

CARIBBEAN EXAMINATIONS COUNCIL

Caribbean Secondary Education Certificate®
CSEC®



INTEGRATED SCIENCE

Specimen Papers and Mark Schemes/Keys

Specimen Papers:

Paper 01
Paper 02
Paper 03/2

Mark Schemes and Key:

Paper 01
Paper 02
Paper 03/2



TEST CODE **01230010**

SPEC 2015/01230010

**CARIBBEAN EXAMINATIONS COUNCIL
CARIBBEAN SECONDARY EDUCATION CERTIFICATE®
EXAMINATION**

INTEGRATED SCIENCE

Paper 01 – General Proficiency

1 hour 15 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This test consists of 60 items. You will have 1 hour and 15 minutes to answer them.
2. In addition to this test booklet, you should have an answer sheet.
3. Each item in this test has four suggested answers lettered (A), (B), (C), (D). Read each item you are about to answer and decide which choice is best.
4. On your answer sheet, find the number which corresponds to your item and shade the space having the same letter as the answer you have chosen. Look at the sample item below.

Sample Item

Benzene dissolves stains caused by

- (A) tar
- (B) fruit
- (C) paint
- (D) starch

Sample Answer



The correct answer to this item is “tar”, so (A) has been shaded.

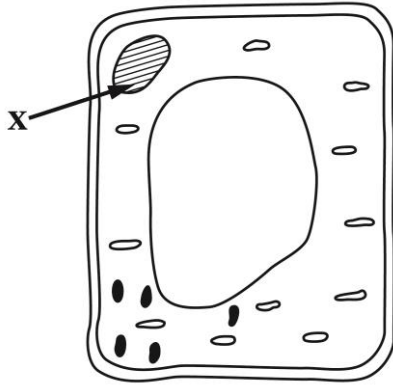
5. If you want to change your answer, erase it completely before you fill in your new choice.
6. When you are told to begin, turn the page and work as quickly and as carefully as you can. If you cannot answer an item, go on to the next one. You may return to that item later.
7. Figures are not necessarily drawn to scale.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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1. Energy for cell activities is produced in the
- (A) nucleus
 - (B) vacuole
 - (C) ribosomes
 - (D) mitochondria

Item 2 refers to the following diagram of the plant cell.



2. The structure labelled X is the
- (A) vacuole
 - (B) nucleus
 - (C) chloroplast
 - (D) mitochondrion
3. Which of the following structures is associated with sexual reproduction?
- (A) Bulbs
 - (B) Corms
 - (C) Flower
 - (D) Rhizomes

Items 4-5 refer to the following types of birth control methods.

- (A) Natural
 - (B) Barrier
 - (C) Hormonal
 - (D) Surgical
4. A condom is an example of which type of birth control?
5. A vasectomy is an example of which type of birth control method?

6. Which of the following sexually transmitted infections are caused by viruses?
- I. AIDS
 - II. Herpes
 - III. Syphilis
- (A) I and II only
 - (B) I and III only
 - (C) II and III only
 - (D) I, II and III

7. The products of photosynthesis are
- I. Glucose
 - II. Oxygen
 - III. Carbon dioxide
- (A) I and II only
 - (B) I and III only
 - (C) II and III only
 - (D) I, II and III

8. Primary consumers feed on
- (A) herbivores
 - (B) producers
 - (C) carnivores
 - (D) omnivores

9. Which of the following enzymes digests fats?
- (A) Pepsin
 - (B) Lipase
 - (C) Renin
 - (D) Maltase

10. Which of the following arteries carry deoxygenated blood?
- (A) Renal artery
 - (B) Hepatic artery
 - (C) Coronary artery
 - (D) Pulmonary artery

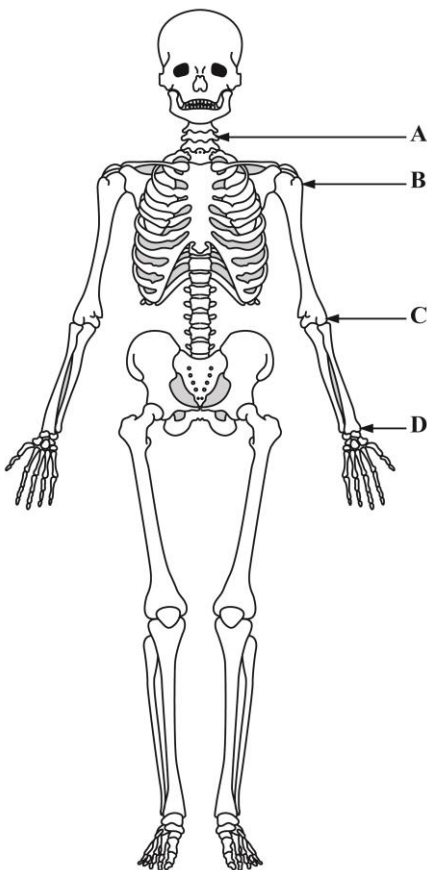
11. Which of the following blood groups is known as the universal recipient?

- (A) A
- (B) B
- (C) AB
- (D) O

12. Which of the following bones is NOT located in the leg?

- (A) Ulna
- (B) Tibia
- (C) Fibula
- (D) Femur

Item 13 refers to the following diagram of a human skeleton.



13. Which of the parts labelled A, B, C, D is a hinge joint?

14. The products of respiration are

- I. water
- II. oxygen
- III. carbon dioxide

- (A) I and II only
- (B) I and III only
- (C) II and III only
- (D) I, II and III

15. Which of the following pollutant gases has an affinity for the haemoglobin in red blood cells?

- I. Carbon dioxide
- II. Sulphur dioxide
- III. Carbon monoxide

- (A) I only
- (B) III only
- (C) I and II only
- (D) II and III only

16. Which of the following is NOT an excretory organ?

- (A) Skin
- (B) Lungs
- (C) Kidney
- (D) Stomach

17. Which of the following are characteristics of sense organs?

- I. Receive stimuli
- II. Contain specialized receptor cells
- III. Detect changes in the environment

- (A) I and II only
- (B) I and III only
- (C) II and III only
- (D) I, II and III

18. The function of the iris in the eye is to

- (A) focus rays of light
- (B) alter the shape of the lens
- (C) control the amount of light entering
- (D) keep the eyeball in shape

19. Which of the following is secreted by the endocrine system?
- I. Bile
 - II. Enzymes
 - III. Hormones
- (A) I only
 - (B) III only
 - (C) I and II only
 - (D) II and III only
20. Which of the following are stages in the life cycle of a mosquito?
- I. Egg
 - II. Pupa
 - III. Larva
- (A) I and II only
 - (B) I and III only
 - (C) II and III only
 - (D) I, II and III only
21. Which of the following conditions are MOST likely to encourage the growth of microorganisms on food?
- I. Warm
 - II. Dry
 - III. Damp
- (A) I and II only
 - (B) I and III only
 - (C) II and III only
 - (D) I, II and III
22. The use of another organism to control a pest is referred to as
- (A) chemical control
 - (B) sanitary control
 - (C) biological control
 - (D) mechanical control
23. The collision of molecules within a substance results in the transfer of energy by
- (A) radiation
 - (B) convection
 - (C) conduction
 - (D) evaporation
24. Liquids and gases normally expand when heated and contract when cooled. This behaviour explains the working of a
- (A) water pump
 - (B) thermometer
 - (C) vacuum cleaner
 - (D) tyre pressure gauge
25. Which of the following conditions are MOST likely to cause a person to produce the greatest amount of sweat?
- (A) Hot and dry
 - (B) Hot and humid
 - (C) Humid and cool
 - (D) Warm and humid
26. The unit of energy is the
- (A) gram
 - (B) joule
 - (C) meter
 - (D) watt
- Item 27 refers to the following energy conversion sequence.
- Chemical → Electrical → Mechanical → Heat
27. The energy conversion sequence is MOST likely to occur in a
- (A) solar light
 - (B) car engine
 - (C) solar water heater
 - (D) diesel-powered generator
28. The formula $p = mv$ is used to calculate
- (A) speed
 - (B) energy
 - (C) momentum
 - (D) temperature

