24. In a DNA molecule of bacteria, 30% of the nitrogenous bases are cytosine (C). What is the percentage of adenine (A) in this DNA molecule?
A. 10% B. 20% C. 30% D. 40%

25. Three types of seaweeds, P, Q and R, were collected from the intertidal zone (the zone between the high tide mark and the low tide mark) of a rocky shore. The distribution of these seaweeds in the intertidal zone is related to their ability to withstand exposure to air. The graph below shows the changes in the fresh mass of these seaweeds when they are left to dry in the laboratory:



Which of the following shows the most likely distribution of these seaweeds from the lower shore to the upper shore?
A. P, Q, R B. P, R, Q C. Q, R, P D. R, Q, P

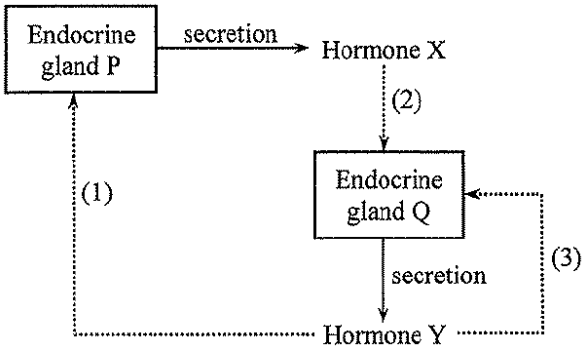
26. Person W has a genetic abnormality. The following karyotype shows the chromosomes of one body cell of W.



Which of the following regarding person W is correct?
(1) Person W is a female.
(2) The genetic abnormality that person W has is caused by an extra chromosome 21.
(3) All children of person W will have this abnormality.
A. (1) only B. (2) only C. (1) and (2) only D. (2) and (3) only

27. A normal person temporarily lost his hearing when he took a lift from the ground floor to the 70th floor of a high-rise building. This is probably because
A. a low pressure in the middle ear sucks in the ear drum which cannot transmit vibrations.
B. a low pressure in the inner ear sucks in the oval window which cannot transmit vibrations.
C. a high pressure in the middle ear presses on the ear drum which cannot transmit vibrations.
D. a high pressure in the inner ear presses on the round window which cannot transmit vibrations.

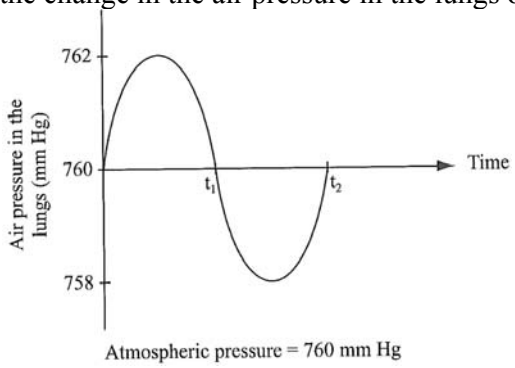
28. The flow chart below shows the interaction between the two endocrine glands and the hormones they secrete;



Which of the following combinations correctly shows the regulation of hormone Y by a negative feedback mechanism?

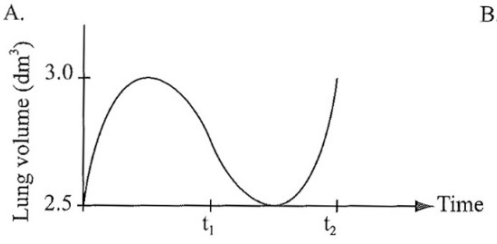
	(1)	**(2)**	**(3)**
A.	inhibition	stimulation	inhibition
B.	inhibition	inhibition	stimulation
C.	stimulation	stimulation	inhibition
D.	stimulation	inhibition	stimulation

29. The graph below shows the change in the air pressure in the lungs of a person:

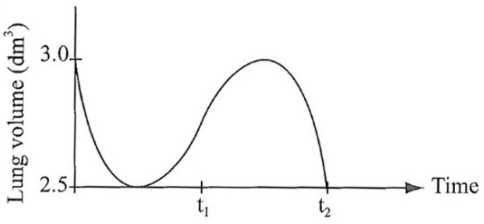


Which of the following graphs shows the corresponding changes in the lung volume of the person?

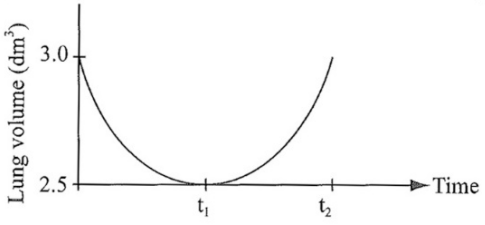
A.



