DEPARTMENT OF EDUCATION

LOWER SECONDARY SCHOOL CERTIFICATE EXAMINATIONS

(LSSCE)

SCIENCE

Wednesday

12th October, 2016

Time allowed:

3 hours

8:30 am – 11:30 am

Sc

INSTRUCTIONS TO CANDIDATES:

(To be read out by the external invigilator before the start of the examination)

There are **46** questions in this paper worth **50** marks. Attempt **ALL** questions even if you are not so sure of some of the answers.

The Examination is divided into three parts:

PART A: Multiple-Choice (Questions 1 to 25)

PART B: Short-Answer (Questions 26 to 45)

PART C: Extended Response (Question 46)

The Answer Sheet is part of the Examination Booklet. Take out the middle pages and remove the Answer Sheet by tearing along the perforation. You may use the blank sheet for rough work.

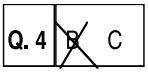
For each question in **PART A** choose the correct answer and write the letter A, B, C or D in the space provided on the **ANSWER SHEET**.

For each question in **PART B and PART C** work out the answer and write the answer in the space provided on the **ANSWER SHEET**.

If you find a question very difficult, do not spend too much time thinking about it. Leave the question out and go on with the rest of the paper. If you have time in the end, return to the difficult questions and think about them more carefully.

Write your answers in BLUE or BLACK ink (pen or biro).

If you decide to change an answer, make your correction as shown below so that it is clear to the markers what your final answer is. Do NOT use **correction fluid** on your answer sheet.



Hand in BOTH the Answer Sheet and the papers used for rough work at the end of the examination.

Extra time will NOT be allowed to complete the examination under any circumstances.

The penalty for cheating or assisting others to cheat in National Examinations is non-certification.

DO NOT TURN OVER THIS PAGE AND DO NOT WRITE UNTIL YOU ARE TOLD TO START.

PART A: MULTIPLE CHOICE (QUESTIONS 1 to 25) 25 MARKS

For each question, choose the correct answer and write the letter A, B, C or D in the space provided on the ANSWER SHEET.

QUESTION 1

Which of the following is the general name given to micro-organisms that cause sickness and disease?

A. Mites B. Vectors C. Pathogens D. Scavangers

QUESTION 2

The immune system protects our body against harmful microbes.

Which component of this system is responsible for this activity?

A. Plasma B. White blood cells

C. Platelets D. Red blood cells

QUESTION 3

The burning of coal and gases such as methane in air are examples of _____ reactions.

A. combustion B. displacement C. decomposition D. neutralization

QUESTION 4

Which organ in the body is responsible for regulating the amount of water in the body?

A. Liver B. Kidney C. Pancreas D. Bladder

QUESTION 5

Continental plates move apart (diverge) at zones which generally occur in the major oceans.

These zones are called mid-ocean _____.

A. floors B. plates C. ridges D. trenches

QUESTION 6

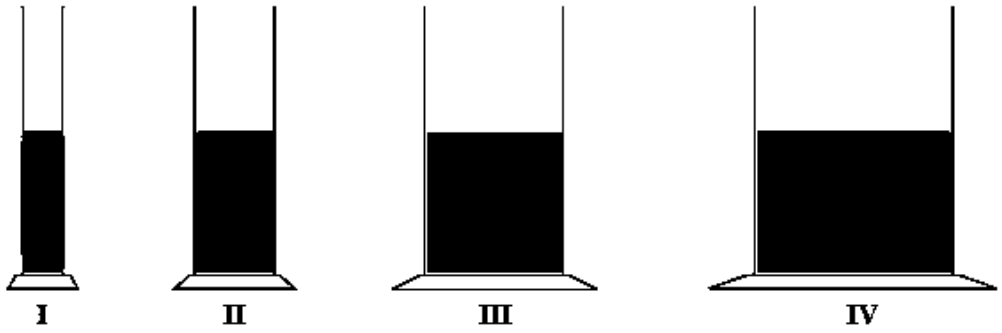
Element X has four (4) shells and two (2) electrons in its outermost shell.

Which group on the periodic table would element X belong to?

A. II B. IV C. VI D. VIII

QUESTION 7

Four (4) containers of the same height but different width were filled with water as shown below.

