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COMBINED SCIENCE

PAPER 1 3102/1

Thursday **9 JUNE 2022** 12:00 NOON–1:15 P.M.

No additional materials required.

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS FOR CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided on this question booklet.

There are **FIFTY** questions on this paper.

Attempt **ALL** questions.

For each question, there are **FOUR** possible answers labelled **A, B, C** and **D**. Choose the **ONE** you consider correct and record your choice by circling the **LETTER** next to the answer of your choice in the booklet.

A copy of the Periodic Table is printed on page 2.

Calculators are permitted, however **NO** graphing calculators are allowed.

FOR EXAMINER'S USE ONLY

Total Marks



This question paper consists of 15 printed pages and 1 blank page.



The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
1 H Hydrogen 1																	
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86
87 Fr Francium	88 Ra Radium	89 Ac Actinium															

* 58-71 Lanthanoid series

+90-103 Actinoid series

a

X

b

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

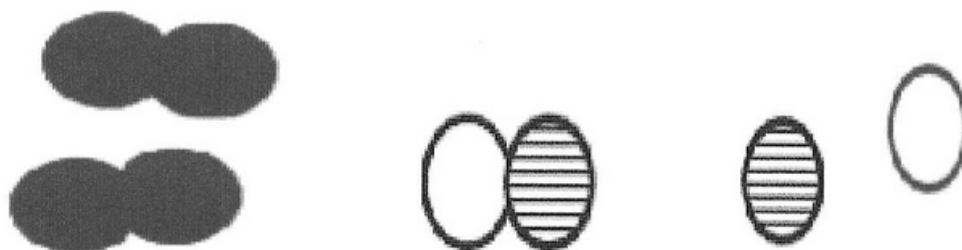
140 58 Ce Cerium	141 59 Pr Praseodymium	144 60 Nd Neodymium	150 62 Sm Samarium	152 63 Eu Europium	157 64 Gd Gadolinium	159 65 Tb Terbium	162 66 Dy Dysprosium	165 67 Ho Holmium	167 68 Er Erbium	169 69 Tm Thulium	173 70 Yb Ytterbium	175 71 Lu Lutetium
90 232 Th Thorium	91 232 Pa Protactinium	92 238 U Uranium	94 238 Pu Plutonium	95 238 Am Americium	96 238 Cm Curium	97 238 Bk Berkelium	98 238 Cf Californium	99 238 Es Einsteinium	100 238 Fm Fermium	101 238 Md Mendelevium	102 238 No Nobelium	103 238 Lr Lawrencium

1. Which row states correct information about plant and animal cells?

	Animal Cell	Plant Cell
A.	cell membrane present	cell membrane absent
B.	cell wall present	cell wall absent
C.	chloroplast absent	chloroplast present
D.	nucleus present	nucleus absent

2. The diagram shows a mixture of elements and compounds.

How many different types of elements are displayed in the diagram?



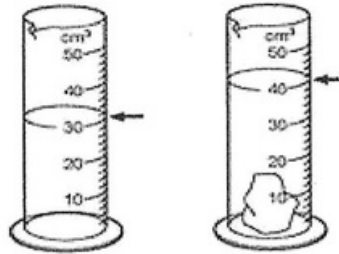
- A. 2
 B. 3
 C. 4
 D. 6
3. Sarah sprayed on perfume before leaving for work. The scent spread throughout the house very slowly.

Which process is responsible for this?

- A. absorption
 B. diffusion
 C. excretion
 D. osmosis

4. A student needed to find the volume of a rock.

The arrow on the cylinder on the left shows the volume of water before the rock was dropped in. The arrow on the cylinder on the right shows the volume of water after the rock was dropped in.



What is the volume of the rock?

- A. 10 cm³
 B. 15 cm³
 C. 30 cm³
 D. 40 cm³
5. Which row states correct information about the arrangement and movement of molecules of water in the solid state?

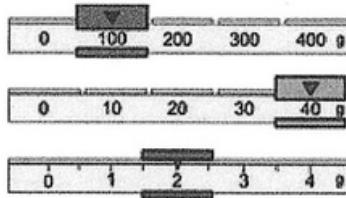
	Arrangement	Movement
A.	random	moving freely
B.	random	vibrating
C.	regular	moving freely
D.	regular	vibrating

6. Which is the correct word equation for photosynthesis?

- A. carbon dioxide + oxygen $\longrightarrow$ water + glucose
 B. glucose + water $\longrightarrow$ carbon dioxide + oxygen
 C. oxygen + glucose $\longrightarrow$ water + carbon dioxide
 D. water + carbon dioxide $\longrightarrow$ glucose + oxygen



7. A student has several oranges of equal mass, each having the same mass as shown by the reading on the balance below.



How many oranges should be placed on the scale for a total of 426 g?

