FUKIEN SECONDARY SCHOOL

S2 First Term Examination (2020-2021)

Integrated Science

(1 hour)

Date: 4th January 2021 Name:_____

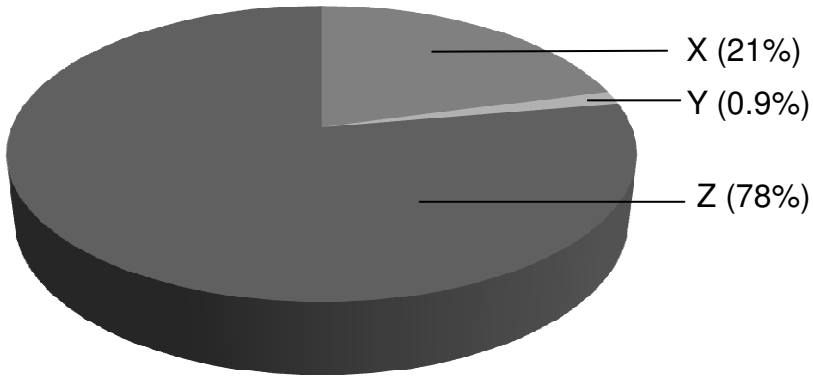
Time: 8:30a.m. - 9:30a.m. Class: _____ No.: _____

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 100.

Section A: Multiple Choice Questions (40 marks)

1. The pie chart below shows the composition of air. What are X, Y and Z?



	X	Y	Z
A	Oxygen	Nitrogen	Noble gases
B	Nitrogen	Carbon dioxide	Noble gases
C	Oxygen	Carbon dioxide	Nitrogen
D	Oxygen	Noble gases	Nitrogen

2. Which of the following substances can be used to test for nitrogen?
   (1) Glowing splints
   (2) Burning splints
   (3) Lime water
   A (1) only
   B (2) only
   C (3) only
   D None of them

3. Which of the following statements about air are correct?
   (1) Air keeps hydrogencarbonate indicator red.
   (2) Air is a mixture of gases.
   (3) Air turns dry cobalt paper from pink to blue.
   (4) Air contains mainly oxygen.
   A (1) and (2) only
   B (3) and (4) only
   C (1), (2) and (3) only
   D (1), (2), (3) and (4)

4. Light is supplied to home aquariums. This aims to

   A allow the fish to distinguish light and day.
   B provide energy for water plants to undergo photosynthesis.
   C provide light for living things to undergo respiration.
   D maintain a suitable temperature of the water.

5. When we investigate whether chlorophyll is needed for photosynthesis, which of the following is the most suitable?
   A A green plant with variegated leaves
   B Two green plants of the same kind with similar size
   C Two green plants of different kinds with similar size
   D A green plant and a non-green plant with similar size

6. Which of the following living things is/are consumer(s) in the food chain below?

   (1) Grass ⟶ (2) Mouse ⟶ (3) Snake ⟶ (4) Hawk

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

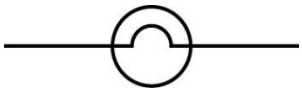
7. Which of the following statements about respiration is/are correct?
   (1) Animals will carry out respiration but plants do not.
   (2) Respiration releases the chemical energy stored in food by breaking down the food.
   (3) Water is formed during respiration.
   A (2) only
   B (1) and (3) only
   C (2) and (3) only
   D (1), (2) and (3)

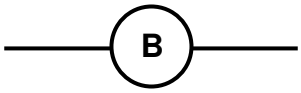
8. Which of the following statements about respiration and photosynthesis is/are correct?
   (1) Both processes need oxygen.
   (2) Energy is converted from one form to another in both processes.
   (3) Water is formed in both processes.
   A (2) only
   B (3) only
   C (1) and (3) only
   D (2) and (3) only

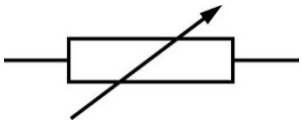
9. Which of the following substances in cigarette smoke lowers the amount of oxygen content in blood?
   A Tar
   B Nicotine
   C Carbon monoxide
   D Sulphur dioxide

