St. Stephen's Girls' College
Final Examination 2015-2016

Form 6 **Biology Paper 1** **SYF, KFL**
64 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

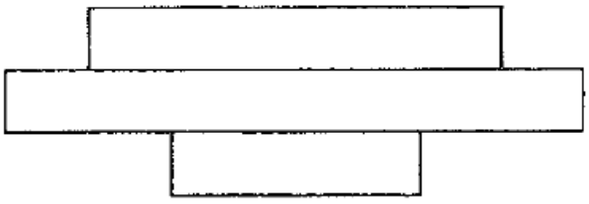
1. Which of the following statements concerning the arteries is/are INCORRECT?
   (1) All arteries drain blood away from the heart.
   (2) All arteries contain oxygenated blood.
   (3) All arteries carry blood under pressure.
   (4) All arteries do not contain any valve.
   A. (1) only B. (2) only C. (1) and (3) only D. (2) and (4) only

2. Which of the following descriptions about pollen grains is correct?
   A. Pollen grains are the male gametes of a plant.
   B. Pollen grains can produce nectar to attract insects.
   C. Pollen grains germinate when they land on the stigma of the same species.
   D. Pollen grains of insect-pollinated flowers are usually smaller than those of wind-pollinated flowers.

3. How is lean meat assimilated in humans after being digested and absorbed?
   (1) For making plasma proteins
   (2) For making enzymes
   (3) Excess amino acids being excreted by the kidney
   A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

4. Which of the following organisms is/are responsible for converting the nitrogen in dead bodies of organisms to nitrates in soil?
   (1) nitrogen fixing bacteria
   (2) nitrifying bacteria
   (3) decomposers
   A. (1) only B. (3) only
   C. (1) and (2) only D. (2) and (3) only

5. The following shows a pyramid of biomass of organisms in a habitat:



   In which of the following food chains can this pyramid of biomass be found?
   A. algae → zooplankton → fish
   B. grass → rabbit → lion
   C. tree → caterpillar → bird
   D. grass → sheep → intestinal parasitic worms

6. Which of the following descriptions about hormones are correct?
   (1) Hormones are transported in blood.
   (2) A specific hormone can only act on one target organ.
   (3) Different hormones can act on the same target organ.
   A. (1) and (2) only B. (1) and (3) only
   C. (2) and (3) only D. (1), (2) and (3)

7. Figure 1 shows a gymnast on a balance beam. Figure 2 shows the major muscles, W, X, Y and Z, in her left leg.

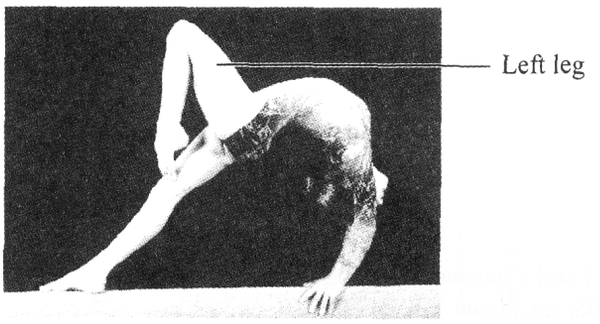


Figure 1

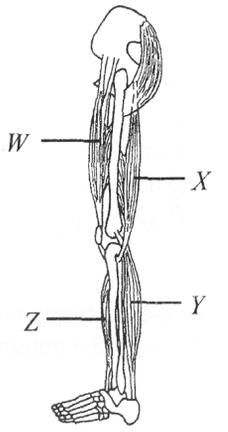
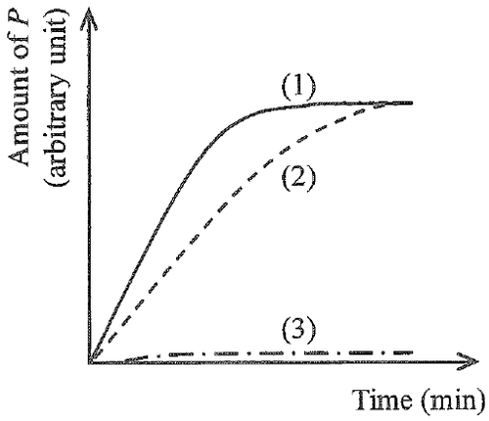


Figure 2

In maintaining the pose of the left leg shown in Figure 1, which of the gymnast's muscles are contracting?

