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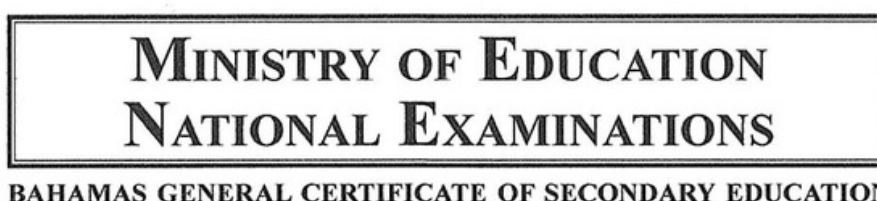
School Number	Candidate Number
Surname and Initials	

COMBINED SCIENCE

PAPER 1 3102/1

Tuesday **26 MAY 2020** 12:00 NOON–1:15 P.M.

No additional materials required.



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 19 printed pages and 1 blank page.



The Periodic Table of the Elements

Group																														
I	II											III	IV	V	VI	VII	0													
1 H Hydrogen																														
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 Ru Ruthenium 44	101 Rh Rhodium 45	103 Pd Palladium 46	106 Ag Silver 47	108 Cd Cadmium 48	112 In Indium 49	115 Sn Tin 50	119 Sb Antimony 51	122 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54														
133 Cs Cesium 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		At Astatine 85	Rn Radon 86													
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89																												
*58-71 Lanthanoid series																														
†90-103 Actinoid series																														
140 Ce Cerium 58																		141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71	
232 Th Thorium 90																		232 Pa Protactinium 91	238 U Uranium 92	238 Pu Plutonium 94	238 Np Neptunium 93	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103

a

X

b

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

Key

*58-71 Lanthanoid series
†90-103 Actinoid series

a

X

b

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

Key

1. Which one of the following features of a green plant is also a characteristic of all other living things?
 - A. having a cellulose cell wall
 - B. responding to stimuli
 - C. escaping from enemies
 - D. having a large central vacuole

2. A liquid used for dissolving a substance is known as a
 - A. mixture
 - B. solute
 - C. compound
 - D. solvent

3. What is the scientific term for "hotness or coldness"?
 - A. climate
 - B. heat
 - C. temperature
 - D. thermometer

4. Which stimulus are taste receptors sensitive to?
 - A. chemicals
 - B. light
 - C. sound
 - D. time

5. How do green plants make their food?
 - A. assimilation
 - B. osmosis
 - C. photosynthesis
 - D. plasmolysis

FOUR methods of separation labelled **A, B, C** and **D** are listed below.

- A** crystallisation
- B** distillation
- C** filtration
- D** magnetism

Use these methods to answer question number 6 and 7.

6. Which method of separation can be used to separate soil particles from muddy water?

A B C D

7. Which method of separation can be used to obtain pure water from seawater?

A B C D

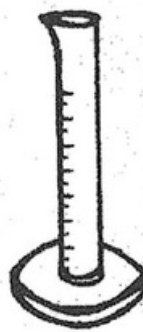
8. Which of the following pieces of apparatus can be used to measure 25.0 cm^3 of liquid most accurately?



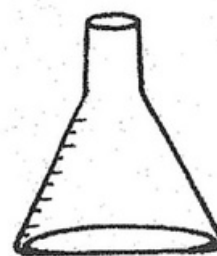
A



B



C



D

9. When an astronaut goes from the Earth to the moon, what changes?

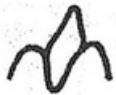
- A. his density
- B. his mass
- C. his volume
- D. his weight



10. What undesirable effect does bleach have when used to catch lobsters?

- A. it causes bacteria to grow rapidly
- B. it kills corals
- C. it produces excessive amount of carbon
- D. it produces excessive amount of fungi

11. Which tooth is adapted for tearing?



A



B



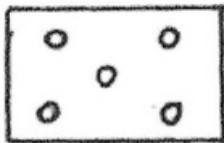
C



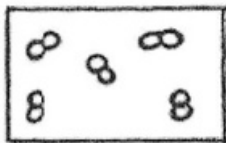
D

12. The diagrams below represent **FOUR** different particle arrangements.

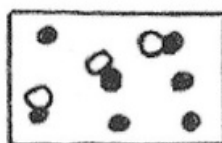
Which diagram best shows a mixture of an element and a compound?