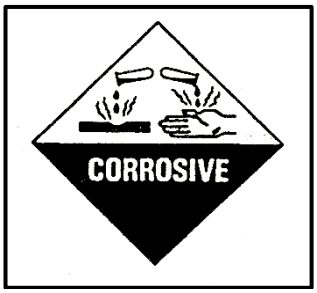


Which of the following statements is TRUE when comparing the volume of water in the containers?

A. Container I, II, III and IV have the same volume of water in them.
B. Container IV has less volume of water compared to the rest.
C. Container III and container IV have the same volume of water.
D. Container I has the least volume of water compared to the rest.

For Questions 8 and 9 refer to the following information.

The following hazard symbol appeared on a glass jar that contained a clear liquid.



QUESTION 8

What does this hazard symbol tell us about the liquid?

A. Pour some liquid on a solid surface before you use it.
B. Handle the liquid with care as it may cause burns.
C. Pour some liquid on your hand before you use it.
D. Wash your hands before you handle the liquid.

QUESTION 9

The hazard symbol above is most likely to be found on containers that contain concentrated _____.

A. acids B. oils C. alcohols D. fuels

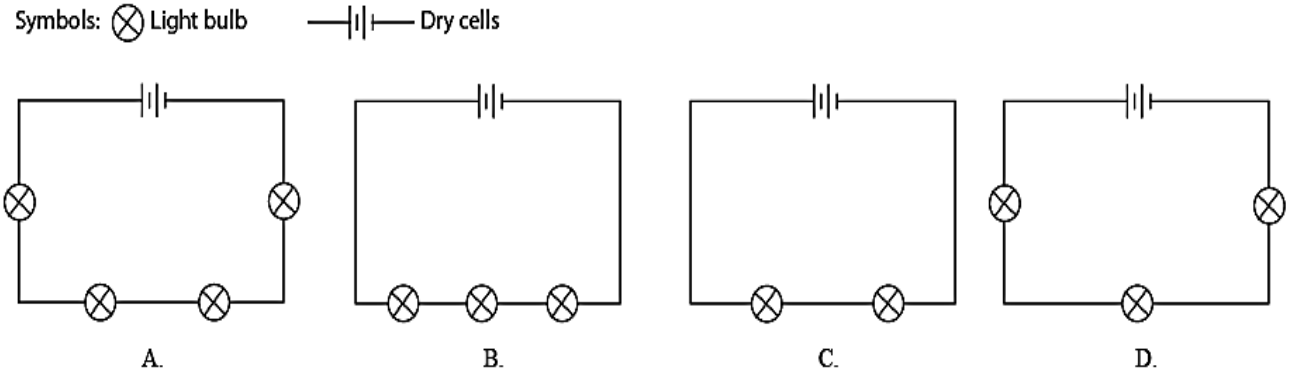
QUESTION 10

What is the correct reading on the thermometer shown below?

A. 62°C B. 64°C C. 65°C D. 66°C

QUESTION 11

Below are the diagrams of four (4) electrical series circuits. They are composed of identical light bulbs and dry cells connected in series by copper wire.



Which of the above circuits A, B, C or D would have the brightest light bulbs?

QUESTION 12

The chemical reaction between calcium oxide (CaO) and suphuric acid (H_2SO_4) produces calcium sulphate ($CaSO_4$) and water (H_2O).

Which of the following correctly represents the balanced chemical equation for this reaction?

A. $CaO + H_2SO_4 \longrightarrow CaSO_4 + H_2O$

B. $CaO + 2H_2SO_4 \longrightarrow CaSO_4 + 2H_2O$

C. $2CaO + H_2SO_4 \longrightarrow 2CaSO_4 + H_2O$

D. $2CaO + H_2SO_4 \longrightarrow CaSO_4 + 2H_2O$

QUESTION 13

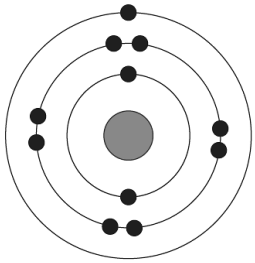
Fluorine has an atomic number of 9 and an atomic mass of 19.

How many neutrons are there in one atom of Fluorine?

A. 9 B. 10 C. 19 D. 28

QUESTION 14

Below is a diagram of an atom with 3 shells and 11 electrons.