A. X and Y
B. X and Z
C. W and Y
D. W and Z

8. A human enzyme E catalyses a reaction to form the product P. The following graph shows the variation of the amount of P with time when the reaction is allowed to take place at three different temperatures:



Which of the following correctly shows the results obtained when the reaction is allowed to take place at 20°C, 35°C and 80°C?

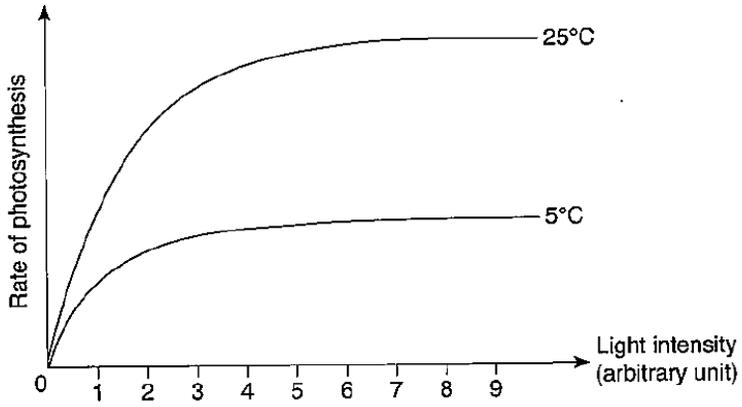
	20°C	35°C	80°C
A.	(1)	(2)	(3)
B.	(2)	(1)	(3)
C.	(3)	(1)	(2)
D.	(3)	(2)	(1)

9. Which of the following correctly describe the significance of phototropism to plants?
   (1) It ensures that the root can anchor to the soil for support.
   (2) It ensures that the root can get water and dissolved minerals from the soil.
   (3) It allows the shoot to reach a position where there is sunlight.

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

10. Which of the following statements about breathing is correct?
    A. The contraction of the diaphragm muscles causes the lungs to expand.
    B. The lungs expand to push the ribs upwards.
    C. The entry of air causes the lungs to expand.
    D. The air pressure inside the lungs keeps decreasing during inhalation.

11. The graph below shows the photosynthetic rate of a green plant under different light intensity and temperatures:



Which of the following can be deduced from the graph?
(1) At 7 units of light intensity and 25°C, carbon dioxide concentration is the limiting factor on its photosynthetic rate.
(2) At 7 units of light intensity and 5°C, temperature is the limiting factor on its photosynthetic rate.
(3) At 2 units of light intensity and 25°C, light intensity is the limiting factor on its photosynthetic rate.

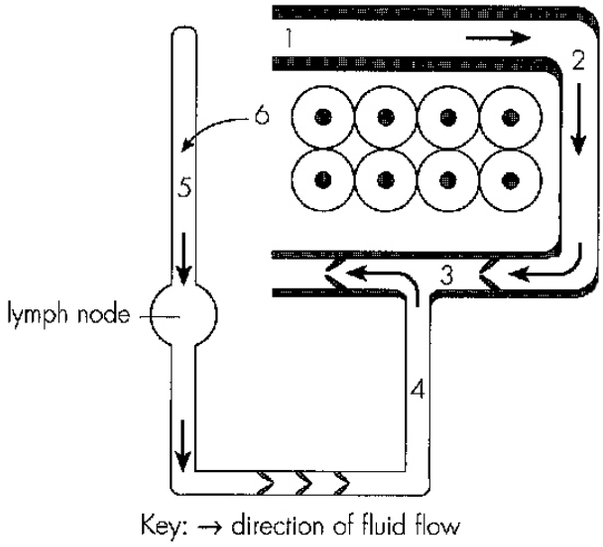
A. (1) and (2) only B. (1) and (3) only
C. (2) and (3) only D. (1), (2) and (3)

12. In which part of a mammal would sound vibrations be eventually converted into nerve impulses ?
    A. middle ear B. inner ear C. auditory nerve D. cerebrum

13. Which of the following blood transfusion may cause harm to the recipient?
    A. People of group O donate blood to people of group A.
    B. People of group A donate blood to people of group AB.
    C. People of group O receive blood from people of group B.
    D. People of group AB receive blood from people of group A.

14. Which of the following statements about haemoglobin is ***incorrect***?
    A. It is protein in nature.
    B. It is a calcium-containing pigment.
    C. It binds weakly with oxygen in muscles.
    D. It binds strongly with oxygen in the lungs.

