

ST. PAUL'S COLLEGE
F.2 MID-YEAR EXAMINATION Sample Paper
INTEGRATED SCIENCE

Suggested Answers

Section A (40 marks)

1	2	3	4	5	6	7	8	9	10
B	B	D	D	A	C	B	A	D	A
11	12	13	14	15	16	17	18	19	20
B	C	A	C	B	D	A	C	C	B

Section B (60 marks)

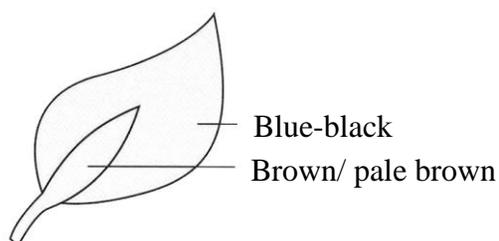
Question 1

(a)

- (i) Presence of chlorophyll / supply of carbon dioxide / supply of water / temperature / amount of sodium hydrogencarbonate solution/ amount of water plant/ type of water plant (Any 2) [2]
- (ii) Turbidity of water/ Type of water [1]
- (iii) Sodium hydrogencarbonate solution [1]
- (iv) Oxygen gas is produced during photosynthesis. [1]
 Faster the (net) rate of formation of oxygen, the faster is the rate of photosynthesis. [1]
- (v) If a glowing splint relights, it is oxygen. [1]
- (vi) Mud in muddy water blocks the light / decreases the light being absorbed by the plants, and hence give a slower rate of photosynthesis in set-up B. [1]
- (vii) Set-up A [1]

(b)

- (i) Remove a leaf and carry out the iodine test until the result shows brown. [1]
- (ii) C → D → A → B [1]
- (iii) Step A: to remove the alcohol and soften the leaf [2]
 Step B: to test for the presence of starch in the leaf [1]
- (iv) William turned on the Bunsen burner when using hot water bath to heat up alcohol. / Heating alcohol with Bunsen burner. [1]
 Alcohol is flammable/ catches fire easily. [1]
 William stoppered the test tube during heating. / heated the test tube in a closed system. [1]
 The air inside the test tube will expand on heating. / This may cause the stopper to shoot out. / cause the test tube to burst./ (Gas) pressure is created inside the test tube. [1]



(v)

[1]

Question 2

(a)

(i) The balloon becomes smaller. [1]

The volume inside the balloon-bell jar decreases and [1]

the gas pressure increases which is higher than the atmospheric pressure. [1]

As a result, air is forced out of the balloon.

(ii) The rubber sheet is pushed by hand, while in human body the movement of the diaphragm is automatic. / The rubber sheet is flat in the resting state, while the diaphragm is dome-shaped in the resting state. / The wall of the bell jar is rigid, while the chest wall is flexible and can move. [1]

(b)

(i) To provide a larger surface area for increasing the rate of gaseous exchange. [1]

(ii) The wall of the air sac is thin. / The air sacs are surrounded by blood capillaries. / The inner wall of the air sac is moist. (Any ONE) [1]

(iii) Tissue A [1]

(iv) As the number of air sacs of a smoker is reduced, [1]
the rate of gaseous exchange is decreased. [1]

This makes the smoker feel short of breath, as he has to increase his breathing frequency to compensate for the loss of air sacs. /

When the walls between the tiny air sacs are destroyed, they combine into a smaller number of larger air sacs, creating air pockets in the lungs. (1)

Air is trapped in these air pockets and is difficult to breath out. The lungs slowly enlarge, and breathing takes more effort. (1)

(v) It causes lung cancer. / It causes coughs. / It causes other respiratory diseases, e.g. bronchitis. [1]

Question 3

(a)

(i) Light bulbs Y and Z. [1]

(ii) $A_1 = 0 \text{ A}$, [1/2]

$A_2 = 0.015 \text{ A}$ [1/2]

$A_3 = 0.015 \text{ A}$ [1/2]

Answer with the unit in ampere [1/2]

(iii) (1) Light bulbs X, Y and Z. [1]

(2) Light bulb X: Its brightness increases / It lights up. [1]

Light bulb Y: Its brightness remains unchanged. [1]

(3) Light bulb Z is brighter than light bulb X [1]

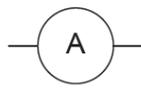
because (total) resistance of the branch with bulb X is larger and [1/2]

smaller current passes through bulb X. [1/2]

(4) Cut the pencil lead to make it thinner. [1]

(5) The light bulb X will go out [1]

because wooden rod is an insulator. [1]



(iv) Add ammeter in the main loop. [1]



(v) Add voltmeter in parallel to the batteries [1]

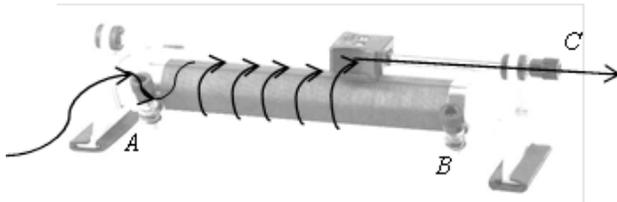
with correct polarity. [1]

(b)

(i) Rheostat [1]



(ii) [1]



(iii) [1]

(iv) The contact should be slide towards B. [1/2]

Thus, the length of the resistance wire through which current passes increases [1/2]

so the resistance of device X increases [1/2]

and hence the current in the circuit decreases. [1/2]

(v) Volume control of a hi-fi system / dimmer switch of a lamp [1]

Question 4

- (a)
- (i) The mains voltage in Japan (100V) is lower than that in Hong Kong (220V), and the current flowing through the hair dryer is lower. [1]
- (ii) The hair dryer will be damaged. [1]
- (b)
- (i) Holes *B* and *C* [1]
- (ii) (1) It prevents anything from being inserted into the sockets accidentally. [1]
- (2) The holes in the sockets today are smaller and rectangular in shape while those in the sockets in the past are bigger and circular in shape. [1]
- It is more difficult for fingers to get inserted into the holes in the sockets today. [1]
- (iii) Hole *C* [1]
- (c)
- (i) Heating effect of electric current [1]
- (ii) It prevents too large current from flowing through a circuit./ It prevents the light bulb or electrical appliances from being damaged by a large current/ overloading/ short circuit. [1]