



Centre Number	Candidate Number

**MINISTRY OF EDUCATION AND HUMAN RESOURCE DEVELOPMENT**

## **SOLOMON ISLANDS SCHOOL CERTIFICATE**

# **2018**

## **SCIENCE**

**FRIDAY 9<sup>TH</sup> NOVEMBER 9.00AM    TIME: 3 Hours Plus 10 Minutes Reading Time.**

<u>SECTION</u>	<u>CONTENT</u>	<u>MARKS</u>	<u>TIME</u>
A	MULTIPLE CHOICE	20	30 mins
B	SHORT ANSWER QUESTIONS	35	60 mins
C	LONG ANSWER QUESTIONS	<u>45</u>	<u>90 mins</u>
	<b>TOTAL</b>	<b>100</b>	<b>180 mins</b>

### **INSTRUCTION TO CANDIDATES**

1. Do NOT open this booklet until you are told to do so.
2. Write your **Centre Number** and **Candidate Number** at the top right hand corner of this page and also on the back flap at the back of this booklet.
3. There are THREE (3) Sections in this paper.
4. All Sections are Compulsory.
5. Write your answers to **Section A** on the Answer Sheet on the **FOLD-OUT FLAP** on the last page. And your answers to **Sections B** and **C** in the spaces provided in this booklet.
6. Do NOT use correction fluid.
7. Mobile phones are NOT allowed in the Examination room.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

**THIS BOOKLET CONTAINS 23 NUMBERED PAGES.**

## FORMULAR AND DATA

$F = ma$	$Wt = mg$	$W = Fd$
$V = IR$	$P_{\text{power}} = VI$	$E_{\text{electrical}} = VIt$
$E_{\text{Potential}} = mgh$	$E_{\text{Kinetic}} = \frac{1}{2}mv^2$	$\rho_{\text{(density)}} = \frac{m}{V}$
$P_{\text{power}} = \frac{\text{Work done}}{\text{Time taken}}$	$a = \frac{\Delta v}{\Delta t}$	$A_1V_1 = A_2V_2$
$v = \lambda f$	$S_{\text{speed}} = \frac{\text{dis tan ce}}{\text{time}}$	
$Q_{\text{heat}} = mc\Delta T$	$P_{\text{pressure}} = \rho hg$	$P_{\text{pressure}} = \frac{F}{A}$

2. Take  $g = 10 \text{ ms}^{-2}$ , where appropriate.

3. The mass number and atomic number of the first 20 elements of the periodic table are provided.

Element	Atomic number	Mass number
Hydrogen	1	1
Helium	2	4
Lithium	3	7
Beryllium	4	9
Boron	5	11
Carbon	6	12
Nitrogen	7	14
Oxygen	8	16
Fluorine	9	19
Neon	10	20
Sodium	11	23
Magnesium	12	24
Aluminum	13	27
Silicon	14	28
Phosphorus	15	31
Sulfur	16	32
Chlorine	17	35
Argon	18	40
Potassium	19	39
Calcium	20	40

**SECTION A:            MULTIPLE CHOICE QUESTIONS**

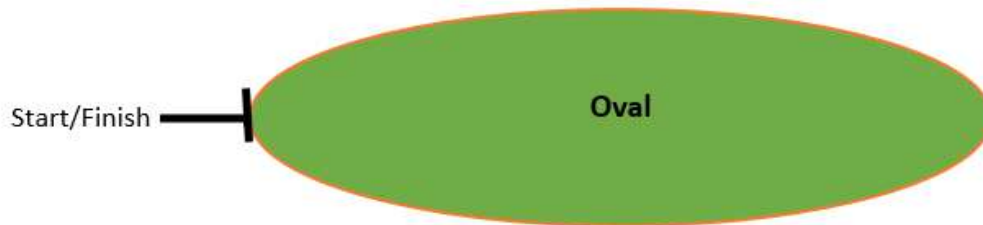
**(20 MARKS)**

**WRITE THE LETTER OF THE MOST CORRECT ANSWER IN THE FOLD OUT FLAP AT THE BACK OF THIS BOOKLET.**

---

1. A force of 10N is applied to a car and it did not move. Therefore, the force of friction on the car is;
- A. less than 10N.
  - B. equal to 10N.
  - C. more than 10N.
  - D. slightly less than 10N.