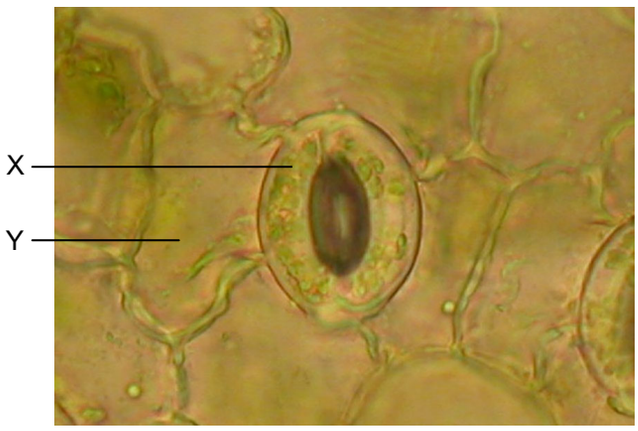
Directions: Questions 15 to 16 refer to the diagram below which represents the relationships between the blood circulatory system, lymphatic system and a muscle in the leg.



15. Which of the following is found at 2 but not at 5?
A. Blood platelets B. Fat
C. Glucose D. White blood cells

16. Which of the following changes may occur after the person has finished a 100 m race?
A. The lactic acid level at 3 increases.
B. The glucose level at 1 decreases.
C. The oxygen level at 1 decreases.
D. The urea level at 3 increases.

17. The photomicrograph below shows the appearance of part of the upper epidermis of a leaf of a floating plant.



Which of the following statements about cell X and cell Y is/are correct?

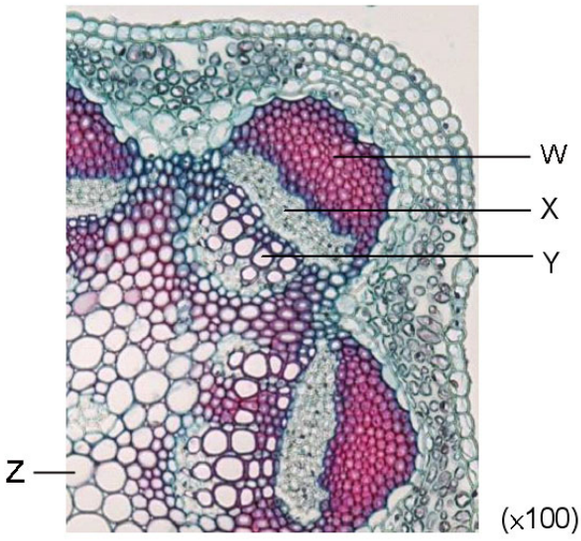
(1) Cell X contains chloroplasts but cell Y does not.
(2) The thickness of the cell wall of cell X is uneven while that of cell Y is even.
(3) Both cell X and cell Y are absent in the lower epidermis of the leaf.

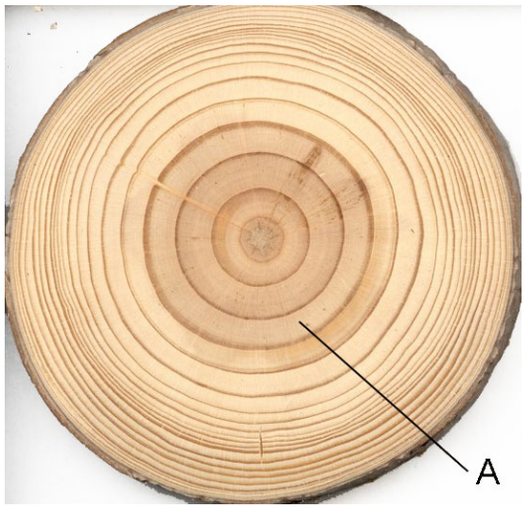
A. (1) only B. (1) and (2) only
C. (2) and (3) only D. (1), (2) and (3)

18. A student put a germinating seed into a blue dye. The dye decolourizes in tissues that carry out respiration actively. Which of the following correctly shows the colour of the dye in different parts of the seed?

	Radicle	***Plumule***	***Cotyledons***
A.	colourless	colourless	colourless
B.	colourless	colourless	blue
C.	blue	blue	colourless
D.	blue	colourless	blue

Directions: Questions 19 and 20 refer to the photomicrographs below show the cross sections of the stems of a woody plant at different stages of growth.