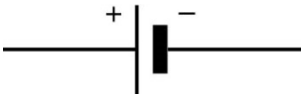
10. If you have to choose a metal for making electrical wires, which of the following properties should the metal possess?
    (1) Good electrical conductivity
    (2) Low price
    (3) Strong (high mechanical strength)
    (4) Easy to make into different shapes
    A (1) only
    B (2) and (3) only
    C (1), (2) and (4) only
    D (1), (2), (3) and (4)

11. Which of the following circuit symbols represents a device that changes chemical energy to electrical energy?

A 

B 

C 

D 

12. Four wires (A, B, C and D) have the same diameter and length. They are made of different metals. Their resistances are shown in the table below. Which wire is made of the best conductor?

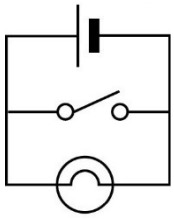
Wire	Resistance (Ω)
A	0.1
B	0.12
C	0.18
D	0.2

13. What is the voltage of three 1.5 V cells connected in series in the same direction?
    A 1.5 V
    B 3 V
    C 4.5 V
    D 6 V

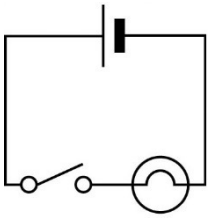
14. Usually, electrical wires carry a small resistance. When electric current is transferred through wires, some energy will be lost in the form of

A sound energy.
B potential energy.
C heat energy.
D chemical energy.

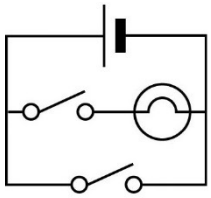
15. Consider the circuit diagrams shown below. Assume the bulbs are identical and the connecting wires have zero resistance.



Circuit (1)



Circuit (2)

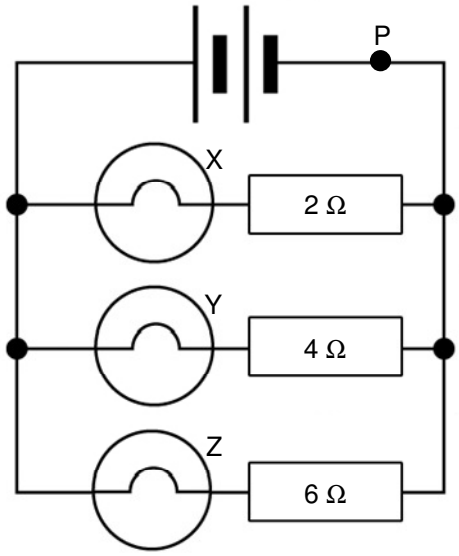


Circuit (3)

In which circuit(s) do you have to open all of the switch(es) so that the bulb lights up?

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

16. The diagram below shows a parallel circuit. The three bulbs are identical.

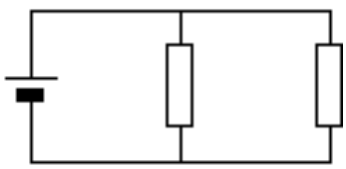


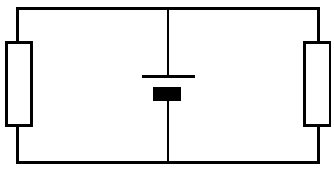
Which of the following statements about the circuit above is/are correct?

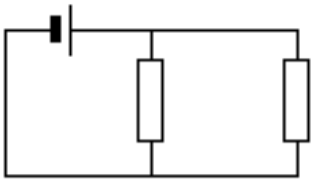
(1) Bulb Z is brighter than bulbs X and Y.
(2) The current passing through bulb X is larger than that passing through bulb Y.
(3) If bulb X is broken, the brightness of bulbs Y and Z will not change.
(4) If bulbs X and Z are interchanged, the current passing through point P in the circuit decreases.