29. Which of the following does NOT conduct electricity?

- (A) Tin
- (B) Iron
- (C) Plastic
- (D) Copper

30. Voltage equals

- (A) Current x Resistance
- (B) $\frac{\text{Current}}{\text{Resistance}}$
- (C) $\frac{\text{Resistance}}{\text{Current}}$
- (D) Current + Resistance

31. Which of the following is a safety device?

- (A) Fuse
- (B) Plug
- (C) Bulb
- (D) Switch

32. Which of the following is the first action which should be taken to prevent an electrical shock?

- (A) Call the fire service
- (B) Turn off the electricity
- (C) Throw water on the person
- (D) Cover the person with a blanket

33. Which of the following is NOT needed to start a fire?

- (A) Heat
- (B) Fuel
- (C) Oxygen
- (D) Nitrogen

Item 34 refers to the following picture of protective gear worn by a welder.



34. The purpose of the protective gear is to shield the welder's

- (A) ears
- (B) eyes
- (C) head
- (D) nose

35. A Class 2 lever has the

- (A) fulcrum and effort in the middle
- (B) fulcrum between the effort and load
- (C) effort between the load and the fulcrum
- (D) load between the fulcrum and the effort

36. Which of the following machines is MOST likely to make the loading of a truck easier?

- (A) Pulley
- (B) Lever
- (C) Wheelbarrow
- (D) Incline plane

37. Which of the following is an advantage of using plastics?

- (A) They are combustible.
- (B) They are non-corrosive.
- (C) They are non-biodegradable.
- (D) They give off toxic fumes when burnt.

38. Which of the following metals is the LEAST reactive?

- (A) Silver
- (B) Copper
- (C) Sodium
- (D) Aluminium

GO ON TO THE NEXT PAGE

39. Stainless steel is an alloy of
- (A) iron and carbon
 - (B) copper and zinc
 - (C) copper and tin
 - (D) lead and nickel
40. Which of the following will not reduce or prevent rusting?
- (A) Painting
 - (B) Washing
 - (C) Galvanizing
 - (D) Electroplating

Item 41 refers to the following safety symbol.



41. The safety symbol indicates that a substance is
- (A) toxic
 - (B) explosive
 - (C) corrosive
 - (D) flammable
42. A solution with a pH of 5 is a
- (A) weak acid
 - (B) strong acid
 - (C) strong alkali
 - (D) neutral solution
43. A mixture of starch and water is a
- (A) colloid
 - (B) solvent
 - (C) solution
 - (D) suspension

44. Which of the following techniques is used to separate the colours that are found in black ink?
- (A) Filtration
 - (B) Distillation
 - (C) Chromatography
 - (D) Solvent extraction
45. The major cause of the seasons on earth is the
- (A) constant tilt of the earth's rotational axis with respect to its orbit around the sun
 - (B) periodic wobbling of the earth on its axis of rotation
 - (C) changing distance of the earth from the sun at different times of the year
 - (D) changing relative positions of the earth, moon and the sun
46. A cycle of moon phases can be seen from earth because the
- (A) moon's axis is tilted
 - (B) moon spins on its axis
 - (C) moon revolves around the earth
 - (D) moon's distance from the earth changes at a predictable rate
47. Which of the following statements about the moon is correct?
- (A) It is a planet.
 - (B) It orbits around the sun.
 - (C) It is a satellite of the earth.
 - (D) It has oceans of water.
48. Which of the following keeps the planets in the solar system in orbit around the sun?
- (A) Thermal energy
 - (B) Gravitational force
 - (C) Atmospheric pressure
 - (D) Electromagnetic energy

GO ON TO THE NEXT PAGE

49. The display of horizons on a vertical cross section through the soil is termed the soil
- (A) bed
 - (B) layer
 - (C) profile
 - (D) strata chart
50. Finely divided, partially decomposed organic matter found in soil is called
- (A) silt
 - (B) sand
 - (C) loam
 - (D) humus
51. Two major processes that occur in the carbon cycle are
- (A) weathering and erosion
 - (B) fixation and denitrification
 - (C) evaporation and transpiration
 - (D) photosynthesis and respiration
52. The LEAST effective way to purify water is
- (A) boiling
 - (B) filtration
 - (C) distillation
 - (D) chlorination
53. Which of the following is LEAST likely to be a source of water pollution?
- (A) Storm water
 - (B) Untreated sewage
 - (C) Agricultural runoff from farms
 - (D) Effluent from industries and factories
54. Which of the following navigational devices depends on artificial satellites to determine locations?
- (A) GPS
 - (B) Sonar
 - (C) Radar
 - (D) Compass
55. Which of the following is true about the 'greenhouse effect'?
- I. It makes the earth cooler
 - II. It is associated with carbon dioxide gas
 - III. It is caused by heat trapped in the atmosphere
- (A) I and II only
 - (B) I and III only
 - (C) II and III only
 - (D) I, II and III
56. Which of the following gases is NOT believed to contribute to the increase in global temperatures via the greenhouse effect?
- (A) Oxygen
 - (B) Methane
 - (C) Nitrous oxide
 - (D) Carbon dioxide
57. Which of the following systems uses a non-renewable resource to generate electricity?
- (A) Geothermal plants using steam
 - (B) Wind turbines using air movement
 - (C) Solar panels using the sun's radiation
 - (D) Nuclear power plants using radioactive elements
58. Which of the following is NOT considered an alternative source of energy?
- (A) Solar
 - (B) Wind
 - (C) Gasoline
 - (D) Geothermal

59. The weight of a body acts through a single point called the

- (A) edge
- (B) fulcrum
- (C) moment
- (D) centre of gravity

60. There are three states of equilibrium. Which of the following is NOT one of these states?

- (A) Stable
- (B) Regular
- (C) Neutral
- (D) Unstable

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

CSEC INTEGRATED SCIENCE

Specimen - Paper 01

2015

QUESTION NUMBER	KEY	SYLLABUS OBJECTIVE
1	D	A. I. 3
2	B	A. I. 2
3	C	A. II. 1
4	B	A. II. 6
5	D	A. II. 6
6	A	A. II. 8
7	A	A. III. 1
8	B	A. III. 3
9	B	A. III. 8
10	C	A. IV. 2
11	C	A. IV. 3
12	A	A. IV. 8
13	C	A. IV. 10
14	B	A. V. 3
15	B	A. V. 5
16	D	A. VI. 2
17	D	A. VII. 1
18	C	A. VII. 2
19	B	A. VII. 9
20	D	A. VIII. 3
21	B	A. VIII. 4
22	C	A. VIII. 5
23	C	B. I. 1
24	B	B. I. 3
25	B	B. I. 4
26	C	B. II. 1
27	B	B. II. 2
28	C	B. II. 4
29	C	B. III. 1
30	B	B. III. 2