- A. 2
B. 3
C. 5
D. 9
8. Which choice shows the three main groups of elements in the correct order from lowest conductivity to highest conductivity?
- A. metals, metalloids, non-metals
B. metals, non-metals, metalloids
C. metalloids, non-metals, metals
D. non-metals, metalloids, metals
9. Identify the main type of energy transfer that occurs when a flashlight is turned on.
- A. chemical $\longrightarrow$ electrical $\longrightarrow$ light
B. chemical $\longrightarrow$ electrical $\longrightarrow$ thermal
C. chemical $\longrightarrow$ thermal $\longrightarrow$ electrical
D. thermal $\longrightarrow$ chemical $\longrightarrow$ light
10. Which food is a good source of fibre?



A. cabbage



B. eggs



C. milk



D. pork

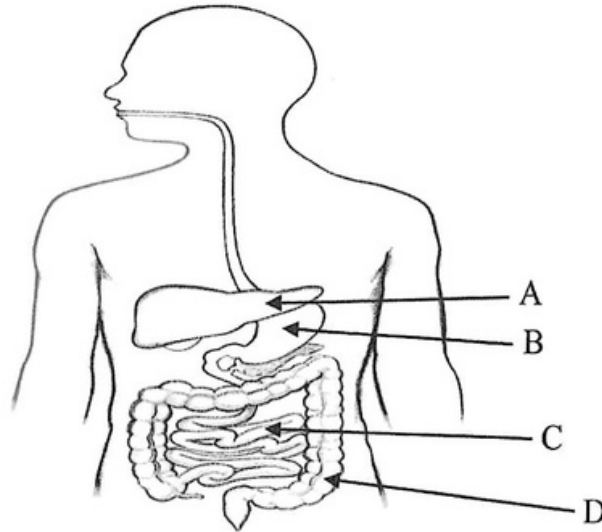


11. Which term best describes aluminium's ability to be hammered into different shapes, or rolled into flat sheets?
- A. ductile
 - B. high density
 - C. lustrous
 - D. malleable
12. Which kind of energy is associated with the position and motion of an object?
- A. mechanical
 - B. nuclear
 - C. sound
 - D. thermal
13. Which substances are dissolved in human blood plasma?
- A. carbon dioxide, haemoglobin and glucose
 - B. carbon dioxide, oxygen and haemoglobin
 - C. glucose, hormones and urea
 - D. oxygen, urea and starch
14. What is the electron configuration of Al^{3+} ?
- A. 2.8
 - B. 2.8.3
 - C. 2.8.6
 - D. 2.8.8.3
15. Which of the following is the rate at which work is done?
- A. force
 - B. motion
 - C. power
 - D. speed



16. The diagram shows the human digestive system.

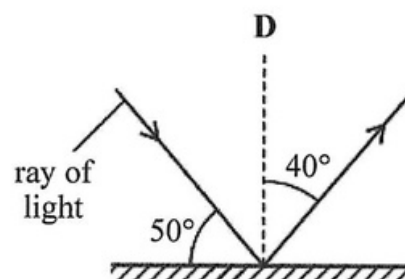
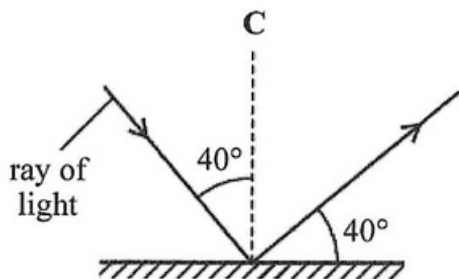
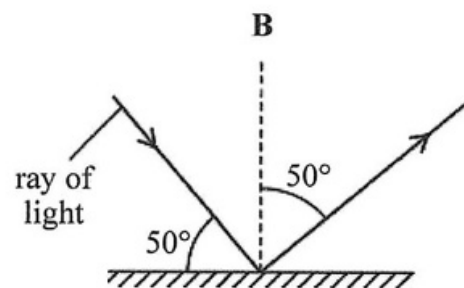
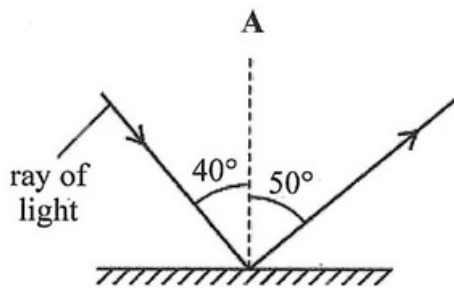
Which part is responsible for the absorption of digested food?