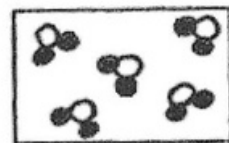
A



B



C

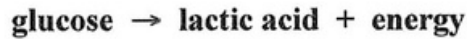


D

13. Which of these waves is an example of longitudinal wave?

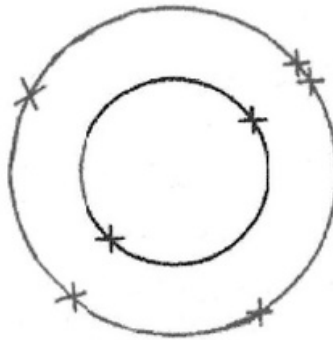
- A. visible light
- B. sound
- C. water ripples
- D. X-rays

14. The equation summarises a process that takes place in the human body.



In which part of the human body is the process likely to occur?

- A. liver
 - B. lungs
 - C. muscles
 - D. stomach
15. What are the characteristics of a gaseous exchange surface?
- A. good blood supply, large surface area and moist surface
 - B. good blood supply, small surface area and dry surface
 - C. poor blood supply, large surface area and moist surface
 - D. poor blood supply, small surface area and dry surface
16. The diagram below shows the electron configuration of an atom.



What is the atomic number of this atom?

- A. 5
- B. 7
- C. 9
- D. 14



17. A guitarist plucks on a string.

She wants to make it louder.

What must she do to the string?

- A. make it longer
- B. make it thicker
- C. pluck it harder
- D. tighten it

18. The table shows the gaseous composition of air.

gas	inspired air	expired air
oxygen	20%	16%
carbon dioxide	0.03%	4.0%
nitrogen	78%	78%

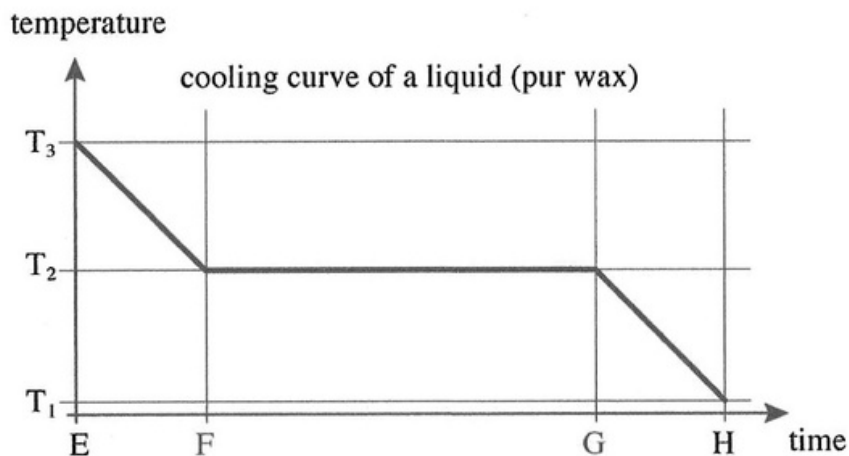
Which percentage of the inspired oxygen is being used by the body?