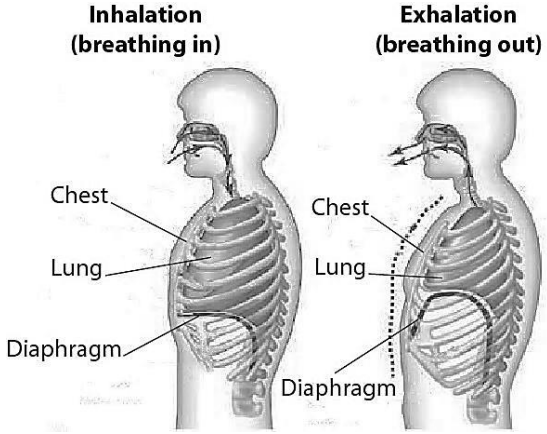


Which period and group of the periodic table would this atom belong to?

A. Period 11, group III
B. Period 1, group III
C. Period 3, group I
D. Period 3, group II

QUESTION 15

Movements in the chest, lungs and diaphragm muscle are involved in inhalation and exhalation of air.

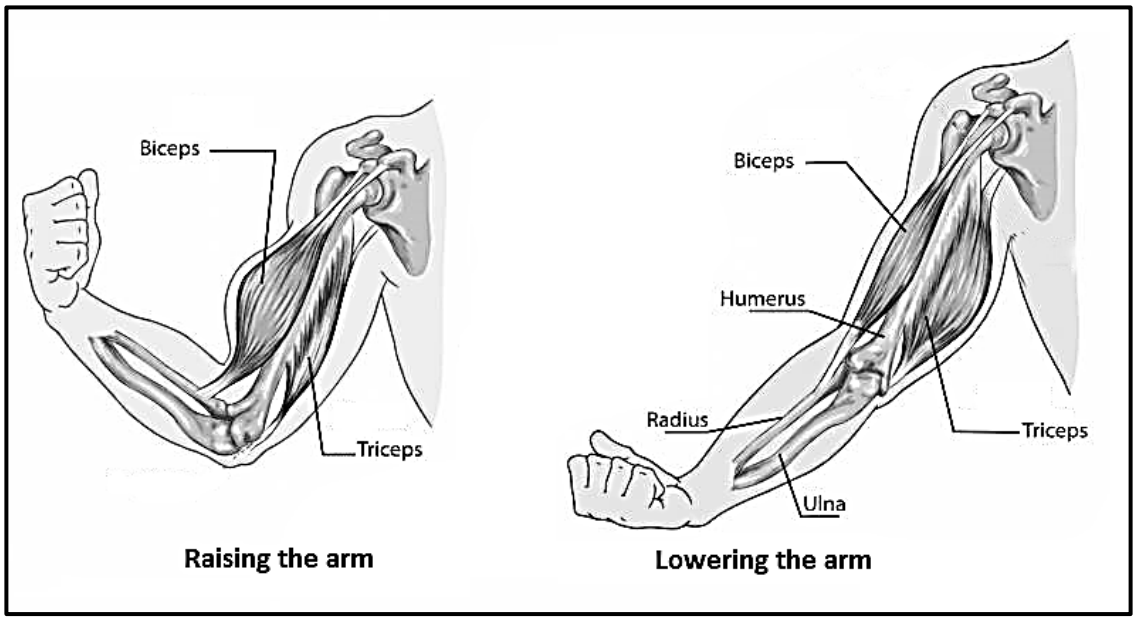


Which of the following happens when a person inhales air?

A. Chest expands, air leaves the lungs and the diaphragm pulls downwards.
B. Chest expands, air enters the lungs and the diaphragm pulls downwards.
C. Chest contracts, air enters the lungs and the diaphragm relaxes.
D. Chest contracts, air leaves the lungs and the diaphragm relaxes.

QUESTION 16

Below is a diagram of the muscles that allow us to raise or lower our arms.



When a person raises his/her arm, what happens to the triceps and biceps muscles in the arm?

A. Triceps muscle contracts while the biceps muscle relaxes.
B. Biceps and triceps muscles both relax.
C. Biceps and triceps muscles both contract.
D. Triceps muscle relaxes while the biceps muscle contracts.

QUESTION 17

Aluminium (Al) and oxygen (O) are the two elements that combine to give aluminium oxide.