**Use the diagram below to answer question 2.**

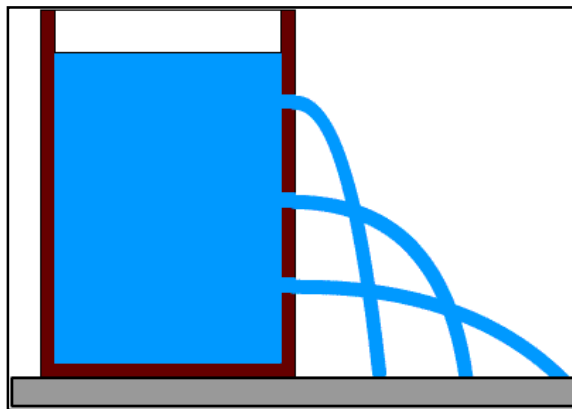


2. A student with mass 20 kg runs around the oval that measured 100 metres for 5 minutes. The amount of work done by the student is;
- A. 0 joules.
  - B. 100 joules.
  - C. 200 joules.
  - D. 2,000 joules.
3. Power is the rate at which work is done ( $P = VI$ ). The correct **unit** used for 'power' is;
- A. watt per second.
  - B. joules per second.
  - C. ohms per second.
  - D. volts per second.

4. Two boats were manufactured with aluminum and iron metals in Honiara. After they were completed and pulled into the ocean, it was observed that the **iron boat** sinks more than the **aluminum boat**. This means;
- A. iron is less dense than aluminum.
  - B. both metals have the same density.
  - C. iron is more dense than aluminum.
  - D. aluminum is more dense than iron.

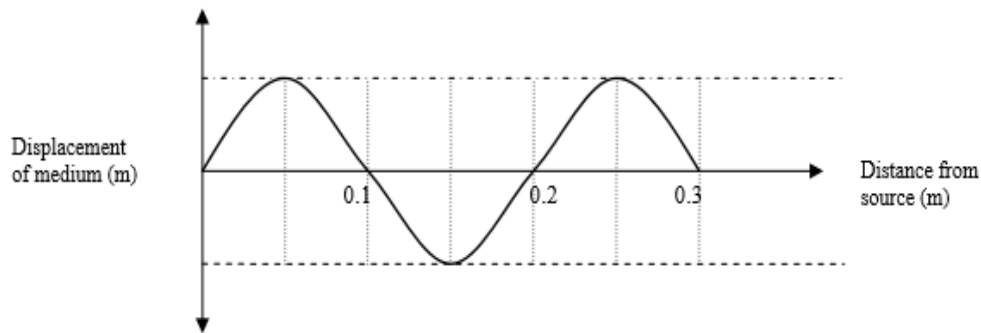
A student conducted an experiment to determine the relationship between pressure and water depth. She took an empty can and make three (3) holes of equal sizes on the side, then filled it up until the water flows out through the three (3) holes.

**The diagram below shows the result of his experiment.**



5. She concluded that pressure;
- A. increase with depth.
  - B. decrease with depth.
  - C. is the same anywhere in water.
  - D. has no effect on depth of water.

Use the diagram below to answer questions (6 and 7).



6. The **wave length** of the above wave is;
- A. 0.1m.
  - B. 0.2m.
  - C. 0.3m.
  - D. 0.6m.
7. If the speed of the wave in question 6 is  $20\text{ms}^{-1}$ . The **frequency** of the wave is;
- A. 50 hertz.
  - B. 100 hertz.
  - C. 200 hertz.
  - D. 300 hertz.

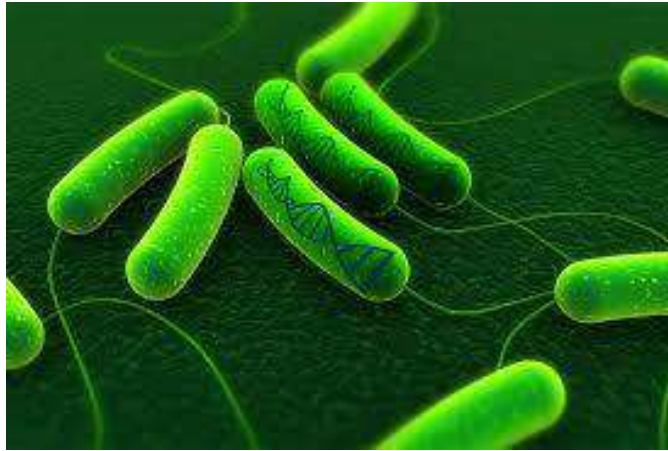
**An atom has 17 electrons attached to its shells.**

Use the information in the box above to answer questions (8 and 9).