- A. 10%
- B. 20%
- C. 25%
- D. 50%

19. After an athlete runs a race, he pants because:

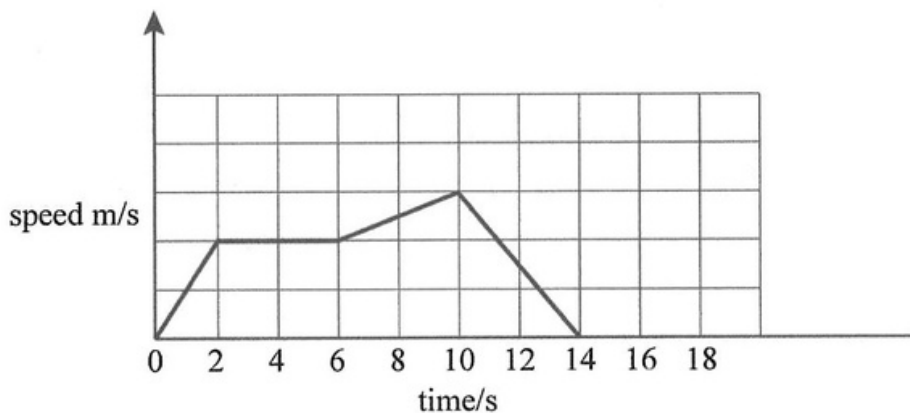
- A. breathing becomes very rapid
- B. carbon dioxide levels in the blood decrease
- C. oxygen demand exceeds the oxygen supply
- D. the cells respire more slowly

20. The graph shows the results of observing a hot liquid, pure wax, as it slowly cools to room temperature.



What can be deduced from these results?

- A. E to F, the wax is starting to freeze
 - B. F to G, the wax is changing state from liquid to solid
 - C. G to H, some wax is still liquid
 - D. The freezing point of the wax is T₁
21. The speed-time graph is for a cyclist.



During what time interval was the cyclist travelling at a constant speed?

- A. 0 s to 2 s
- B. 2 s to 6 s
- C. 6 s to 10 s
- D. 10 s to 14 s



22. Which of the following is not a cause of dental decay?
- A. eating a balanced diet
 - B. brushing teeth only once a week
 - C. drinking lots of fruit juice
 - D. eating lots of sugary snacks
23. Where would the atom with an electron configuration of 2, 8, 6 be located on the Periodic Table?
- A. Group 3, Period 6
 - B. Group 3, Period 8
 - C. Group 6, Period 3
 - D. Group 8, Period 3
24. Which piece of apparatus is used to find the mass of an irregular shaped object?
- A. balance
 - B. displacement can
 - C. measuring cylinder
 - D. pipette

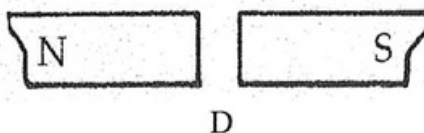
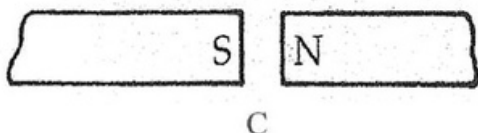
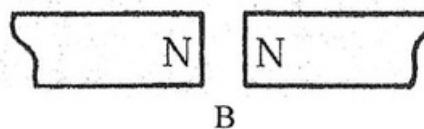
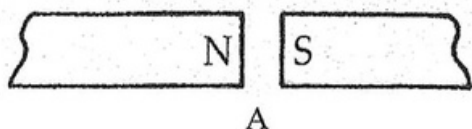
25. Food labels tell how many calories the food inside the box or can contains.

Look at this label on a cereal box:

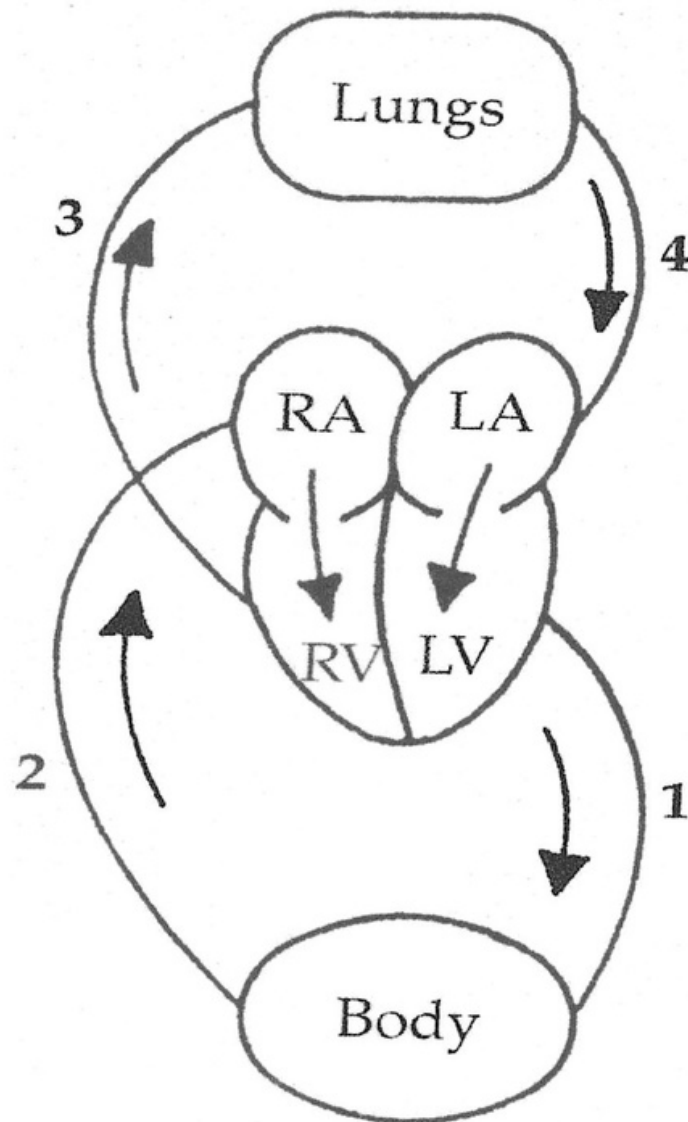
Energy value
1,505 kilojoules per 100 g
350 Calories per 100 g

If you ate 200 g of this cereal, how much energy would it give you?

- A. 350 Calories
B. 700 Calories
C. 1,505 Calories
D. 1,855 Calories
26. What is the symbol of a cation containing 20 protons and 18 electrons?
- A. Ca^{2+}
B. Cu^{2+}
C. Fe^{2+}
D. Mg^{2+}
27. Which pair of bar magnets will repel each other?



28. The diagram shows a plan of the human circulatory system.



Which labels on the diagram show the veins?

- A. 1 and 2
- B. 1 and 3
- C. 2 and 4
- D. 3 and 4

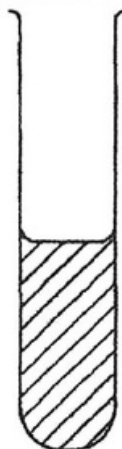
29. The table shows the pulse rate of a student taken each minute for 5 minutes while sitting still.

Time (minutes)	Beats per minute
1	72
2	74
3	78
4	52
5	69

What is the average pulse per minute of the student resting?

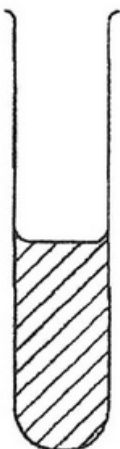
- A. 69
B. 73
C. 75
D. 72
30. Which of these is NOT a solution?

dilute
sulfuric acid



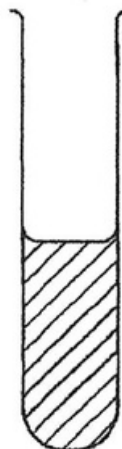
A

distilled
water



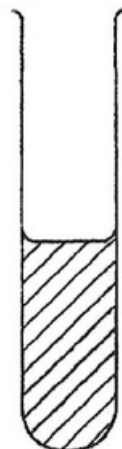
B

tea



C

sea water



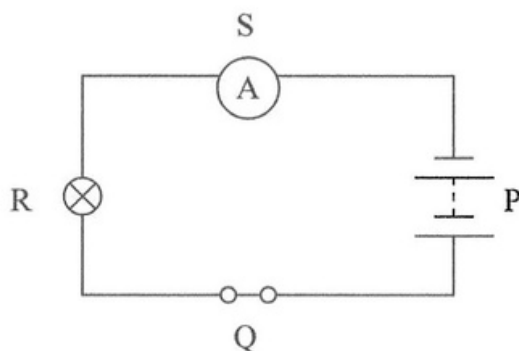
D



31. An electromagnet lifts a car to a height of 10 metres, and holds it steady.

What has happened to the energy of the car?