17. Which process is used to obtain a dissolved solute from a solution?

- A. decantation
- B. distillation
- C. evaporation
- D. filtration

18. Which diagram correctly shows a ray of light reflected by a plane mirror?



19. Name the major blood vessel that takes deoxygenated blood to the heart from the body.

- A. aorta
- B. vena cava
- C. coronary artery
- D. pulmonary vein

20. Which of the mixtures shown is described as immiscible?

- A. ethanol and water
- B. oil and water
- C. salt and water
- D. sand and water

21. When light waves pass from air into glass, refraction takes place.

What property of the wave remains the same in both air and glass?

- A. direction
- B. frequency
- C. speed
- D. wavelength

22. Which statement is correct about gonorrhoea?

- A. It can result in miscarriages.
- B. It causes warts to grow on or near the genital area.
- C. It causes a burning sensation when urinating.
- D. It suppresses the immune system.

23. Which of the following properties is enhanced, when chromium is added to steel?

- A. conductivity
- B. ductility
- C. magnetic property
- D. resistance to corrosion

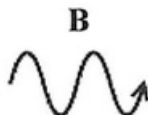


24. A sound wave travels from point X to point Y.

●
X

●
Y

Which diagram represents the movement of the air molecules, due to the sound wave, in the region between X and Y?



25. What is the product of anaerobic respiration formed in the muscles during vigorous exercise?

- A. carbon dioxide
- B. ethanol
- C. lactic acid
- D. water

26. Which process is an example of a chemical change?

- A. steam rising from a boiling pot of soup
- B. a metal railing rusting in damp weather
- C. alcohol evaporating from a cotton swab
- D. a piece of wood shrinking as it dries out

27. Which part of the eye focuses light onto the back of the eye?

- A. iris
- B. lens
- C. pupil
- D. retina

28. What stimulus are taste receptors sensitive to?

- A. chemicals
- B. heat
- C. touch
- D. water

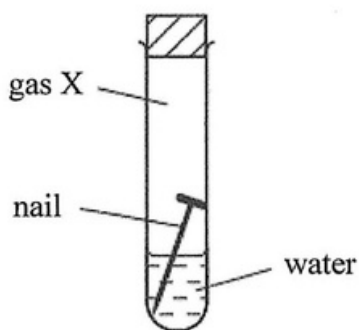
29. Which is a positive test for oxygen gas?
- A. a glowing splint relights
 - B. a lighted splint is extinguished
 - C. lime water turns milky
 - D. universal indicator turns red
30. What causes a fuse to blow in a circuit?
- A. too little current
 - B. too little voltage
 - C. too much current
 - D. too much voltage
31. Which of these does **not** pose a risk of electrical shock?
- A. cables with plastic insulation
 - B. frayed electrical cables
 - C. loose connection in a socket
 - D. water next to an electrical outlet
32. An intra-uterine device (IUD) and spermicide are examples of which types of contraception?

	IUD	Spermicide
A.	mechanical	chemical
B.	mechanical	natural
C.	natural	surgical
D.	surgical	mechanical



33. An iron nail is placed in a closed test-tube containing gas X. The nail rusts.

What is gas X?



- A. argon
B. carbon dioxide
C. nitrogen
D. oxygen
34. The food chain shows numbers of organisms on a farm.



What is the total number of consumers on the farm?

- A. 10
B. 21
C. 50
D. 63
35. Copper is a transition element used to make saucepans.

Which is **not** a property of copper?

- A. good conductor of heat
B. insoluble in water
C. low melting point
D. malleable

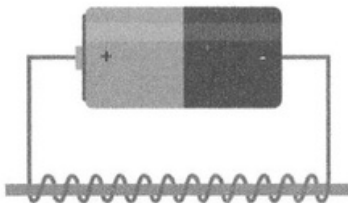


36. An excess of which substance will promote an algal bloom in a lake?
- A. fertilisers
 - B. herbicides
 - C. oil
 - D. pesticides
37. Which of the following correctly describes a positive test for pure water?
- A. a salt residue left behind after evaporation
 - B. blue hydrated copper sulphate turns white
 - C. boils over a range of temperature
 - D. white anhydrous copper sulphate turns blue
38. Sound vibrations travel fastest in which medium?
- A. gases
 - B. liquids
 - C. solids
 - D. vacuum
39. Which of the organisms named is an endangered species in The Bahamas?
- A. bonefish
 - B. hawksbill turtle
 - C. red snapper
 - D. white crab



40. A student wants to make an electromagnet using some easy-to-find materials that are in the school lab.

Which arrangement would make an electromagnet with the strongest magnetic field?



	metal core	power supply setting
A.	soft iron	6 V a.c.
B.	soft iron	6 V d.c.
C.	steel	6 V a.c.
D.	steel	6 V d.c.