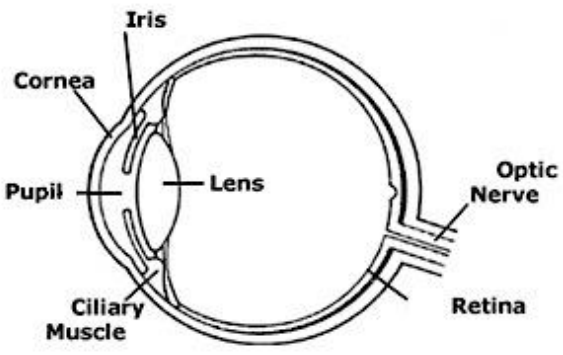
If aluminium has a combining power of 3 while oxygen has a combining power of 2.

What would be the formula for aluminium oxide?

A. $2AlO_3$ B. Al_3O_2 C. Al_3O_3 D. Al_2O_3

QUESTION 18

Below is a diagram of the eye and its parts.

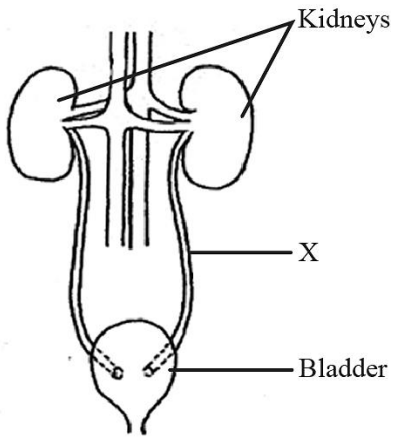


Which part of the eye is responsible for controlling the amount of light that passes through to the retina?

A. Iris
B. Lens
C. Pupil
D. Cornea

QUESTION 19

The diagram below shows part of the urinary system.

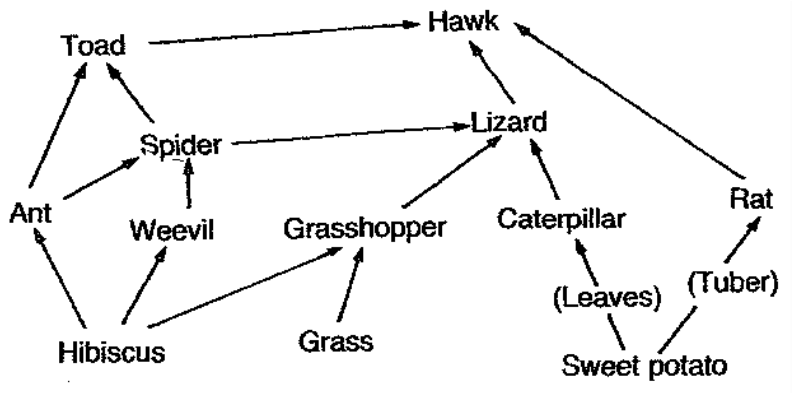


The part labeled X connects the left kidney to the bladder.

What is the name of the part labeled X?

A. Vein B. Urethra C. Artery D. Ureter

For Questions 20 and 21 refer to the following food web.



QUESTION 20

In the food web above, how many food chains is the lizard part of?