QUESTION NUMBER	KEY	SYLLABUS OBJECTIVE
31	A	B. III. 3
32	B	B. III. 9
33	D	B. III. 10
34	B	B. III. 12
35	D	B. IV. 1
36	D	B. IV. 3
37	B	B. V. 2
38	A	B. V. 3
39	A	B. V. 5
40	B	B. V. 8
41	C	B. VI. 1
42	A	B. VI. 2
43	A	B. VI. 3
44	C	B. VI. 4
45	A	C. I. 3
46	C	C. I. 3
47	C	C. I. 4
48	B	C. I. 4
49	C	C. II. 2
50	D	C. II. 3
51	D	C. II. 5
52	B	C. III. 2
53	A	C. III. 5
54	A	C. III. 8
55	C	C. IV. 3
56	A	C. IV. 4
57	D	C. IV. 4
58	C	C. V. 3
59	D	C. V. 4
60	B	C. IV. 3



TEST CODE **01230020**

SPEC 2015/01230020

C A R I B B E A N E X A M I N A T I O N S C O U N C I L

**C A R I B B E A N S E C O N D A R Y E D U C A T I O N C E R T I F I C A T E[®]
E X A M I N A T I O N**

SPECIMEN PAPER

I N T E G R A T E D S C I E N C E

Paper 02 – General Proficiency

2 Hours 30 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections: A and B.
2. SECTION A consists of FOUR questions. Answer ALL questions. Section A is worth 70 marks.
3. SECTION B consists of TWO questions. Answer ALL questions. Section B is worth 30 marks.
4. Write your answer in the space provided in this answer booklet.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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SECTION A

Answer ALL FOUR questions.

1. (a) (i) Distinguish between 'd.c. current' and 'a.c. current'.

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(2 marks)

- (ii) State the name of a material that is suitable for insulating electrical wires.

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(1 mark)

- (b) A local electricity company charges \$1.00 per kWh for the first 2000 kWh and \$3.50 for every kWh afterwards. A fuel adjustment charge of \$0.50 per kWh is added to all electricity bills. If Mrs Brown's previous monthly meter reading was 17 800 kWh and the current monthly meter reading is 20 300 kWh, calculate the electricity bill for Mrs Brown for the current month.

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(5 marks)

GO ON TO THE NEXT PAGE

- (c) Table 1 shows the electricity usage for the Brown family for the period July to December.

TABLE 1: ELECTRICITY USAGE FOR THE BROWN FAMILY, JULY–DECEMBER

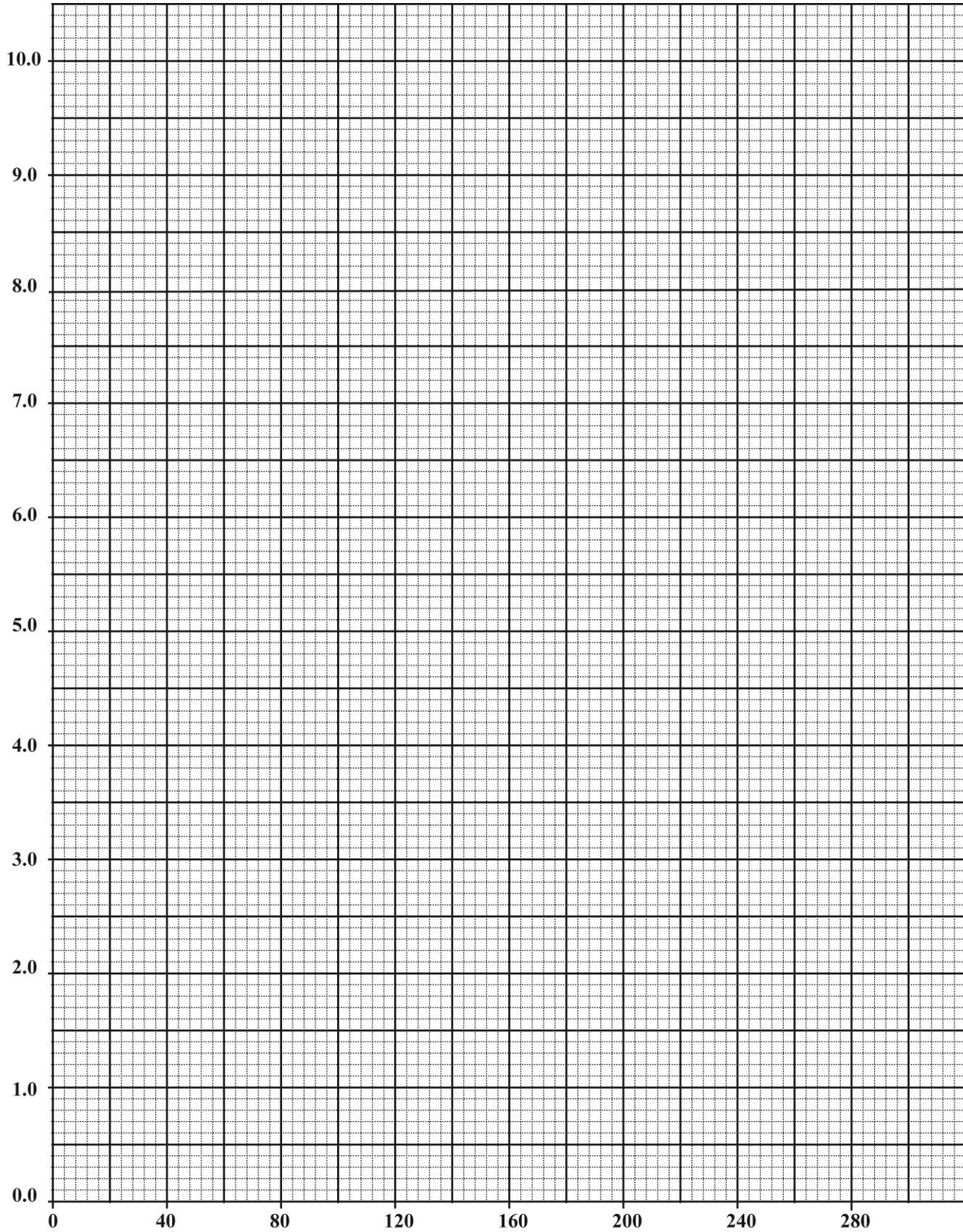
Month	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Electricity Usage (kwh)	1000	1500	1800	2000	2500	4000

- (i) Use the grid on **page 4** to plot a graph to show the data in the table. **(5 marks)**

- (ii) Write a suitable title for the graph.

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(1 mark)



GO ON TO THE NEXT PAGE

(d) (i) Define the term 'machine'.

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(1 mark)

(ii) State the formula used to calculate the mechanical advantage of a machine.

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(1 mark)

(iii) Suggest ONE energy conservation measure the Brown family may use to prevent high electricity usage such as that seen in December.

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(1 mark)

(iv) Plan and design an experiment to determine which type of lever (a first class lever or a second class lever) is more efficient for lifting a specific weight. Use the following headings in your response.

Hypothesis

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(2 marks)

Procedure

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(5 marks)

GO ON TO THE NEXT PAGE

Manipulated Variable

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(1 mark)

Total 25 marks

2. Table 2 shows the results of food tests conducted on two local foods.

TABLE 2: RESULTS OF FOOD TESTS ON LOCAL FOODS

Food	Food Test	Results	Deduction
Breadfruit	Potassium/iodide test	Blue black colour	_____
Green peas	_____	_____	Protein

(a) Complete Table 2.

(3 marks)

(b) Figure 1 shows a diagram of a typical cell found in the green pea.

