

FUKIEN SECONDARY SCHOOL  
S3 First Term Uniform Test (2020-2021)  
Biology  
(45 minutes)

Date: 22<sup>nd</sup> October 2020

Name: \_\_\_\_\_

Time: 8:30a.m. – 9:15a.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 50.

**I. Multiple Choice Questions (20 marks)**

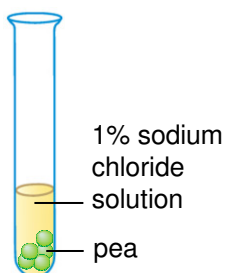
- 1 Which of the following best describes the study of Biology?
  - A** The study of plants and their environment and the interactions between them.
  - B** The study of animals and their environment and the interactions between them.
  - C** The study of bacteria and the environment and the interactions between them.
  - D** The study of living things and their environment and the interactions between them.
  
- 2 Which of the following are the areas of study in biology?
  - (1) The functions of different parts of the brain
  - (2) Interactions between micro-organisms and the ocean
  - (3) The universe
  - 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 is **NOT** a stage of scientific investigation?
  - A** Making observations
  - B** Preparing classification
  - C** Proposing a hypothesis
  - D** Doing experiments

- 4 Which of the following descriptions about experiments is correct?
- A Experiments must be repeatable and produce the same results.
  - B Experiments can only be done in the laboratory.
  - C Only scientists can do experiments.
  - D Experiments must always prove the hypothesis correct.
- 5 A student is designing an experiment to investigate whether heavier female rats produce more offspring than lighter female rats. In the experiment, what are the independent and dependent variables?

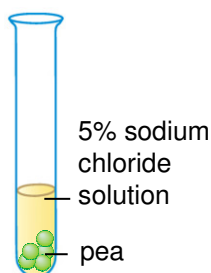
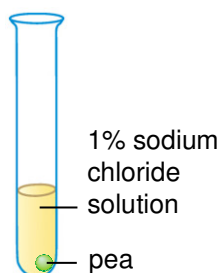
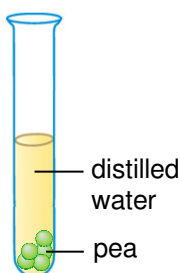
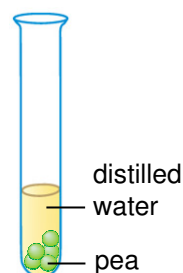
**Independent variable****Dependent variable**

- |   |                           |                           |
|---|---------------------------|---------------------------|
| A | age of the female rats    | weight of the female rats |
| B | number of offspring       | weight of the female rats |
| C | weight of the female rats | age of the female rats    |
| D | weight of the female rats | number of offspring       |

- 6 The set-up below is used to investigate whether sodium chloride solution can preserve peas.



Which of the following set-up should be included as the control in this investigation?

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

- 7 Which of the following are examples of excretion in humans?

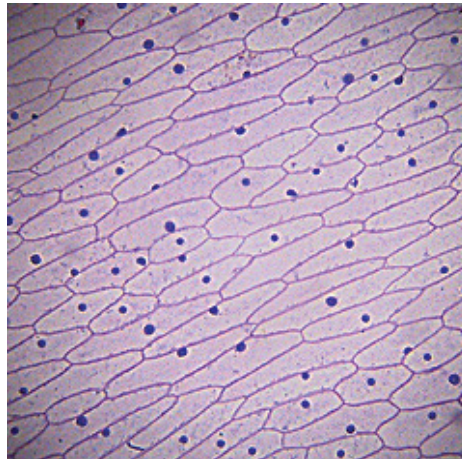
- (1) breathing out carbon dioxide
  - (2) sweating
  - (3) getting rid of urine from the body
- A (1) and (2) only
  - B (1) and (3) only
  - C (2) and (3) only
  - D (1), (2) and (3)

- 8 The process in which food is broken down to release energy for body activities is called
- A** digestion.
  - B** nutrition.
  - C** respiration.
  - D** excretion.
- 9 When you touch the leaves of Mimosa, the leaves fold up immediately. Which of the following are involved in this phenomenon?