A. Three (3) B. Four (4) C. Five (5) D. Six (6)

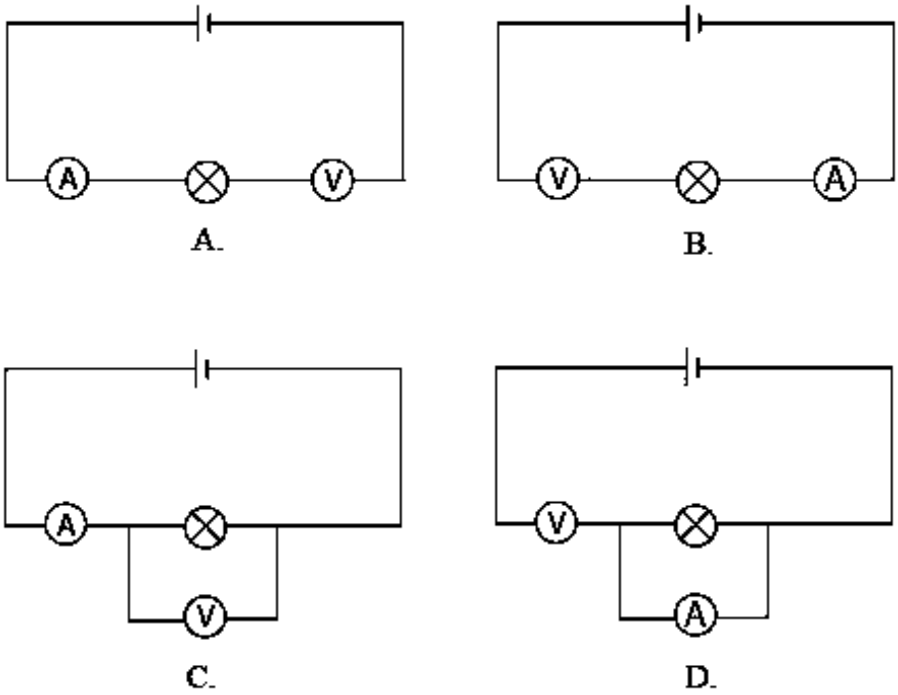
QUESTION 21

Which of the following organisms is a third order consumer in this food web?

A. Ant B. Spider C. Grasshopper D. Rat

QUESTION 22

Which of the following electrical circuit diagrams shows the correct way of connecting an ammeter and a voltmeter to measure the current and voltage of a light bulb?



QUESTION 23

When Maria was standing in front of a mirror, she made the comments shown in the picture below.

By this comment, Maria is simply saying that images in plane mirrors are

A. laterally inverted.
B. equal in size.
C. upright.
D. virtual.

QUESTION 24

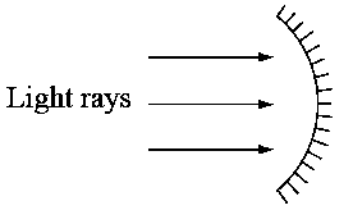
The comment that Maria makes in the picture below is "My image is not upside down".

This statement tells us that all images in a plane mirror are _____.

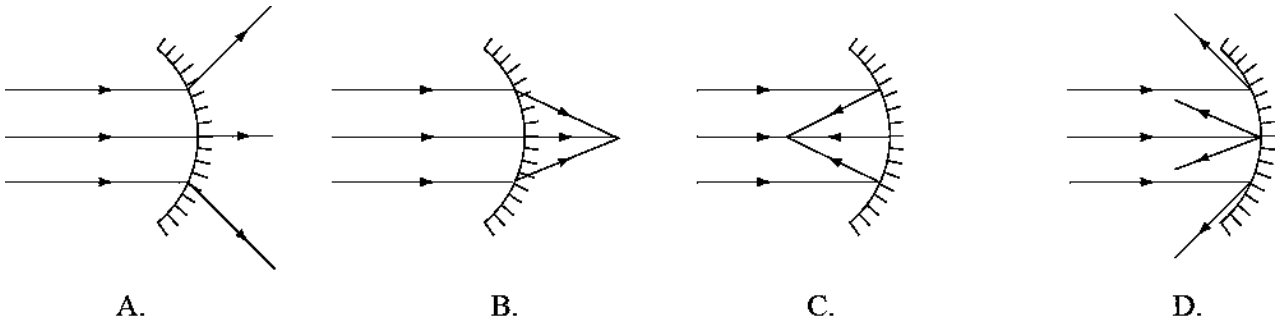
A. real B. virtual C. inverted D. upright

QUESTION 25

The following diagram shows parallel rays of light approaching a concave mirror.



Which of the following diagrams shows the correct reflection of light from the concave mirror?



PART B: SHORT ANSWERS (QUESTIONS 26 to 45) 20 MARKS

For each question, write the correct answer in the space provided on the ANSWER SHEET.