- A. gains kinetic energy
 - B. gains potential energy
 - C. gains potential and kinetic energy
 - D. no energy change
32. What is the function of fibrin in the blood?
- A. to destroy invading bacteria
 - B. to help form a blood clot
 - C. to stimulate the production of antibodies
 - D. to transport oxygen
33. Which statement describes all elements in Group II of the Periodic Table?
- A. they are all in Period 2
 - B. they are known as the alkaline earth metals
 - C. they have the same atomic mass
 - D. they all have two electron shells
34. The diagram represents an electric circuit.



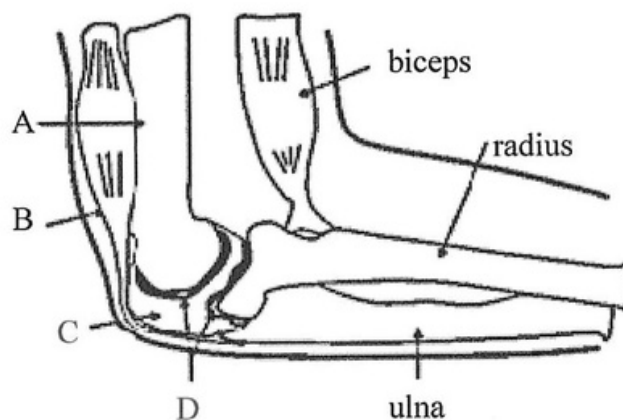
Which labelled part pushes electrons through the circuit?

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

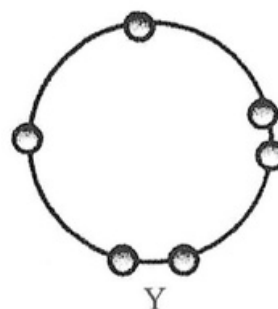
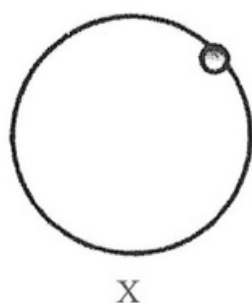


35. The diagram represents a joint in the human body.

Which labelled structure is the cartilage?



36. The diagrams represent the outer shells of TWO different atoms X and Y.



What is the formula of the compound formed on bonding?

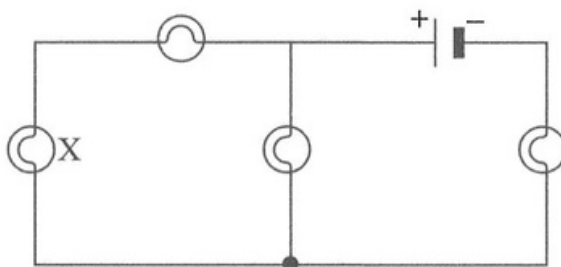
- A. XY
- B. XY_2
- C. X_2Y
- D. XY_3



37. Which are the two effects of the hormone adrenaline?

- A. decreased breathing and heart rate
- B. increased breathing rate, decreased heart rate
- C. increased breathing and heart rate
- D. increased heart rate, decreased breathing rate

38. The diagram shows a circuit in which all the lamps are lit.



The bulb marked X blows and breaks part of the circuit.

How many lamps will remain on?

- A. 0
 - B. 1
 - C. 2
 - D. 3
39. How are covalent compounds formed?
- A. by the transfer of electrons between metallic and non-metallic elements.
 - B. by sharing of electrons between metallic and non-metallic elements.
 - C. by the transfer of electrons between non-metallic elements.
 - D. by the sharing of electrons between non-metallic elements.