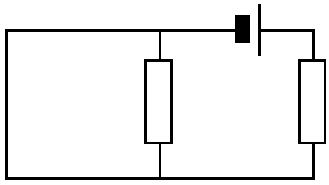
A (1) only
B (2) and (3) only
C (3) and (4) only
D (1), (2) and (3) only

17. Which of the following circuits is different from the others?

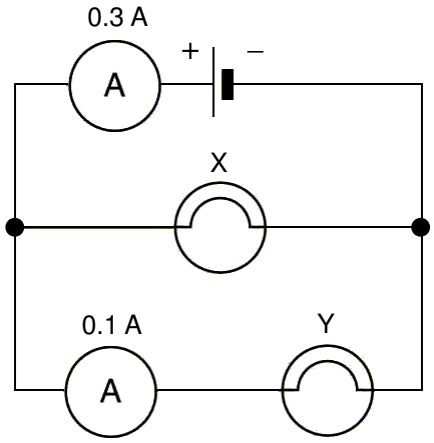
A 

B 

C 

D 

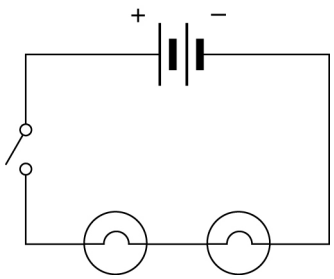
18. In the circuit below, what is the size of the current passing through bulb X?



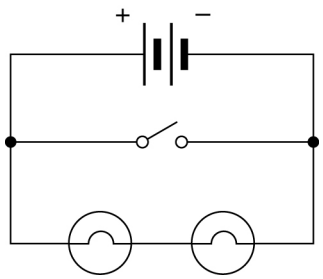
A 0.1 A
B 0.2 A
C 0.3 A
D 0.4 A

19. In which of the following circuits will the two bulbs go out when the switch is closed?

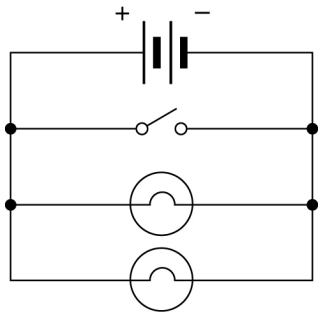
(1)



(2)



(3)



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

20. Fig 1 shows the resistive wire XZ in a toaster (多士爐). Wire Y is connected to the metal case of the toaster. Fig 2 shows the wiring of the three pins in the plug of the toaster.

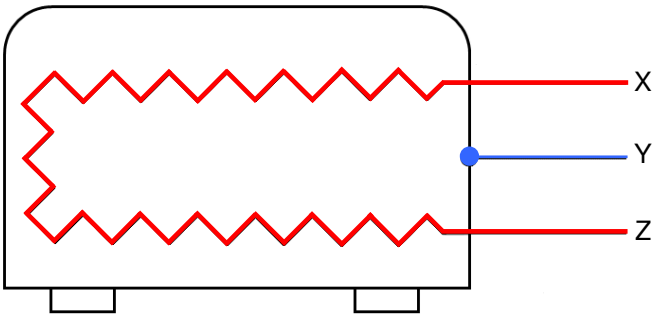


Fig 1

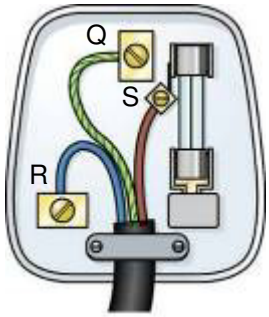


Fig 2

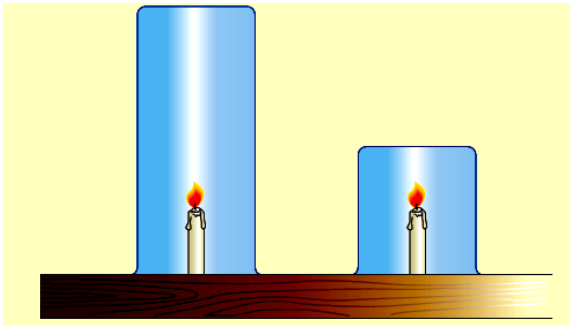
Which pin in the plug should wires X, Y and Z be connected to respectively?