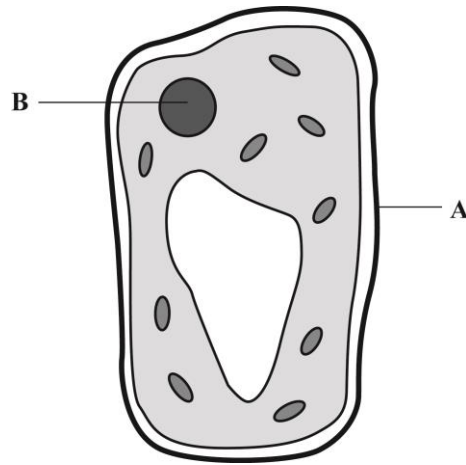


Figure 1: Typical plant cell

State the name of the parts labelled A and B.

A

B

(2 marks)

- (c) (i) Explain the principle of 'salting' in food preservation.

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(2 marks)

- (ii) Other than 'salting', suggest ONE method suitable for the preservation of breadfruit and ONE method suitable for the preservation of green peas.

Breadfruit

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(1 mark)

Green peas

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(1 mark)

(d) Figure 2 shows a breadfruit being roasted.

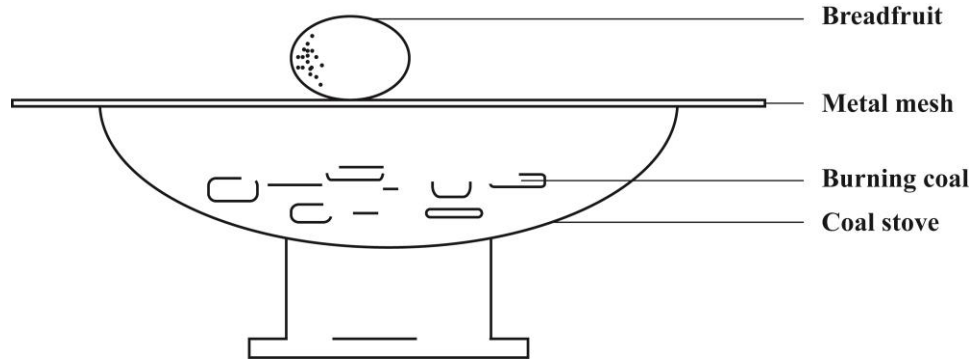


Figure 2: A breadfruit being roasted

(i) Identify TWO properties of the metal used to make the mesh that makes it suitable for the purpose it is being used for.

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(2 marks)

- (ii) Describe TWO processes by which the breadfruit receives heat energy from the stove.

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(4 marks)

Total 15 marks

3. Figure 3 is a diagram of a human skeleton.

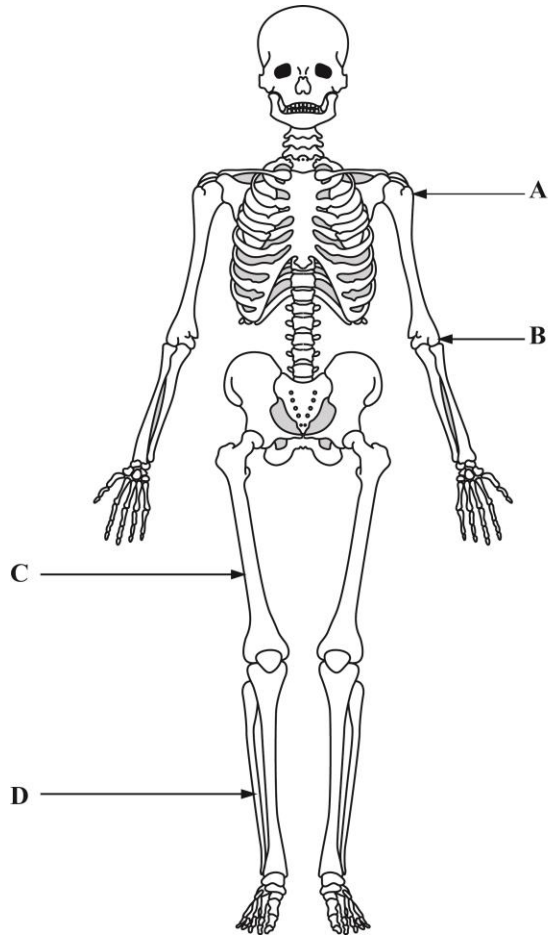


Figure 3: Diagram of the human skeletal system

(a) (i) State the name of the types of joints labelled A and B.

A

B

(2 marks)

(ii) State the name of the bones labelled C and D.

C

D

(2 marks)

(iii) One of the functions of the skeleton is to protect the organs of the circulatory and respiratory systems. State ONE function, **other** than protection, of the skeletal system.

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(1 mark)

(b) Discuss the physiological effects of exercise on the circulatory and the respiratory systems.

Circulatory system:

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Respiratory system:

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(6 marks)

- (c) Sam has a disease that causes the ciliary muscles of the eye to malfunction. Explain what effect this disease may have on Sam's ability to view objects.

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(4 marks)

Total 15 marks

4. (a) Define the following terms:

(i) Centre of gravity

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(1 mark)

(ii) Stable equilibrium

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(1 mark)

(b) A load of 50 N is applied 10 m away from the fulcrum of a lever. What is the distance at which an effort of 100 N should be applied to ensure that the lever remains at equilibrium?

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(5 marks)

(c) Define the following terms:

(i) Energy

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(1 mark)

(ii) Momentum

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(1 mark)

(d) (i) State ONE energy conversion that takes place when a solar powered car is in motion.

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(1 mark)

- (d) (ii) An SUV weighing 2 000 kg travelling north with a velocity of 5 m/s collides head-on with a truck weighing 4 000 kg and travelling south at a velocity of 2 m/s. Calculate the velocity of the vehicles after the collision.

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(5 marks)

TOTAL 15 marks

SECTION B

Answer BOTH questions.

Write your answer on the pages provided at the end of each question.

5. (a) State the name of TWO household chemicals that are acidic and TWO household chemicals that are basic. Briefly describe a simple procedure that may be used to determine the pH of the chemicals.

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(7 marks)

- (b) Using examples, explain how the principles of neutralization and solvent extraction are applied to stain removal.

Neutralization:

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Solvent extraction:

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(8 marks)

Total 15 marks

6. (a) State ONE use of water and describe TWO stages in the purification of water for domestic use.

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(7 marks)

GO ON TO THE NEXT PAGE

- (b) Identify TWO industrial pollutant gases and explain how ‘eutrophication’ affects aquatic life.

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(8 marks)

Total 15 marks

END OF TEST

C A R I B B E A N E X A M I N A T I O N S C O U N C I L
H E A D Q U A R T E R S

C A R I B B E A N S E C O N D A R Y E D U C A T I O N C E R T I F I C A T E[®]
E X A M I N A T I O N

I N T E G R A T E D S C I E N C E

P a p e r 0 2 - G e n e r a l P r o f i c i e n c y

S P E C I M E N P A P E R

K E Y A N D M A R K S C H E M E

**Integrated Science
Specimen Paper
Paper 02 – General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions or Comments	Marks		
				KC	UK	XS
1(a) (i)	B.III.2	d.c current occurs when the flow of current in a circuit is in one direction (1) a.c current occurs when the flow of current is one direction at first and then switches to another direction (1)	1 mark for each correct definition	2		
(ii)	B.III.1	Plastic, rubber	Any one 1 mark	1		
(b)	B.III.6	Energy used $20,300 - 17,800 = 2500$ Kwh (1) 1^{st} 2000 kWh @ \$11.00 = \$2000.00 (1) Remaining 500 kWh @ \$13.50 = \$1,750.00 (1) Fuel adjustment 2500 @ \$0.50 = \$1,250.00 (1) Total Cost: $\$2000.00 + 1750.00 + 1250.00 = \$5,000.00$ (1)	1 mark for each stage correctly calculated		5	
(c) (i)	B.III.6	Axis x-axis - month (1) y-axis - electricity usage (1) Correct plotting (3 marks) 5-6 points correctly plotted - 3 3-4 points correctly plotted - 2 1-2 points correctly plotted - 1	1 mark for each stage correctly calculated		5	
(c) (ii)	B.III.6	Title: Graph to show electricity usage per month			1	