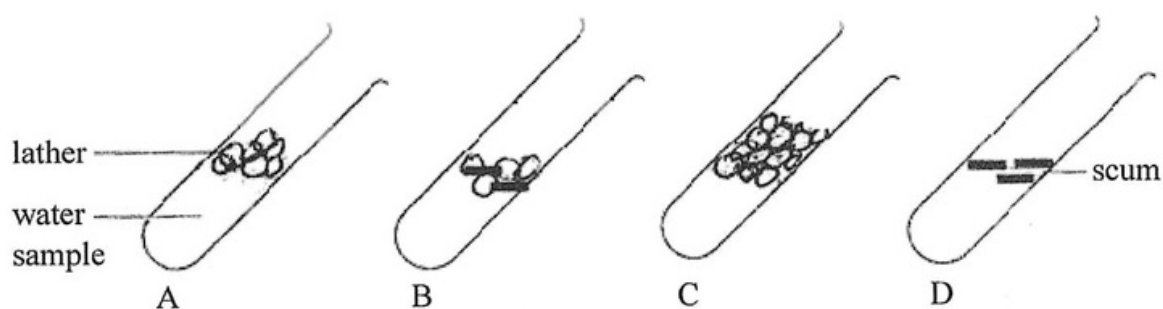
40. Which characteristics describe the images formed by a convex mirror?

- A. erect, virtual
- B. enlarged, real
- C. enlarged, virtual
- D. real, reduced

41. Which of the following is an involuntary action?

- A. walking
- B. blinking
- C. winking
- D. clapping

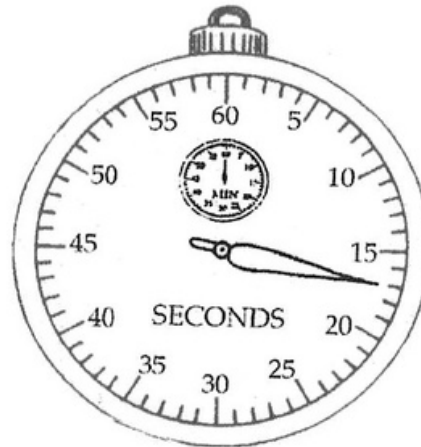
42. Five drops of soap solution were added to equal volumes of different samples of water in **FOUR** test tubes. The test tubes were shaken and the results obtained shown.



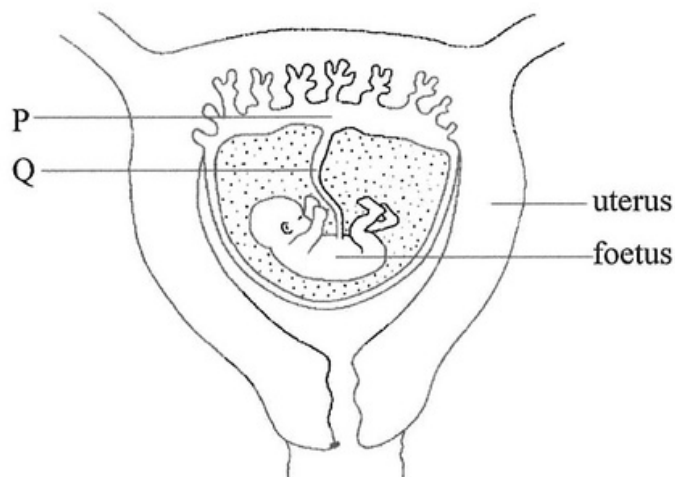
Which test tube contains the soft water sample?



43. What is the time shown on the stopwatch?



- A. 15.2 seconds
B. 15 seconds
C. 17 seconds
D. 43 seconds
44. The diagram shows a developing foetus.



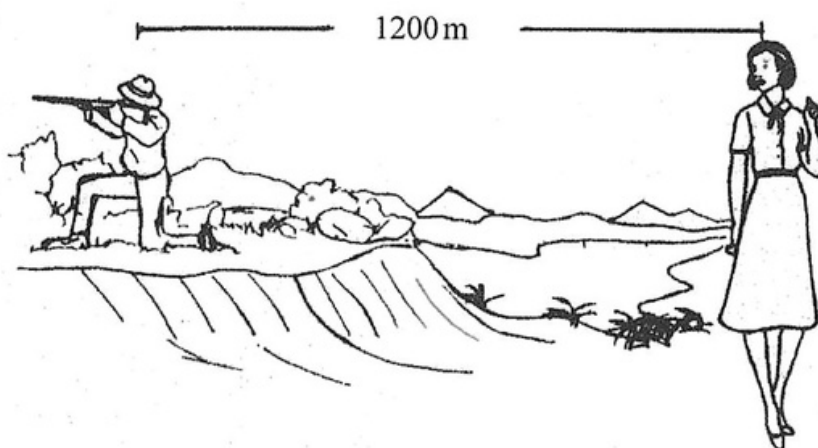
Which TWO substances pass from structure P to structure Q?