8. The correct number of electrons in the **outer most** shell is;
- A. 2
  - B. 3
  - C. 5
  - D. 7

9. The atom in **question 8** is a/an;
- A. halogen.
  - B. noble gas.
  - C. alkaline metal.
  - D. alkaline earth metal.
10. Aluminum reacts readily with oxygen gas to form **Aluminum Oxide**. The correct formula for aluminum oxide is;
- A.  $\text{Al}_2\text{O}_2$
  - B.  $\text{Al}_2\text{O}_3$
  - C.  $\text{A}_3\text{O}_2$
  - D.  $\text{Al}_3\text{O}_3$
11. ONE (1) **chemical property** of an acid is that it;
- A. has a sour taste.
  - B. has a pH of 1- 6.
  - C. neutralizes a base.
  - D. turns litmus paper red.
12. Nitrogen is a very important element for plants. It is usually taken up by plants as;
- A. nitrates.
  - B. nitrogen gas.
  - C. nitrogen dioxide.
  - D. nitrogen trioxide.
13. \_\_\_\_\_ gas produced when fossil fuel such as petrol burns in limited oxygen.
- A. carbon dioxide.
  - B. nitrogen dioxide.
  - C. carbon trioxide.
  - D. carbon monoxide.
14. In **meiosis**, cell division ends up with\_\_\_\_\_ daughter cell(s).
- A. 1
  - B. 2
  - C. 3
  - D. 4

Use the diagram (structure of a bacteria) below to answer question 15.



15. The correct name for the **bacterium** in the diagram above is;

- A. cilia.
- B. cocci.
- C. bacilli.
- D. spirilia.

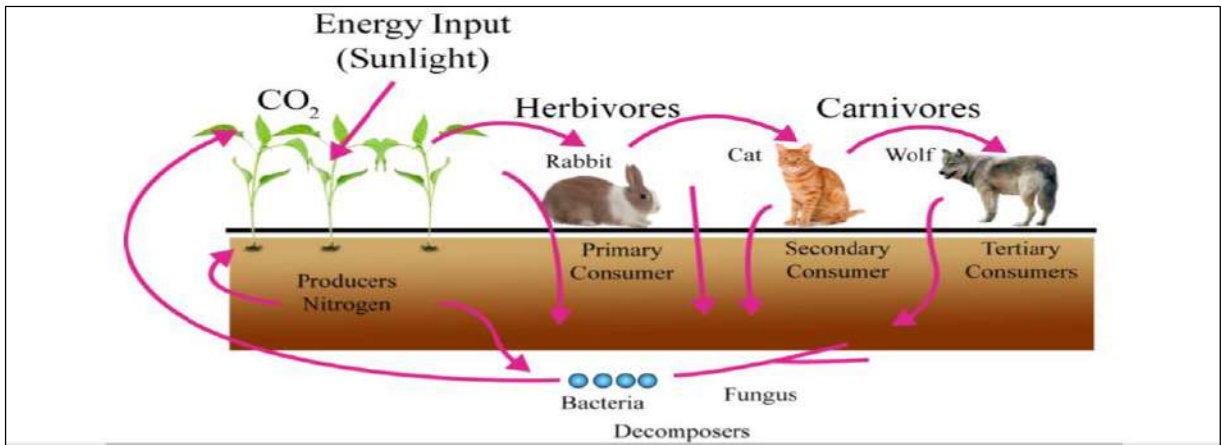
16. **Virus** are tiny little organisms that cause diseases such as;

- A. polio.
- B. malaria.
- C. diarrhea.
- D. common cold.

17. The rate of photosynthesis in plants is affected by increasing;

- A. green pigment in the leaves.
- B. water provided to the plant.
- C. pressure in the atmosphere.
- D. yellow pigment in the leaves.

Use the diagram (typical food chain in the forest ecosystem) below to answer question 18.