**Integrated Science
Specimen Paper
Paper 02 – General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions or Comments	Marks		
				KC	UK	XS
1(d) (i)	B.IV.2	A machine is a device which makes it easier to do work		1		
(ii)	B.IV.3	MA = $\frac{\text{Load}}{\text{Effort}}$		1		
(iii)	B.III.7	Use energy efficient appliances Turn off lights and appliances when not in use Clean AC units regularly	Any one 1 mark each		1	
(iv)	B.IV.1	<u>Hypothesis:</u> The first class lever is more efficient than the second class lever when lifting a heavy box <u>Procedure:</u> Use the first class lever to lift a 10 kg box. (1) Measure and record the effort used by the first class lever. (1) Use a second class lever to lift the same 10 kg box. (1) Measure and record the effort used by the second class lever. (1) The lever which uses the least effort to lift the box is the more efficient lever. (1) <u>Manipulated Variable:</u> Type of lever				2
						5
						1
			TOTAL	5	12	8

**Integrated Science
Specimen Paper
Paper 02 – General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions or Comments	Marks		
				KC	UK	XS
2(a) (i)	A.III.4	Starch present (1) Biuret reagent/copper sulphate and sodium hydroxide solution (1) Purple stain (1)	1 mark each	3		
(b)	A.I.3	A - Cell wall B - Nucleus	1 mark each	2		
(c) (i)	A.III.7	Salt removes the moisture (1) by a process of osmosis.(1)			2	
(ii)	A.III.7	Breadfruit: Pickling/heating Green Peas: Canning	1 mark each		2	
(d) (i)	B.V.1	High melting point Good conductor of heat	1 mark for each property (Accept malleable and high tensile strength)		2	
(ii)	B.I.1	Conduction: The transfer of heat from the metal mesh to the breadfruit Convection: The transfer of heat from the hot air to the breadfruit Radiation: The transfer of heat directly from the coal to the breadfruit	1 mark for naming the process and 1 mark for describing the process 2 x 2 = 4 marks			4
TOTAL				5	10	

**Integrated Science
Specimen Paper
Paper 02 – General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions or Comments	Marks		
				KC	UK	XS
3(a) (i)	A.IV.10	A – Ball and socket joint B – Hinge joint	1 mark for each	2		
(ii)	A.IV.8	C Femur D Fibula	1 mark for each	2		
(iii)	A.IV.9	Movement, support, blood cell production	Any one, 1 mark	1		
(b)	A.IV.7	Circulatory system: Heart rate increases, red blood cells count increases, this allows the circulatory system to transport more oxygen through the body to meet the increased oxygen demand caused by the exercise Respiratory system: Increase in breathing rate to increase oxygen intake and to eliminate excess carbon dioxide. Strengthening of the respiratory muscles	Full discussion 3 marks Partial discussion 1-2 marks		3	
(c)	A.VII.2	This malfunction may result in Sam's eye being <u>unable to accommodate objects which means he would not be able to focus</u> (1) on objects properly. It also means that objects would appear blurry to him. The muscles <u>may not be able to contract enough</u> (1) to give the lens its <u>rounded shape</u> for <u>close object focus</u> . (1) Similarly the muscles may not be able to <u>relax enough</u> to give the lens an <u>elongated shape</u> for <u>distant object focus</u> . (1)			4	
			TOTAL	5	10	

**Integrated Science
Specimen Paper
Paper 02 – General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions or Comments	Marks		
				KC	UK	XS
4 (a)	C.V.3	(i) Centre of gravity: The point at which all of the weight of an object appears to be concentrated (ii) Stable equilibrium: When an object is at rest and not falling over	1 mark for each definition	2		
(b)	C.V.4	Force x Distance = Force x Distance (1) $50 \times 10 = 100 \times (1)$ $500 = 100 \times (1)$ $= \frac{500}{100} (1)$ $= 5 \text{ m} (1)$			5	
(c)	B.II.2	(i) Energy is the capacity to do work. (ii) Momentum is the term used to describe an object in motion.		1		
(d) (i)	B.II.2	Solar → electrical Electrical → mechanical Mechanical → kinetic	Any conversion 1 mark	1		
(ii)	B.II.4	Momentum is conserved therefore momentum before collision = momentum after collision <u>Before</u> $2000 \times 5 - 4000 \times 2 (1)$ $10000 - 8000$ $= 2000 \text{ kg m/s} (1)$ <u>After</u> $6000 \times V = 2000$ $V = \frac{2000}{6000} (1)$ $V = 0.33 \text{ m/s} (1)$			5	
			TOTAL	5	10	

Integrated Science
Specimen Paper
Paper 02 – General Proficiency
Key and Mark Scheme

Ques	Syll Ref	Possible Response	Instructions or Comments	Marks		
				KC	UK	XS
5 (a)	B.VI.1 B.VI.2	Acidic: Vinegar (lime juice); hydrogen peroxide, toilet bowl cleaners	1 mark each	4		
		Basic: Toothpaste, dishwashing liquid, antacids Procedure <ul style="list-style-type: none"> • Dissolve chemical in water • Use pH paper OR add pH indicator • Match the colour against the pH indicator chart to determine the pH 	1 mark for each part	3		
(b)	B.VI.2	Neutralization: This process is the reaction between an acid and a base to produce a salt and water (1); Some stains, for example, fruit stains are acidic (1) and if a base such as bicarbonate of soda is applied to the stain (1), the stain is neutralized and removed. (1) Solvent extraction: Some stains are aqueous and some are non-aqueous. (1) Likewise some solvents are aqueous and some are non-aqueous. (1) Aqueous solvents will dissolve in aqueous substances and non-aqueous solvents will dissolve in non-aqueous substances, (1) for example, paint is a non-aqueous substance so a non-aqueous solvent such as turpentine may be used to dissolve the paint stain. (1)	Full explanation 4 marks Partial explanation 1-3 marks		4	4
TOTAL				7	8	

**Integrated Science
Specimen Paper
Paper 02 – General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions or Comments	Marks		
				KC	UK	XS
6 (a)	C.III.1	Use: Cooking, cleaning, agriculture	Any one use 1 mark	1		
	C.III.2	Filtration: Water is passed through a bed of gravel and sent to remove small solid particles. Chlorination: The addition of chlorine to remove microorganisms. Aeration: The pumping of the water through tiny holes to improve the taste.	1 mark for name of method; 2 marks for description Any TWO stages 2 marks each	6		
(b)	C.III.5	Oil spills, pesticides, fertilizers, industrial waste and domestic waste	1 mark for each source		2	
	C.III.5	Run-off from agricultural crops contains chemicals such as phosphates and nitrates. (1) These chemicals encourage the growth of aquatic plants including algae. (1) Rapid growth of algae covers the source of the water (1) preventing the light from reaching aquatic life. (1) This prevents aquatic plants from photosynthesizing and results in their death. (1) The lack of oxygen results in aquatic animals not having enough oxygen for respiration, causing their death. (1)			6	
			TOTAL	7	8	



TEST CODE **01230032**

SPEC 2015/01230032

C A R I B B E A N E X A M I N A T I O N S C O U N C I L
C A R I B B E A N S E C O N D A R Y E D U C A T I O N C E R T I F I C A T E[®]
E X A M I N A T I O N

SPECIMEN PAPER

I N T E G R A T E D S C I E N C E

Paper 032 – General Proficiency

Alternative to SBA

2 hours 10 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. Answer ALL questions.
2. Write your answers in the spaces provided in this booklet.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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Answer ALL questions.