	X	Y	Z
A	R	S	Q
B	Q	R	S
C	S	R	Q
D	S	Q	R

END of Section A

Section B: Structured Questions (60 marks)

1. The diagram below shows two glass jars of different sizes. They are placed over two identical lighted candles at the same time.



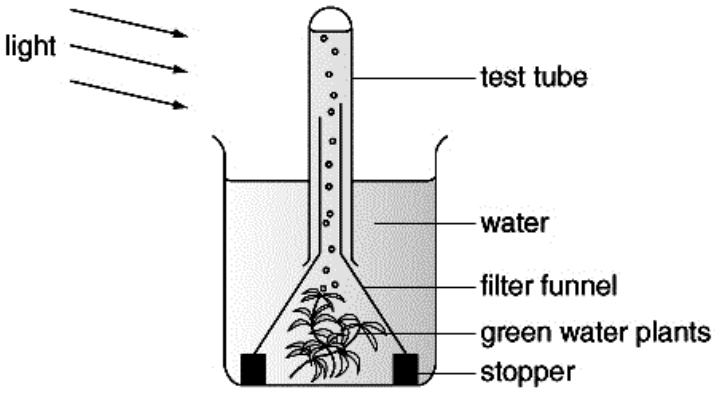
(a) In which jar, A or B, will the candle flame go out first? (1 mark)

(b) Explain your answer in (a). (2 marks)

(c) When the flames go out, what is the most abundant gas remaining in the jars? (1 mark)

(d) If a burning splint is put into one of the jars after the flame goes out, what do you expect to see? (2 marks)

2. Jimmy puts some green water plants in a beaker of water. He covers the plants with an inverted filter funnel and an inverted test tube. He puts the whole set-up under sunlight for several hours as shown below.



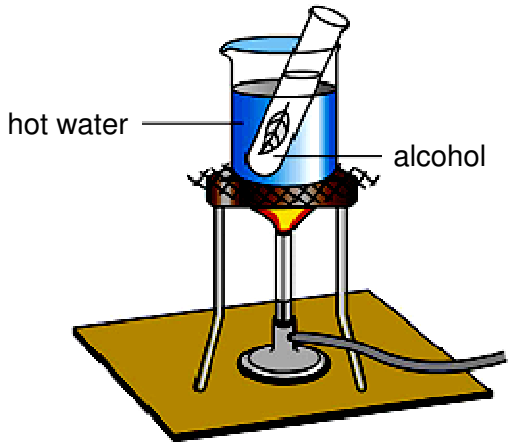
(a) How will the water level in the test tube change? (2 marks)

(b) Give an explanation for the observation in (a). (3 marks)

(c) Suggest and describe ONE test for your explanation in (b). (3 marks)

(d) Suggest a gas dissolved in the water of the above set-up that is important to the plant. (1 mark)

3. The diagram below shows a leaf being heated in alcohol in a test for starch.



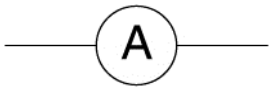
(a) Point out ONE mistake in the above set-up and give a reason. (2 marks)

(b) Explain why the alcohol turns green. (2 marks)

(c) What should be added to the leaf to test for starch? (1 mark)

(d) Write down the test result if starch is present in the leaf. (2 marks)

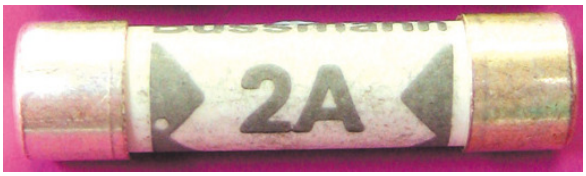
4. The diagram below shows the circuit symbol of a circuit component.