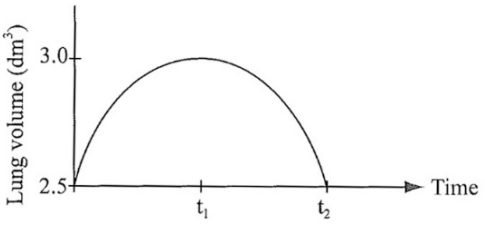
B.



C.



D.



30. Which of the following is a correct sequence of events during inspiration in humans?
    (1) decrease in lung pressure (2) air rushes into the lungs
    (3) increase in lung volume (4) contraction of intercostal muscles
    A. (2),(1),(3),(4) B. (4),(2),(3),(1)
    C. (4),(1),(3),(2) D. (4),(3),(1),(2)

31. Which of the following combinations correctly states the difference between the blood composition of umbilical artery and umbilical vein?

	Umbilical artery	**Umbilical vein**
A.	more glucose	less glucose
B.	more oxygen	less oxygen
C.	more urea	less urea
D.	less carbon dioxide	more carbon dioxide

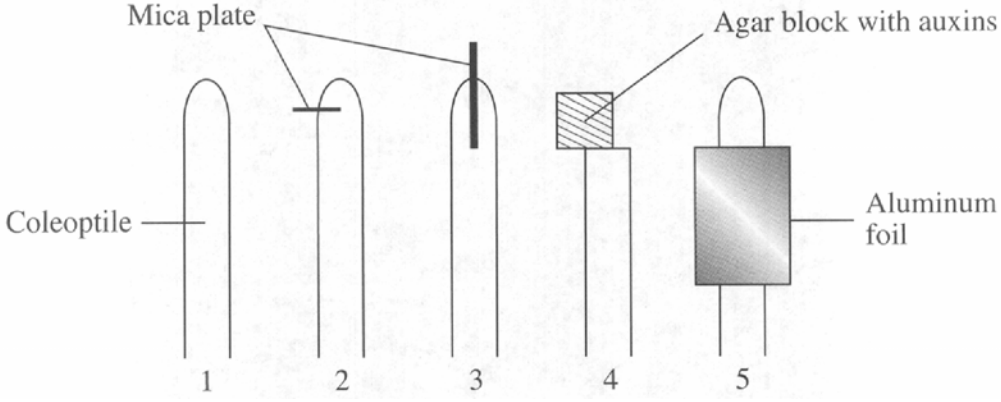
Directions: Questions 32 and 33 refer to an investigation to study the effect of diet on the performance of athletes. Three groups of athletes were each fed on a different diet for three days. The concentration of glycogen in their leg muscles was then measured. The athletes then exercised on a cycling machine at maximum level until they were exhausted. The results of the investigation are shown in the bar chart below:

32. In order to make a valid comparison of the investigation results, the amount of proteins, vitamins and minerals in the diets have to be the same. Apart from these substances, what other parameter of the diets has to be identical?
    A. mass of the food intake B. energy content of the diet
    C. water content of the diet D. proportion of dietary fibre in the diet

33. With reference to the bar chart, what conclusion can be drawn from the results of the investigation?
    A. A high-fat diet has a higher energy content than a high-carbohydrate diet.
    B. The amount of fat stored in the leg muscles is smaller than the amount of glycogen stored.
    C. The leg muscles undergo anaerobic respiration more readily when the athletes have a high-fat diet.
    D. The more glycogen stored, the longer the athlete can carry out vigorous exercise.

34. Which of the following food substances enter(s) lacteal upon absorption by intestinal epithelium in the ileum?
(1) fatty acid (2) vitamin A (3) lipid
A. (1) only B. (1) and (2) only
C. (2) and (3) only D. (1), (2) and (3)

Directions: Questions 35 and 36 refer to the diagram below, which shows the beginning of an experiment for testing the growth response of coleoptiles to unilateral light.



Coleoptiles	Direction of tip growth
1	Turn left
2	Turn left
3	No turning
4	Turn left
5	Turn left

35. Which of the following coleoptiles need to be compared in order to reach a conclusion that 'auxins can move laterally'?
A. (1) and (2) only B. (1) and (3) only
C. (2), (3) and (5) only D. (1), (2), (3) and (4) only

36. The direction of unilateral light applied to coleoptiles is not shown in the diagram above. Based on the results of the experiment, where should the table lamp be placed in order to give unilateral light?
A. on the left B. on the right C. above the set-up D. below the set-up

END OF SECTION A

Go on to Question-Answer Book B for questions on Section B