18. Which of the above organisms has the **least** amount of energy per kilogram of its body weight?
- A. Cat.
  - B. Wolf.
  - C. Plant.
  - D. Rabbit.
19. Which is the **correct** method used to survey an ecosystem to determine the population of butterflies?
- A. Quadrat method.
  - B. Transect method.
  - C. Pitfall trap method.
  - D. Capture and recapture.
20. Which of the following cycle is **mostly** affected by the increase in fossil fuel used in the environment?
- A. Water cycle.
  - B. Carbon cycle.
  - C. Nutrient cycle.
  - D. Nitrogen cycle.

<b>Section A.</b>	
	<b>20</b>



**SECTION B:            SHORT ANSWER QUESTIONS**

**(35 MARKS)**

**WRITE YOUR ANSWERS IN THE SPACES PROVIDED. IF YOU NEED MORE SPACE FOR ANY ANSWER, ASK YOUR INVIGILATOR FOR EXTRA SHEET OF PAPER. MAKE SURE TO WRITE YOUR NAME AND QUESTION NUMBER ON THE EXTRA SHEET.**

-----

**Question 21.**

**(10 Marks)**

- A. A man placed a box of mass 5.0 kg on a rough surface, a force of 10N was opposing the motion. Calculate the acceleration if a force of 30N is applied on the box.

3 marks

- B. A student conduct an experiment to determine the density of an unknown piece of irregular special rock. Describe the **procedure** (steps) used to determine the density of the piece of rock.

3 marks

- C. During a thunderstorm, a person saw a lightning flash 5.0 seconds before its accompanying thunder was heard. If the speed of sound is  $337.0 \text{ ms}^{-1}$ ;
- i. Calculate the **distance** from the person to where the lightning strike.

2 marks

- ii. Explain why the speed of sound is **greater** in solid than in liquids and gases.

2 marks

<b>Section B: Question 21.</b>	
	<b>10</b>

**Question 22.**

**(13 Marks)**

**A.** A student conduct an experiment reacting an acid and base. She reacted a sulfuric acid with sodium hydroxide.

i. State the general name for the reaction.

\_\_\_\_\_

1 mark

ii. Describe the pH range of the acid and base used.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 marks

iii. Write a balanced chemical equation for the above reaction.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 marks

**B.** Assume you are working in a chemical laboratory and your boss gave you 200 ml of 8M hydrochloric acid to dilute.

i. In the space below show (calculate) how you would dilute the concentrate acid above to **200 ml of 2M.**

2 marks

ii. Name TWO (2) **safety procedures** used when handling concentrated acids.

a) \_\_\_\_\_ 1 mark

b) \_\_\_\_\_ 1 mark

C. Graphite and Diamond are allotropes of carbon atom.

i. Explain why **carbon atom** is able to form an allotrope.

---

---

---

2 marks

ii. Explain why **graphite** is able to conduct electricity.

---

---

---

2 marks

<b>Section B: Question 22.</b>	
	<b>13</b>

Question 23.

(12 Marks)

- A. Inherited variation are determined by genetic information passed on from generation to generation. Explain the **advantage** of sexual reproduction than asexual reproduction in reference to genetic variation.

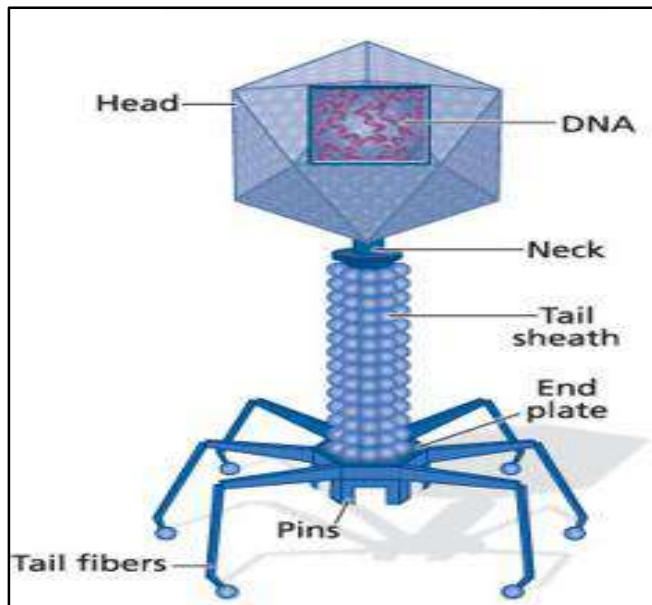
---

---

---

2 marks

- B. Below is a diagram that shows the general structure of a virus.