- A. carbon dioxide and nutrients
B. carbon dioxide and urea
C. nutrients and oxygen
D. urea and oxygen

45. Which entry shows the link between the property and use of the metal?

	Metal	Property	Use
A	aluminium	conducts electricity	making aeroplanes
B	aluminium	resists corrosion	making food containers
C	mild steel	conducts electricity	making garden tools
D	mild steel	conducts heat	making car bodies

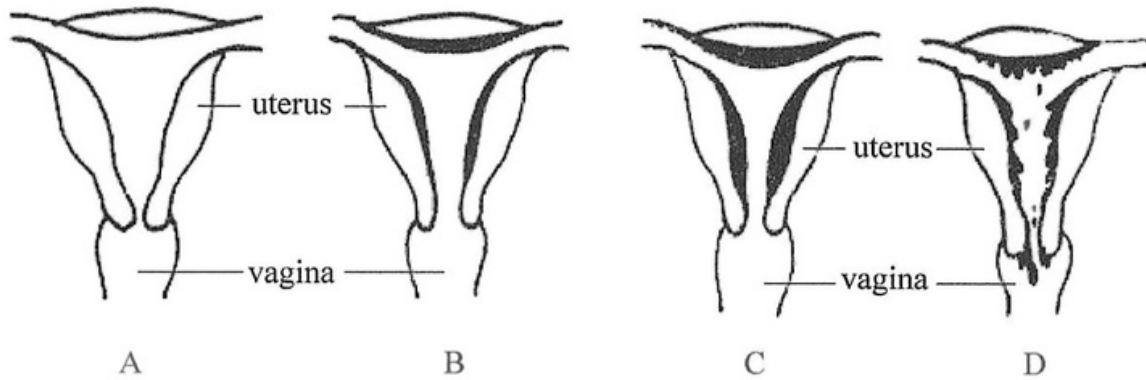
46. Sound travels at 300 m/s.



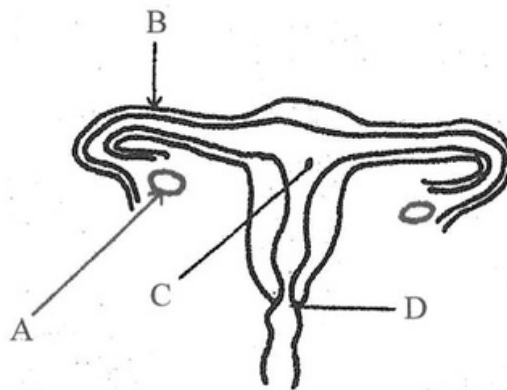
How long did it take the sound of the gun shot to reach Karen?

- A. 0 s
 B. 0.25 s
 C. 4 s
 D. 330 s
47. Which pair of physical changes are both endothermic?
- A. condensation and sublimation
 B. condensation and freezing
 C. melting and freezing
 D. melting and evaporation

48. Which diagram best represents the state of the uterus during menstruation?

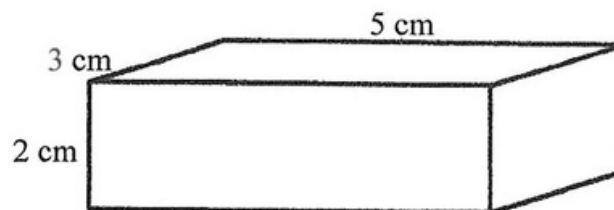


49. The diagram shows the female reproductive system of a mammal.



In which labelled position would a diaphragm be correctly placed?

50. The diagram shows a wooden block of 150 g and its dimensions.



What is its density?

- A. 2g/cm^3
- B. 3g/cm^3
- C. 4g/cm^3
- D. 5g/cm^3

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