- (1) growth
  - (2) movement
  - (3) irritability
- A** (1) and (2) only
  - B** (1) and (3) only
  - C** (2) and (3) only
  - D** (1), (2) and (3)
- 10 In a scientific investigation, if the results of an experiment do not match the prediction, we should
- (1) revise the method of the experiment.
  - (2) revise the hypothesis.
  - (3) give up the investigation.
- A** (1) and (2) only
  - B** (1) and (3) only
  - C** (2) and (3) only
  - D** (1), (2) and (3)

**Directions:** Questions 11 and 12 refer to the photomicrograph below, which shows some onion epidermal cells observed under a light microscope. An objective of 10X is used.



( $\times 100$ )

- 11 If he turns the nosepiece to choose a 40X objective, which of the following statement(s) correctly describes the image he observed?
- (1) Fewer cells are observed.
  - (2) More details of the cells are observed.
  - (3) The image is brighter.
- A** (1) only  
**B** (1) and (2) only  
**C** (2) and (3) only  
**D** (1), (2) and (3)
- 12 Below are some steps of adjusting the microscope from low-power magnification to high-power magnification.
- (1) Rotate the nosepiece to select a 40X objective.
  - (2) Move the part of the specimen to be observed in detail to the centre of the field of view.
  - (3) Turn the fine adjustment knob to adjust the focus.
  - (4) Adjust the diaphragm to brighten the view if necessary.
- Which of the following is the most reasonable sequence of steps?
- A** (1), (2), (3), (4)  
**B** (2), (1), (3), (4)  
**C** (1), (3), (4), (2)  
**D** (2), (4), (1), (3)

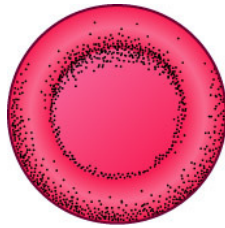
- 13 Which of the following is/are the advantage(s) of using a light microscope over an electron microscope in observing an organism?
- (1) Any movement of the organism can be observed.
  - (2) Preparation of the specimen for observation is easier.
  - (3) The structure of the organism can be shown in greater detail.
- A** (2) only  
**B** (1) and (2) only  
**C** (1) and (3) only  
**D** (1), (2) and (3)
- 14 Which of the following parts of a light microscope are responsible for magnifying objects?
- (1) objective
  - (2) stage
  - (3) eyepiece
  - (4) mirror
- A** (1) and (3) only  
**B** (2) and (4) only  
**C** (3) and (4) only  
**D** (1), (2), (3) and (4)
- 15 When observing a specimen under a light microscope, which of the following parts should be adjusted to bring the image in focus?
- A** clip  
**B** mirror  
**C** fine adjustment knob  
**D** nosepiece
- 16 Which of the following statements about the Cell Theory is correct?
- A** It states the differences between plant cells and animal cells.  
**B** It describes how cells divide to form new cells.  
**C** It states that all organisms are made up of one or more cells.  
**D** It states that all cells have a nucleus, a cell membrane and cytoplasm.
- 17 Which of the following statements about mitochondrion and chloroplast is correct?
- A** Both of them are bounded by a double membrane.  
**B** Both of them are involved in releasing energy.  
**C** Mitochondrion can be found in animal cells but not plant cells.  
**D** Chloroplast can be found in both animal cells and plant cells.

18 Which of the following statements about the nucleus are correct?

- (1) It is the main site where respiration takes place.
- (2) It is the site where the genetic material is located.
- (3) It is bounded by a double membrane.

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

19 The diagram below shows a mature human red blood cell.



This cell has

- (1) cytoplasm.
- (2) nucleus.
- (3) cell membrane.