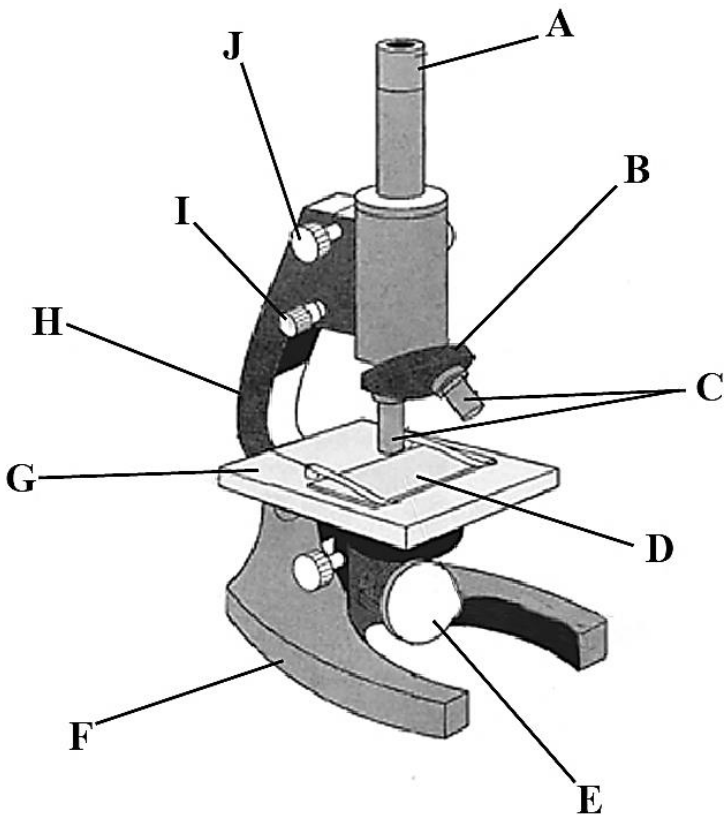
QUESTION 26

Name the body system composed of bones that supports the body, maintains the shape of the body and protects vital organs.

QUESTION 27

Name the body system that transports nutrients to and wastes from all cells in the body by using blood.

For Questions 28, 29 and 30 refer to the diagram of the microscope shown below.



QUESTION 28

Name the part labeled by the letter F.

QUESTION 29

Name the part labeled by the letter A.

QUESTION 30

Which letter represents the coarse adjustment knob?

QUESTION 31

What gaseous element is required for combustion (burning) reactions to take place?

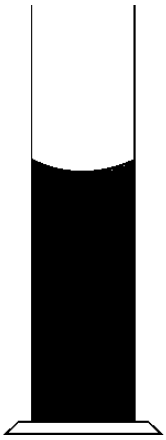
QUESTION 32

There are three (3) main types of joints found in the body.

Name the type of joint that allows for movement in one direction (such as the elbow).

QUESTION 33

When a liquid is poured into a measuring cylinder, the top surface of the liquid is not flat but is slightly curved.

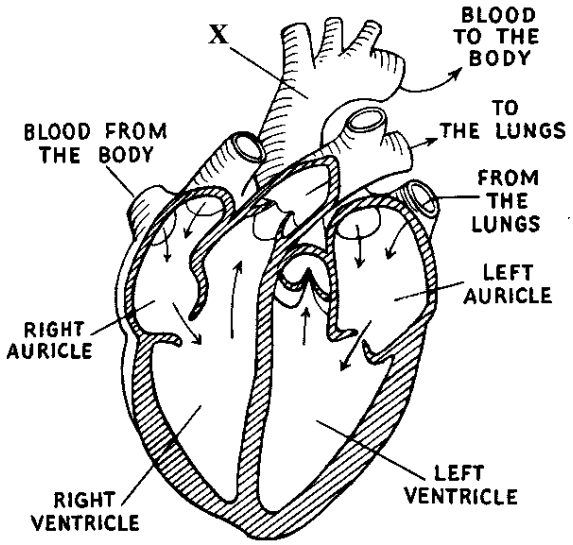


What do we call this curved surface?

QUESTION 34

Below is a diagram of the heart with the arrows showing the movement of blood.

Name the major blood vessel labeled X which transports oxygenated blood.



QUESTION 35

A chemical reaction between Magnesium (Mg) and Hydrochloric acid (HCl) is shown by the equation below.

$$Mg + \mathbf{Y}\,HCl \longrightarrow MgCl_2 + H_2$$

What number should be in place of **Y** in order to balance the equation?

QUESTION 36

Barium (Ba) is a metallic element that has a combining power of 2. It reacts with chlorine (Cl) which has a combining power of 1, to give barium chloride which is a compound with the formula $BaCl_2$.

If oxygen (O) has a combining power of 2, what would be the formula of the compound that is formed by a reaction between barium and oxygen?

For Questions 37 and 38 refer to the humidity table below.