41. Which is **not** a method of softening hard water?

- A. chlorination
- B. deionisation
- C. reverse osmosis
- D. simple distillation

42. A cuboid block is made from a metal of density 2.5 g/cm^3 and has a volume of 20 cm^3 .

What is the mass of the block?

- A. 8 g
- B. 16 g
- C. 50 g
- D. 100 g

43. Billy shone a flashlight in Sally's eye. He noticed that her pupil constricted.

Which characteristic of living organisms did he observe?

- A. growth
- B. irritability
- C. movement
- D. respiration



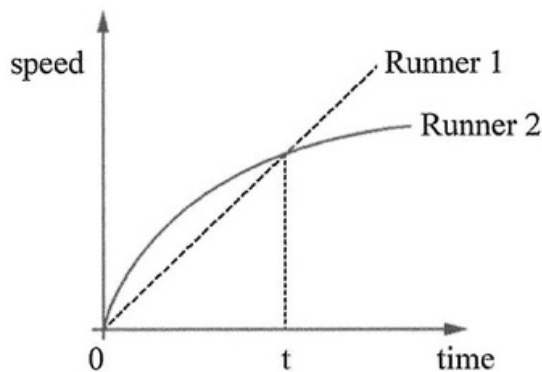
44. Many metals are extracted from their ores by heating the metal oxide with carbon.

Which metal **cannot** be extracted using this method?

- A. aluminium
- B. copper
- C. iron
- D. zinc

45. Two runners take part in a race.

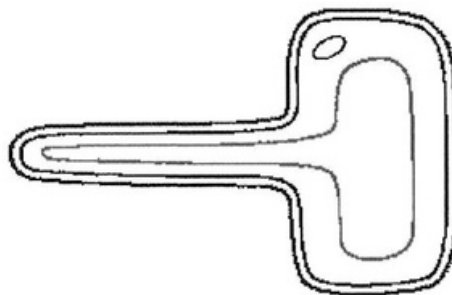
The graph shows how the speed of each runner changes with time.



What does the graph show about the runners at time t ?

- A. Both runners are moving at the same speed.
- B. Runner 1 has zero acceleration.
- C. Runner 1 is overtaking runner 2.
- D. Runner 2 is slowing down.

46. What is the function of the cell shown in the diagram?



- A. absorb water and mineral salts from the soil
- B. defend the body against harmful microorganisms
- C. transmit nerve impulses
- D. transport oxygen

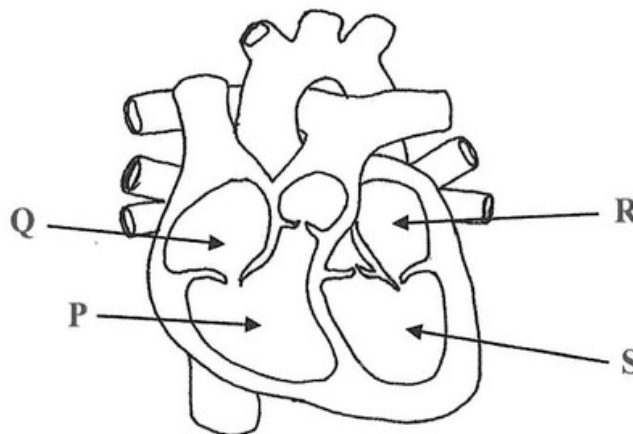


47. A fisherman on a dock is counting the number of waves that pass by him in one minute.

What is the fisherman measuring?

- A. amplitude
 - B. frequency
 - C. period
 - D. wavelength
48. Which organ in the body changes the chemical composition of alcohol?
- A. brain
 - B. kidney
 - C. liver
 - D. stomach
49. In which pair are both materials magnetic?
- A. aluminium and copper
 - B. copper and iron
 - C. iron and steel
 - D. steel and aluminium
50. The diagram shows a longitudinal section of the heart.

In which labelled chambers will the blood be deoxygenated?



- A. P and Q
- B. P and S
- C. Q and R
- D. R and S

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