- i. Describe the life cycle of a virus.

---

---

---

2 marks

ii. Explain why virus evolve new strain relatively faster than bacteria.

---

---

---

2 marks

C. Homeostasis is the way the body regulates its products, so that, a constant level required is maintained.

i. Explain the function of the **liver** in maintaining blood sugar levels in the blood.

---

---

---

2 marks

ii. Explain how the body controls high temperature to maintain a constant temperature in a very hot day.

---

---

---

2 marks

D. The diagram below shows a picture of fern tree growing in the forest.



i. List any TWO (2) **abiotic factors** that influence the life cycle of the fern.

(a) \_\_\_\_\_

(b) \_\_\_\_\_

2 marks

<b>Section B: Question 23.</b>	
	<b>12</b>

**SECTION C.            LONG ANSWER QUESTIONS**

**(45 MARKS)**

**WRITE YOUR ANSWERS IN THE SPACES PROVIDED. IF YOU NEED MORE SPACE FOR ANY ANSWER, ASK YOUR INVIGILATOR FOR EXTRA SHEET OF PAPER. MAKE SURE TO WRITE YOUR NAME AND QUESTION NUMBER ON THE EXTRA SHEET.**

-----

**Question 24.**

**(17 Marks)**

A. A man bought a Christmas light which has 5 bulbs joined together, each using 10.0 watt globes.

i. Explain why the globes are connected in parallel.

---

---

---

2 marks

ii. Calculate the total resistance of the six bulbs.

2 marks

iii. Calculate the rate at which energy is supplied to globes, when all five bulbs are working?

2 marks



**B. Atmospheric pressure varied at different altitude.**

i. Explain the status of atmospheric pressure at;

a. High altitude

---

---

---

2 marks

b. Low altitude

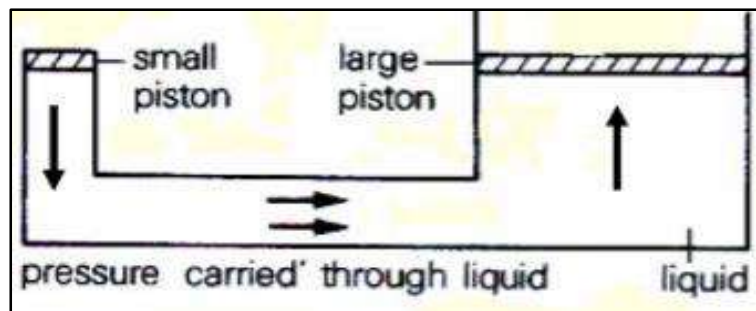
---

---

---

2 marks

C. Below is a graphic representation of a hydraulic jack for lifting cars. There is a net force of 200 N applied on the smaller piston with an area of  $1.0 \text{ m}^2$ . The area of the larger piston is  $3.0 \text{ m}^2$ .



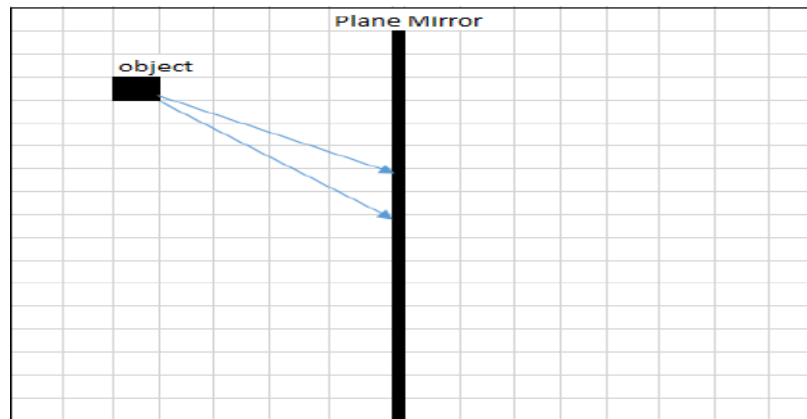
i. Calculate the pressure exerted by the small piston.

2 marks

- ii. Calculate the force required by the large piston.