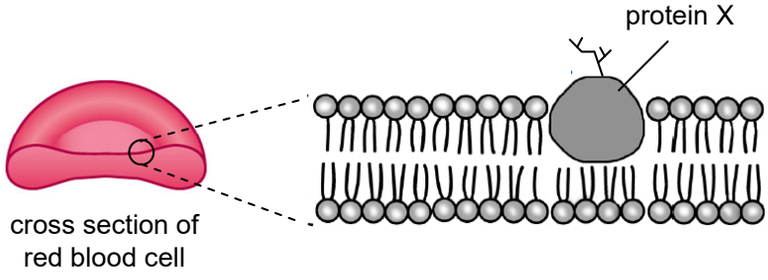
19. Which of the following correctly states the functions of structures X and Y?

	Structure X	***Structure Y***
A.	transports water	carries out photosynthesis
B.	transports water	provides support
C.	transports organic nutrients	carries out photosynthesis
D.	transports organic nutrients	provides support

20. Part A is developed from the cells in

A. part W
B. part X.
C. part Y.
D. part Z.

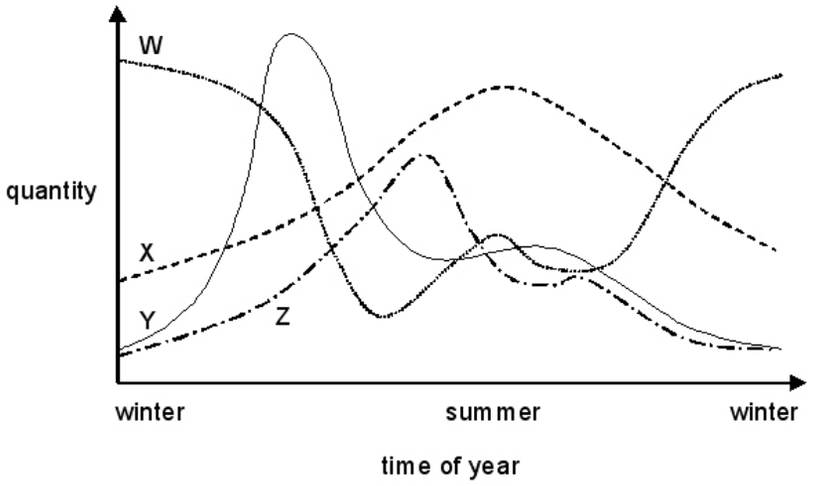
21. The diagram below shows part of the membrane of a red blood cell.



What is the most possible function of protein X?

A. as a carrier to carry molecules across the membrane
B. provides a channel for transporting molecules across the membrane
C. as an antigen for cell recognition
D. as a pigment for carrying oxygen

22. The graph below shows the changes of the following in a lake in a year:

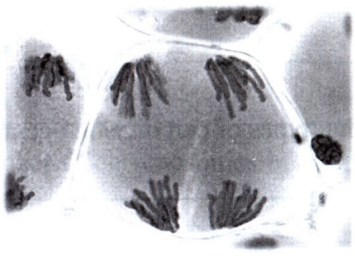


(1) light intensity
(2) nitrate content in water
(3) population of producers
(4) population of primary consumers

What do curves W, X, Y and Z represent?

	Curve W	***Curve X***	***Curve Y***	***Curve Z***
A.	(1)	(4)	(2)	(3)
B.	(3)	(1)	(4)	(2)
C.	(2)	(1)	(3)	(4)
D.	(4)	(3)	(1)	(2)

Directions: Questions 23 and 24 refer to the diagram below, which shows a cell in the process of cell division:

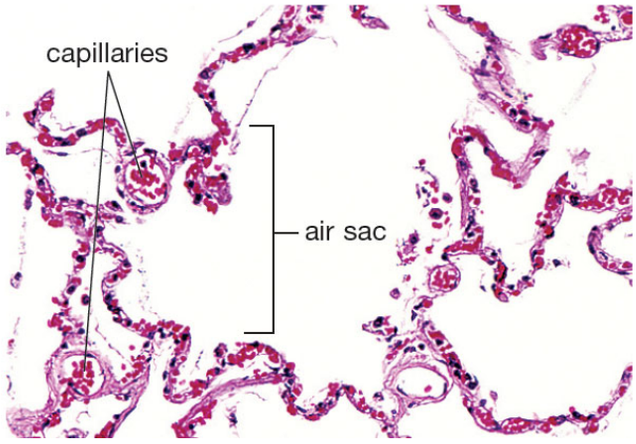


23. Where can this type of cell division be found in the human body?
A. muscle B. brain C. ovary D. skin

24. What is the stage of cell division in the above diagram?
A. anaphase I B. anaphase II C. metaphase I D. metaphase II

25. A new species is considered to have evolved when different groups of a population
A. can no longer interbreed to produce fertile offspring.
B. are isolated from each other by a geographic barrier.
C. show increased variations due to mutations.
D. are subjected to increased competition in their habitats with limited resources.