Temperature of dry bulb	**Depression of wet bulb (dry temperature – wet temperature) °C**									
°C	1	2	3	4	5	6	7	8	9	10
50	94	89	84	79	74	70	65	61	57	53
45	94	88	83	78	73	68	63	59	55	51
40	93	88	82	77	71	65	61	56	52	47
35	93	87	80	75	68	62	57	52	47	42
30	92	86	78	72	65	59	53	47	41	36
25	91	84	76	69	61	54	47	41	35	29
20	90	81	73	64	56	47	40	32	26	18
15	89	79	68	59	49	39	30	21	12	4
10	87	75	62	51	38	27	17	5		

QUESTION 37

If the readings on the dry bulb and wet bulb are 45°C and 35°C respectively, what is the relative humidity?

QUESTION 38

If the relative humidity is 72% and the wet bulb thermometer reading is 26°C, what would the thermometer reading on dry bulb be?

QUESTION 39

Resistance (in ohms, Ω) is related to current (in amps, A) and voltage (in volts, V) by Ohm's law. The formula for Ohm's law given below.

$$\textbf{Resistance} = \frac{\textbf{Voltage}}{\textbf{Current}}$$

If a car headlight globe operates at 12V with a current of 2.5A, what would be the resistance of the headlight globe?

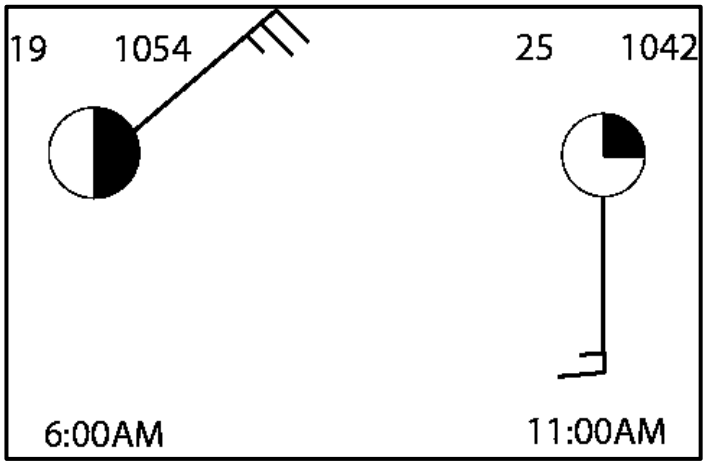
QUESTION 40

On a clear windless day a gunshot is made on an open field. The gunshot sound is heard 1, 650 metres away after 5 seconds.

What is the speed of the sound in metres per second (m/s)?

For Questions 41, 42 and 43 refer to the following information.

The following are two weather diagrams that summarise the weather at Mt Hagen at 6:00AM and 11:00AM on a particular day.



QUESTION 41

At 6:00AM the wind speed at Mt Hagen was 25 kilometers per hour (kph).

What is the wind speed at 11:00AM?

QUESTION 42

At 11:00AM, the atmospheric pressure in Mt Hagen was 1042 millibars (mb).

What is the difference in atmospheric pressure in millibars (mb) between 6:00AM and 11:00AM?

QUESTION 43

Approximately 50% of the sky was covered by clouds at 6:00AM.

What percentage of the sky is covered by clouds at 11:00AM?

QUESTION 44

The total amount of electrical energy consumed (in kilowatt-hours, kWh) is related to power rating (in kilowatts, kW) and time of operation (in hours, h).

This relationship is shown in the equation below.

Electrical energy (in kWh) = Power (in kW) × Time (in h)

Where kW is kilowatts, h is hours, kWh is kilowatt-hours

Judy switched on her 2.55kW washing machine for 3 hours.

Calculate the electrical energy in kWh used by the washing machine.

QUESTION 45

The speed of a wave (in metres per second, m/s) is related to the frequency (in Hertz, Hz) and wavelength (in metres, m) of a wave by the formula below.

wave speed = wave frequency × wavelength

For example: A wave with a wave speed of 2 metres per second will have a wave frequency of 2 hertz and a wavelength of 1 metre.