2 marks

- D. The diagram below shows two (2) light rays from an object hitting a plane mirror.



- i. On the diagram above, draw path ways of the light rays after they have been reflected by the mirror.

1 mark

- ii. Describe the image formed in relation to the object.

---

---

---

2 marks

<b>Section C: Question 24.</b>	
	<b>17</b>

**Question 25.**

**(14 Marks)**

**A. Refer to the part of the periodic table below to answer questions (i and ii).**

Magnesium reacts with Chlorine to form a chemical compound.

Period 1			H						VIII He
	I	II		III	IV	V	VI	VII	
Period 2	Li	Be		B	C	N	O	F	Ne
Period 3	Na	Mg		Al	Si	P	S	Cl	Ar
Period 4	K	Ca		Ga	Ge	As	Se	Br	Kr

i. Explain the type of bond formed when Magnesium reacted with Chlorine.

---

---

---

2 marks

ii. In the space below draw the structure of how the electrons of the magnesium and chlorine atoms rearranged into their respective ions to form the compound.

4 marks

B. Alloys are very useful for making bridges and building.

i. Explain why alloys are stronger than pure metals.

---

---

---

2 marks

ii. Explain why alloys have high resistance to corrosion.

---

---

---

2 marks

C. The table below shows formula of two (2) types of organic compounds (1 & 2). Use this table to answer questions (i, ii and iii) below.

Organic compounds	
Compound 1 CH <sub>4</sub>	Compound 2 C <sub>2</sub> H <sub>4</sub>

i. Write the IUPAC name for compound 1: \_\_\_\_\_  
1 mark

ii. Write the IUPAC name for compound 2: \_\_\_\_\_  
1 mark

iii. Both compounds 1 and 2 are colorless. **Explain** a test used to distinguish the 2 compounds.

---

---

---

2 marks

<b>Section C: Question 25.</b>	
	<b>14</b>

**Question 26**

**(14 marks)**

A. Speciation is a process which new species may evolve due to isolation. Explain how isolation influence process of speciation.

---

---

---

2 marks

B. Medicines help our immune system to protect us from bacterial infection.

i. Explain antibiotic resistance.

---

---

---

2 marks

ii. Explain why inflammation is considered part of the immune response.

---

---

---

2 marks

C. A student conduct an experiment to determine the rate of photosynthesis in algae in the ocean zonation floor. He measured the amount of oxygen produced from algae against depth at which the algae grow.

**The table below shows the results of the experiment. Use the results in the table to answer questions (i and ii).**

Depth of Ocean (m)	Volume of Oxygen produced per Minute
0	25
5	20
10	15
15	10
20	5
25	0

i. List ONE (1) factor that remain constant in the experiment.

\_\_\_\_\_ 1 mark

ii. Study the results and explain the trend observed from the results.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3 marks

D. Solomon Islands, now joins the rest of the world to fight against the impact of climate change. ONE (1) of its effect is the **sea level** rise. **Discuss** the cause of sea level rise.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4 marks

<b>Section C: Question 26.</b>	
	<b>14</b>

# SISC – SCIENCE 2018

## SECTION A MULTIPLE CHOICE (20 MARKS)

Write the letter of the correct answer in the box provided. Make sure your answer is put alongside the right question number.

**Example:** If you consider A is the correct answer, write it like this:

To change your answer from A to C, Cross out A and write the new answer C by the box, like this:  C

1	<input type="text"/>	11	<input type="text"/>
2	<input type="text"/>	12	<input type="text"/>
3	<input type="text"/>	13	<input type="text"/>
4	<input type="text"/>	14	<input type="text"/>
5	<input type="text"/>	15	<input type="text"/>
6	<input type="text"/>	16	<input type="text"/>
7	<input type="text"/>	17	<input type="text"/>
8	<input type="text"/>	18	<input type="text"/>
9	<input type="text"/>	19	<input type="text"/>
10	<input type="text"/>	20	<input type="text"/>

CENTRE NUMBER

CANDIDATE NUMBER

<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------

### FOR MARKERS USE ONLY

SECTION	MARK	MARKER	SCRIPT CHECKER
A	20		
B: Q.21	10		
Q.22	13		
Q.23	12		
C: Q.24	17		
Q.25	14		
Q.26	14		
<b>TOTAL</b>	<b>100</b>		
Marker/ Checker Initial			