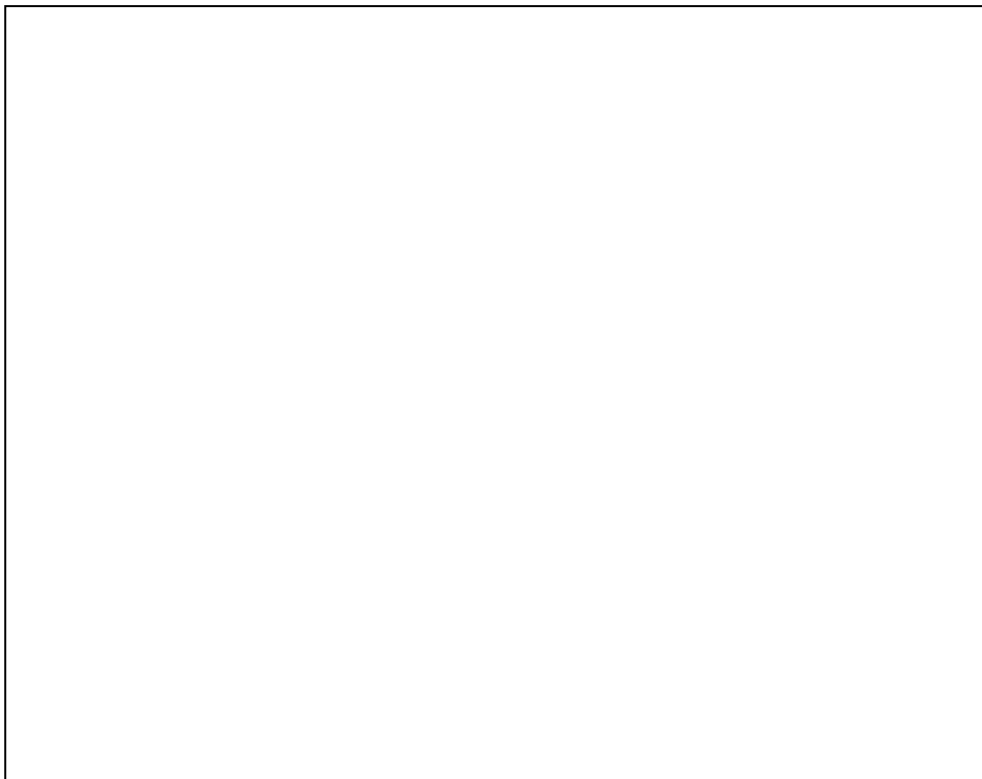
1 (a) You are provided with the following materials and apparatus:

- 4 potato strips each of 5.0 cm in length
- 2 boiling tubes
- Solution X
- Solution Y
- Spatula
- Stopwatch

Procedure

1. Fill one boiling tube with Solution X and place two potato strips inside the tube.
2. Fill one boiling tube with Solution Y and place two potato strips inside the tube.
3. Start the stopwatch immediately.
4. For a period of 30 minutes, remove the potato strips every 5 minutes and measure them,
 - (i) Construct a suitable table and record your observation.

(2 marks)



(5 marks)

(ii) Give the table a suitable title.

.....
.....

(1 mark)

(iii) State the name the process which is occurring in the experiment.

.....
.....

(1 mark)

(b) You are provided with the following materials and apparatus:

- Benedict's solution
- Potassium iodide solution
- Biuret reagent
- Ethanol
- A mixture of cereal and milk
- Test tubes

Use the reagent to investigate the food nutrients found in the cereal and milk as instructed below.

TABLE 1: RESULTS OF FOOD TESTS

Food Test	Observation	Inference
1. Place approximately 5 cm ³ of the mixture of cereal and milk in a test tube; add three drops of iodine		
2. Place approximately 5 cm ³ of the mixture of cereal and milk in a test tube; add three drops of Biuret reagent		
3. Place approximately 5 cm ³ of the mixture of cereal and milk in a test tube; add 2 cm ³ of ethanol and shake		
4. Place approximately 5 cm ³ of the mixture of cereal and milk in a test tube and three drops of Benedict's solution		

Record your observations and inferences in the table.

(16 marks)

Total 25 marks

2 Malik finds that after playing football, his white shorts usually has grass stains. His friends suggested that he use one of the following chemicals to remove the grass stains: acetone, ethanol, turpentine, methylated spirits. Plan and design an experiment to help Malik determine which chemical is MOST suitable for removing the grass stains.

(a) Write a suitable hypothesis for the experiment.

.....
.....
.....
.....

(2 marks)

(b) Use the following headings to describe a procedure that Malik may use to conduct the experiment.

Manipulated Variable

.....
(1 mark)

Controlled Variable

.....
(1 mark)

Responding Variable

.....
(1 mark)

Procedure

.....
.....
.....
.....
.....
.....
.....
.....
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.....
.....
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.....
.....

(4 marks)

Limitations

.....
.....
.....

(1 mark)

- (c) (i) A group of students conducted an experiment to determine where in the reactivity series an unknown metal X belonged. They were provided with dilute hydrochloric acid, aluminum, copper, metal X and iron. The table below shows the observations of the students. Complete the table.

TABLE 2: REACTION OF METALS AND ACID

Metal	Observation	Inference
Cu		
Al		
Fe		
X	Moderate amount of fizzing	

(10 marks)

- (ii) Write a word equation for the reaction between aluminium and hydrochloric acid.

.....
.....

(3 marks)

- (iii) Based on the results in the table, arrange the metals in order of **decreasing** reactivity.

.....
.....
.....

(2 marks)

Total 25 marks

- 3 Jameel constructs a lever which has a fulcrum at C and a load of 100 g at B as shown in **Figure 1**. He tried to balance the lever by applying an effort at A with a 10 g block, but he found that 15 g of additional mass was required.

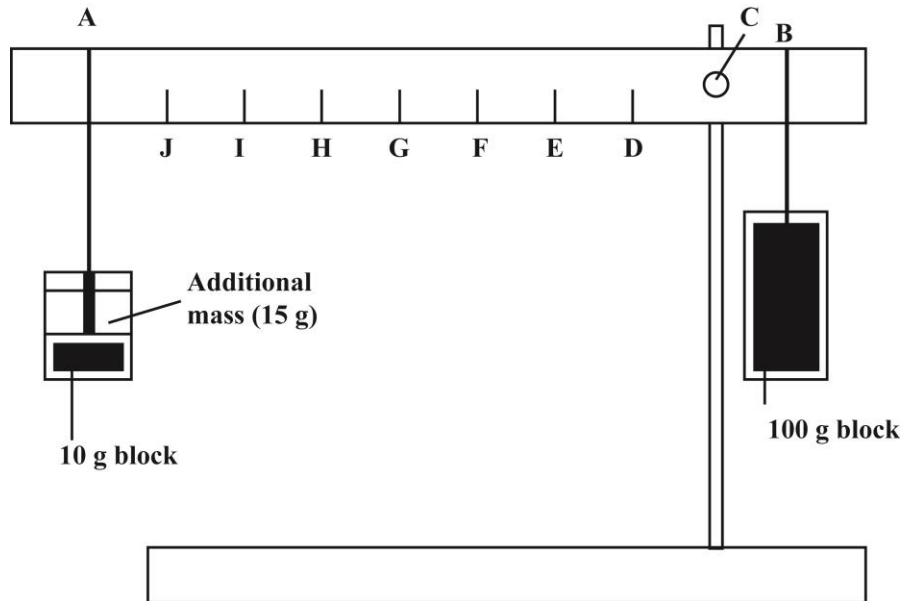


Figure 1: Diagram of Lever

- (a) Jameel is interested in finding the values of masses which will balance the lever when they are hung at points D–J so he creates Table 1. Complete the table by using your ruler to measure the distance from the fulcrum, C, to the points D, E, F, G, H, I and J in Figure 1. **(5 marks)**