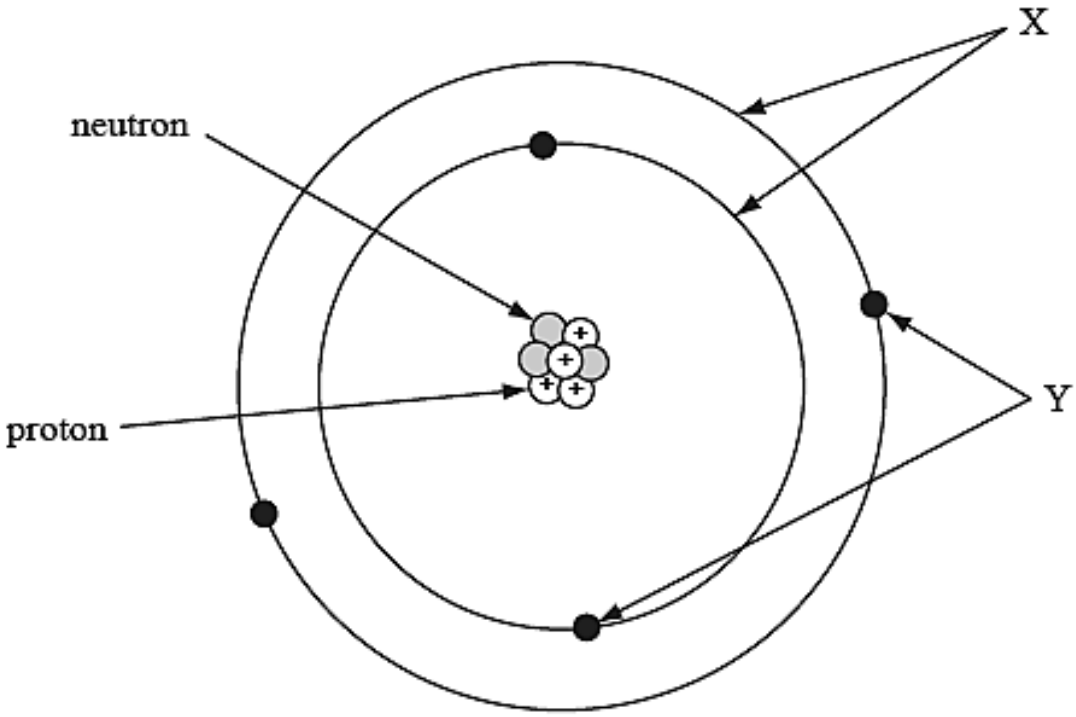
A water wave has a wavelength of 4 metres and travels at a speed of 28 metres per second.

What is the frequency of this water wave in hertz (Hz)?

PART C: EXTENDED RESPONSE **5 MARKS**

QUESTION 46

Below is a diagram representing the structure of an atom which has 4 protons and 3 neutrons.



a) Name the part of the atom labelled X. (1 mark)

b) Name the particles labelled Y. (1 mark)

c) What is the atomic number of this atom? (1 mark)

d) What is the mass number of this atom? (1 mark)

e) Give the name or the chemical symbol for the element whose atom is represented by this diagram. (1 mark)

END OF EXAMINATION

LOWER SECONDARY SCHOOL CERTIFICATE EXAMINATIONS - 2016

SCIENCE - ANSWER SHEET

MARKER 1

YEAR		PROV.		SCHOOL			CAND No.		
1	6								

NAME	
SCHOOL	

PART A: **(Questions 1 to 25)**
Write the letter of your answer next to each question below.

1		**6**		**11**		**16**		**21**	
2		**7**		**12**		**17**		**22**	
3		**8**		**13**		**18**		**23**	
4		**9**		**14**		**19**		**24**	
5		**10**		**15**		**20**		**25**	

PART B **(Questions 26 to 45)**
Write your answer next to each question below.

26		**31**		**36**	
27		**32**		**37**	%
28		**33**		**38**	°C
29		**34**		**39**	Ω
30		**35**		**40**	m/s

PART C **(Question 46)**
Write your answer next to each question below.

41	kph	**46**	a)
42	mb		b)
43	%		c)
44	kWh		d)
45	Hz		e)

MARKER 2

DO NOT WRITE ON THIS PAGE

YOU MAY DO YOUR ROUGH WORK ON THIS PAGE

CAREFULLY TEAR ALONG THIS PERFORATION

YOU MAY DO YOUR ROUGH WORK ON THIS PAGE