(a) (i) Name the circuit component. (1 mark)

(ii) What does this circuit component measure? (1 mark)

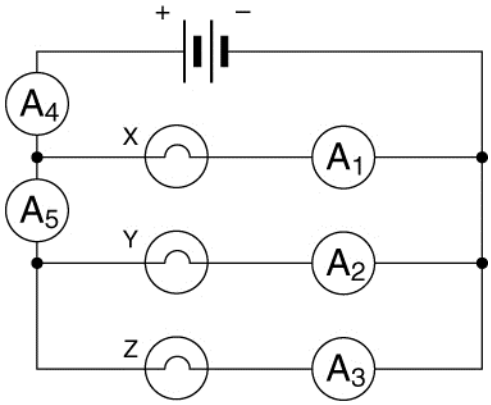
(b) Look at the photo below and answer the questions.



(i) What is shown in the photo? (1 mark)

(ii) What is the use of the above device? (2 marks)

(c) Three bulbs, X, Y and Z are connected in the circuit below.



(i) If the readings of A_1, A_2 and A_3 are 0.3 A, what are the readings of A_4 and A_5? Show your workings. (4 marks)

(i) Modify the circuit so that bulb X lights up all the time and bulbs Y and Z can be switched on and off at the same time. Draw your circuit in the space on the answer sheet provided. (2 marks)

5. Michael used lighting with 50 bulbs to decorate his Christmas tree. The lighting is connected to a circuit breaker.

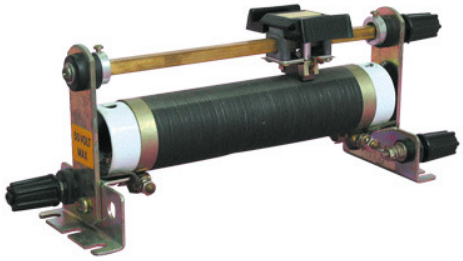
(a) Were the light bulbs connected in series or in parallel? Explain briefly. (3 marks)

(b) Michael placed the decorated Christmas tree in an outdoor garden. One night, it rained heavily and the lights on the tree turned off suddenly. Michael checked the circuit breaker and discovered that one of the switches was OFF. He then decided to put the tree indoors.

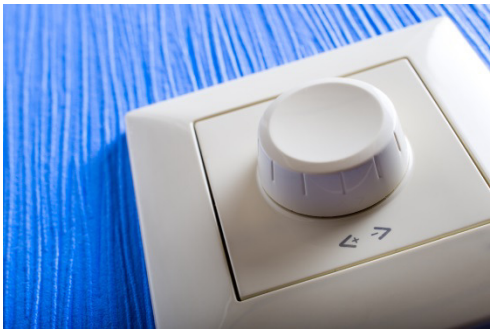
(i) What happened to the circuit under the heavy rain? (2 marks)

(ii) What may happen if there is no circuit breaker? (2 marks)

6. Consider the devices below. They perform similar function in a circuit.



A



B

(a) Name device A. (1 mark)

(b) Explain why when a light bulb is connected to device B, the light bulb becomes dimmable. (2 marks)

(c) Describe an example of the use of Device B in other home appliances. (2 marks)

7. In an experiment, a student is investigating the relationship between the voltage and the current in a circuit.

(a) Suppose that the student has 3 cells, 1 switch, 1 bulb, 1 ammeter, 1 voltmeter and some connecting wires. In the space on the answer sheet provided, draw a circuit diagram to show how the apparatus should be connected in the experiment. (4 marks)

(b) State the independent variable and the dependent variable of the experiment. (2 marks)

(c) Suggest ONE way to change the voltage of the battery in the experiment. (2 marks)

(d) The experimental results are summarized in the table below.

Voltage (V)	1.5	3	4.5
Current (A)	0.6	1.2	1.8

(i) Draw a graph of current against voltage using the data above. (5 marks)

(ii) Describe how the current changes with voltage. (2 marks)

End of Paper