26. The photograph below shows the transverse section of the human lungs under a high-power microscope.



Based on the information shown in the photograph, which of the following statements correctly explain why the human lungs can carry out gas exchange efficiently?

(1) The distance of gas diffusion is short.
(2) The air sacs provide a large surface area for gas exchange.
(3) The oxygen which enters the lungs can be carried away rapidly.

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

Directions: Questions 27 to 29 refer to the experiment described below.

Four test tubes containing equal volumes of coagulated egg white cubes were set up. Different solutions were then added to the test tubes and they were allowed to stand at 37°C. The table below shows the solutions added to the test tubes and the results observed after 24 hours:

Tube		1	2	3	4
Solutions added	sodium hydrogen carbonate solution	5 cm^3	5 cm^3	-	5 cm^3
	solution X	-	5 cm^3	5 cm^3	5 cm^3 (boiled solution X)
	distilled water	5 cm^3	-	5 cm^3	-
Results after 24 hours		+	-	+	+

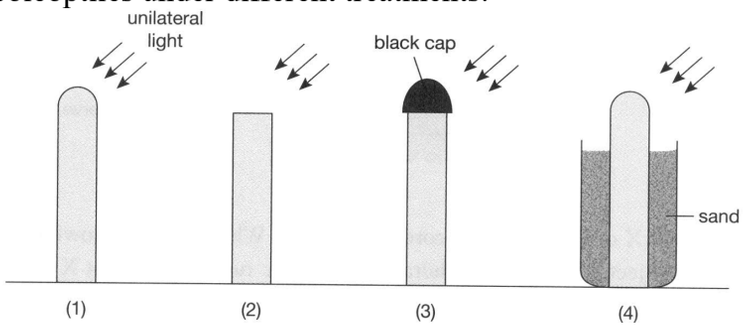
Key: += egg white cube present
- = egg white cube absent

27. Which of the following can be concluded from the results of tubes 1 and 2?
A. Solution X is pancreatic juice.
B. Solution X can break down protein.
C. Solution X can digest protein only in an alkaline medium.
D. Solution X contains protease.

28. Which of the tubes helps to confirm that the results obtained are due to the action of an enzyme in solution X?
A. Tube 1 B. Tube 2 C. Tube 3 D Tube 4

29. Which of the following digestive juices contains enzymes which can produce the same result as solution X?
A. Saliva B. Gastric juice C. Pancreatic juice D. Bile

Directions: Questions 30 and 31 refer to the experimental set-up below, which was used to show the responses of coleoptiles under different treatments:



30. Which coleoptiles would grow towards the unilateral light?
A. (1) only B. (1) and (2) only C. (1) and (3) only D. (1) and (4) only

31. Which of the following should be the controlled variable(s) of the experiment?
(1) intensity of light
(2) amount of nutrients in soil
(3) wavelength of light
A. (1) and (2) only B. (1) and (3) only
C. (2) and (3) only D. (1), (2) and (3)

32. Where is/are cilia found in humans?
(1) oviduct (2) bronchus (3) nasal cavity
A. (1) only B. (1) and (2) only
C. (2) and (3) only D. (1), (2) and (3)

Directions: Questions 33 to 34 refer to the paragraph below.

In maize plants the allele for big leaf (**B**) is dominant to small leaf (**b**) and the allele for smooth leaf (**S**) is dominant to wrinkly leaf (**s**). A maize plant heterozygous for both pairs of alleles is self-pollinated and 160 seeds are produced and sown.

33. What would be the expected number of offspring showing wrinkly leaf?
A. 30 B. 40 C. 80 D. 90

34. What would be the expected number of offspring showing both big leaves and smooth leaves?
A. 30 B. 40 C. 80 D. 90

35 Which of the following structures contain DNA?
(1) Nucleus (2) Chloroplast (3) Mitochondria (4) Rough endoplasmic reticulum
A. (1) only B. (1) and (2) only
C. (1), (2) and (3) only D. (1), (2), (3) and (4)

36. Which of the following contain glycogen?
(1) Liver cells of humans (2) Muscle cells of humans
(3) Mesophyll cells of leaf (4) Hyphae of fungi
A. (1) and (2) only B. (2) and (3) only
C. (3) and (4) only D. (1), (2) and (4) only

End of Section A