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

20 The cells in human testes secrete male sex hormones which is made of lipids. These cells are expected to have a large amount of

- A** nuclei.
- B** rough endoplasmic reticulum.
- C** smooth endoplasmic reticulum.
- D** vacuoles.

**End of Section I**

**II Structured Questions (30 marks)**

1. Karen thinks that people eating oatmeal every day have a lower cholesterol level in blood than those who do not eat oatmeal. She divided 200 individuals into 2 groups. The diets of both groups are the same except for the inclusion of oatmeal. The experimental group is provided with oatmeal for breakfast every day and the control group is provided with breakfast with no oatmeal. After one month, she measured the blood cholesterol levels of each individual, and compared the average blood cholesterol level of the two groups.

The following table shows the result of the experiment.

	Experimental group	Control group
Average blood cholesterol level (mg/dL)	202	205

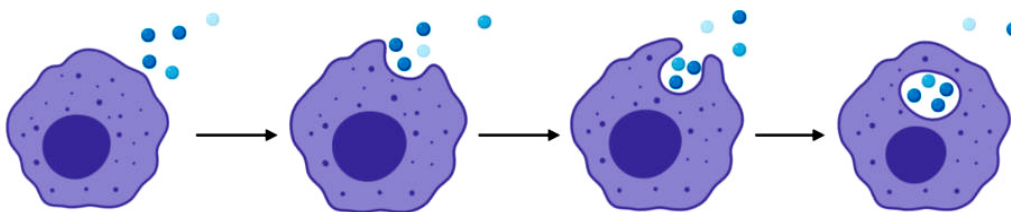
According to the information provided, answer the following questions.

- a State the hypothesis of this experiment. (1 mark)
  - b State the independent variable of this experiment. (1 mark)
  - c State the dependent variable of this experiment. (1 mark)
  - d State THREE controlled variables of this experiment. (3 marks)
  - e What conclusion can be drawn from the results? (1 mark)
2. In response to the COVID-19 pandemic, the Hong Kong government implemented the Universal Community Testing Programme that aims at finding out the asymptomatic infected citizens in the community.



- a Give THREE reasons to support the idea that studying biology is useful in fighting against COVID-19. (3 marks)
- b Some people claim that participating in the Universal Community Testing Programme greatly increases one's chance of getting infected by COVID-19. Does such claim qualify to be a scientific hypothesis? Explain your answer. (2 marks)

3. The following diagram shows the sequence of feeding of a unicellular organism.



Name and describe **THREE** vital functions carried out by the unicellular organism during this process. (6 marks)

4. Below are two images taken from the same kind of cells using different kinds of microscopes. Fig I is obtained using a light microscope and Fig II is obtained using an electron microscope.

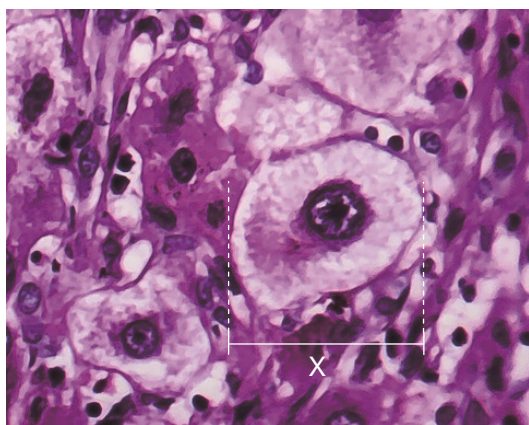


Fig I ( $\times 400$ )



Fig II ( $\times 15000$ )

- a Are these animal cells or plant cells? Give a reason to explain your answer. (2 marks)
- b Find the actual length (X) of the cell in Fig I. Show your workings. (2 marks)
- c Which type of electron microscope was used to produce the image in Fig II? Explain your answer. (2 marks)
- d
  - i Name and state the functions of organelles Q and R. (4 marks)
  - ii Suggest why organelles Q and R can be observed in Fig II but not in Fig I. (2 marks)

**End of Paper**