TABLE 3: MASS REQUIRED TO BALANCE LEVER AND DISTANCE OF EFFORT FROM FULCRUM

Position of Effort	Distance of Effort from Fulcrum (cm)	Mass required to Balance Lever (g)
A	8.1	25
J		29
I		33
H		40
G		50
F		67
E		100
D		200

(b) Write a hypothesis relating the distance of the effort from the fulcrum and the mass required to balance the lever.

.....

.....

(2 marks)

(c) (i) On the grid **provided on page 9**, plot a line graph of Jameel's results for the distance of the effort from the fulcrum against the mass required to balance the lever. **(4 marks)**

(ii) Label the axes on the graph. **(2 marks)**

(d) (i) Extend your graph to read the point where the load is 250 g. Mark this point with an X. **(2 marks)**

(ii) Using the graph, determine the value of the distance from the fulcrum for a load of 250 g. Draw TWO dotted lines in the appropriate places on the graph to assist you with your reading. **(4 marks)**

(e) From your graph, state how the effort changes as the distance from the fulcrum increases.

.....

.....

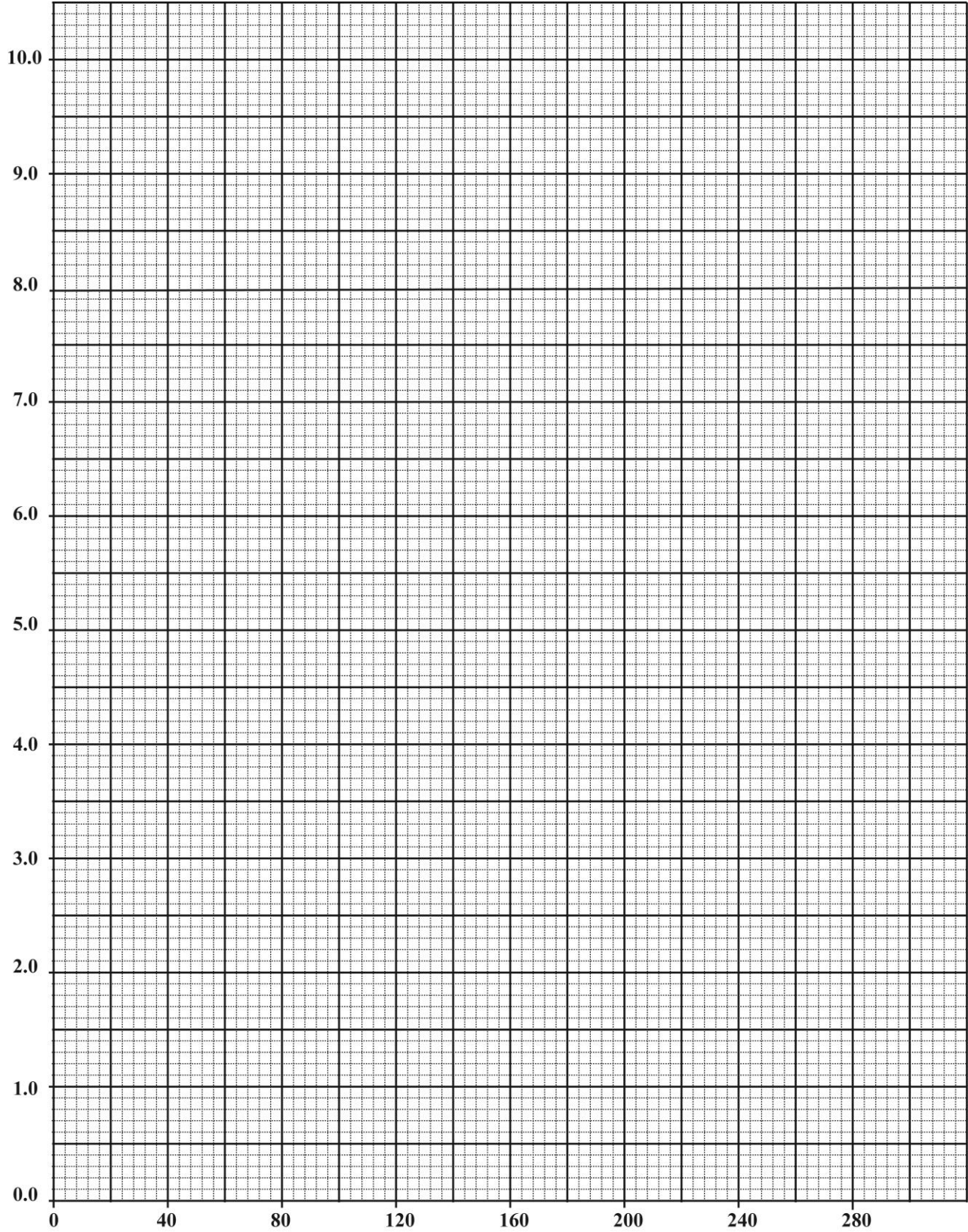
(1 mark)

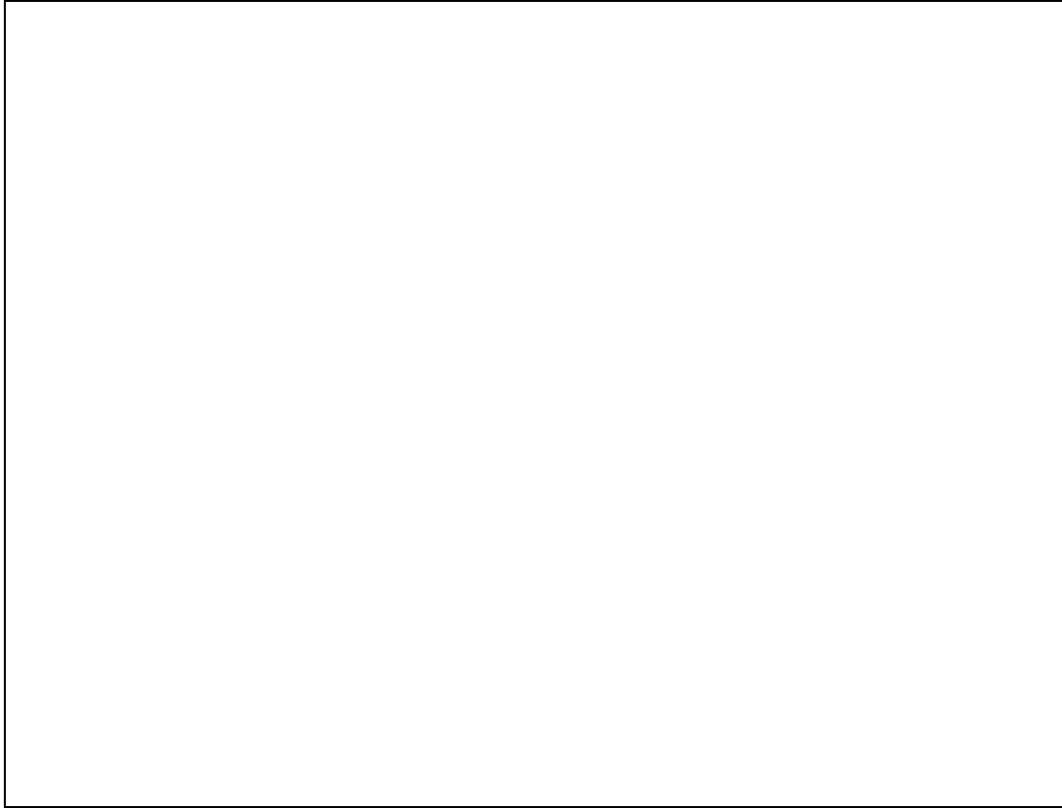
(f) Figure 2 is a picture of one of the masses used by Jameel. In the box **provided on page 10**, draw a two-dimensional diagram of the mass. Include the following in your diagram:

- The magnification
- Clear lines
- A title for the drawing



Figure 2: One of the Masses used by Jameel





(5 marks)

Total 25 marks

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

C A R I B B E A N E X A M I N A T I O N S C O U N C I L
H E A D Q U A R T E R S

C A R I B B E A N S E C O N D A R Y E D U C A T I O N C E R T I F I C A T E[®]
E X A M I N A T I O N

I N T E G R A T E D S C I E N C E

P a p e r 0 3 2 - G e n e r a l P r o f i c i e n c y

S P E C I M E N P A P E R

K E Y A N D M A R K S C H E M E

**Integrated Science
Specimen Paper
Paper 032 - General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions/ Comments	UK	XS																										
1(a)		Filling of boiling tubes and adding the potato strips Table: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Time (Mins)</th> <th colspan="2">Length of Strips</th> </tr> <tr> <th>Solution X</th> <th>Solution Y</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>5.0</td> <td>5.0</td> </tr> <tr> <td>5</td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> </tr> <tr> <td>15</td> <td></td> <td></td> </tr> <tr> <td>20</td> <td></td> <td></td> </tr> <tr> <td>25</td> <td></td> <td></td> </tr> <tr> <td>30</td> <td></td> <td></td> </tr> </tbody> </table>	Time (Mins)	Length of Strips		Solution X	Solution Y	0	5.0	5.0	5			10			15			20			25			30			ORR Headings (2) MM measurements (1) ORR recording data (2)		2
Time (Mins)	Length of Strips																														
	Solution X	Solution Y																													
0	5.0	5.0																													
5																															
10																															
15																															
20																															
25																															
30																															
		Suitable title of table Process - Osmosis	1 mark 1 mark	1	1																										
(b)		Ability to measure 5 cm ³ of cereal and milk (2) Ability to add testing reagents to the mixture (2)			4																										
		ORR - Observations Reporting and Recording: Accuracy of Observations and Details of Observations	2 marks for each test 4 x 2 = 8 marks		8																										
		Use of knowledge: correct inferences from observations	1 mark for each test 4 x 1 = 4 marks	4																											
TOTAL				5	20																										

**Integrated Science
Specimen Paper
Paper 032 - General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions/ Comments		
				UK	XS
2 (a)	B.VI.4	Hypothesis - Clearly stated (1) - Testable/manageable (1)			2
(b)	B.VI.4	Manipulated Variable: Solvent/chemical used			1
		Controlled Variable: Time, volume of solvent used, size of stain			1
		Responding Variable: Disappearance of stain			1
		Procedure: Take 3 large beakers and add 100 cm ³ of each solvent/chemical to the beaker (1) Cut 6 stained pieces of the same size from the shorts (1) Place 2 pieces of the stained cloth into each beaker (1) Start the stopwatch immediately and record the time it takes for the stain to dissolve (1)			4
	B.VI.4	Limitations: Getting equal amounts of stain for each solvent			1

**Integrated Science
Specimen Paper
Paper 032 - General Proficiency
Key and Mark Scheme**

Ques	Syll Ref	Possible Response	Instructions/ Comments	UK	XS
(c) (i)	B.V.3	<p>Inferences</p> <p>Cu: Copper does not react with dilute hydrochloric acid</p> <p>Al: Reacts with dilute hydrochloric acid</p> <p>Fe: Reacts with dilute hydrochloric acid</p> <p>X: Reacts with dilute hydrochloric acid</p>	<p>1 mark for each inference</p>		4
	B.V.3	<p>Observations</p> <p>Cu: Reaction mixture did not bubble or fizz</p> <p>Al: the mixture bubbled and fizzed rapidly, the texture was warm</p> <p>Fe: The mixture fizzed and bubbled slowly</p>		<p>2 marks for each observation</p>	
(c) (ii)	B.V.3	Iron + hydrochloric acid (1) → Iron chloride (1) + Hydrogen gas (1)		3	
(c) (iii)	B.V.3	<p>Descending Order:</p> <p>Al, X, Fe, Cu</p>	<p>3-4 correct = 2 marks</p> <p>1-2 correct = 1 mark</p>	2	
TOTAL				5	20

Integrated Science
Specimen Paper
Paper 032 - General Proficiency
Key and Mark Scheme

Ques	Syll Ref	Possible Response	Instructions/ Comments	UK	XS																
3 (a)	C.V.4	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>A</td><td>8.1</td></tr> <tr><td>J</td><td>7.1</td></tr> <tr><td>I</td><td>6.1</td></tr> <tr><td>H</td><td>5.1</td></tr> <tr><td>G</td><td>4.1</td></tr> <tr><td>F</td><td>3.1</td></tr> <tr><td>E</td><td>2.1</td></tr> <tr><td>D</td><td>1.1</td></tr> </table>	A	8.1	J	7.1	I	6.1	H	5.1	G	4.1	F	3.1	E	2.1	D	1.1	<p>Correct significance - 1 mark 7 points - 4 marks 5-6 points - 3 marks 3-4 points - 2 marks 1-2 points - 1 mark</p>		5
A	8.1																				
J	7.1																				
I	6.1																				
H	5.1																				
G	4.1																				
F	3.1																				
E	2.1																				
D	1.1																				
(b)	C.V.4	<ul style="list-style-type: none"> • Hypothesis links the two variables • Hypothesis is measurable 		2																	
(c) (i)	C.V.4	<p>Correct plotting of points</p>	<p>7-8 points - 3 marks 4-6 points - 2 marks 1-3 points - 1 mark</p>		4																
	C.V.4	Fine line through points	<p>Fine line and points - 1 mark</p>																		
(c) (ii)	C.V.4	Correct labelling of axes x - mass; y - distance	<p>Label must include unit</p>		2																
(d) (i)	C.V.4	<ul style="list-style-type: none"> • Smooth line extended (1) • Point marked (1) 		2																	
(d) (ii)	C.V.4	<ul style="list-style-type: none"> • Reading from the graph (1) • Correct unit (1) • Correct x value (1) • Correct y value (1) 	Expected 0.6 cm		4																
(e)	C.V.4	<u>Small decrease</u> in effort results in <u>large increases</u> in distance from fulcrum	<p>Small effort - large distance Decrease → Increase 1 mark</p>	1																	
(f)	C.V.4	<ul style="list-style-type: none"> • The magnification • Clear lines • A title for the drawing 	<p>2 marks 2 marks 1 mark</p>		5																
TOTAL				5	20																