

3102/1

BGCSE

School Number

Candidate Number

Surname and Initials

COMBINED SCIENCE

PAPER 1 3102/1

Friday 28 MAY 2010 12.00 – 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 paper.

There are FIFTY questions on this paper.

Attempt ALL questions.

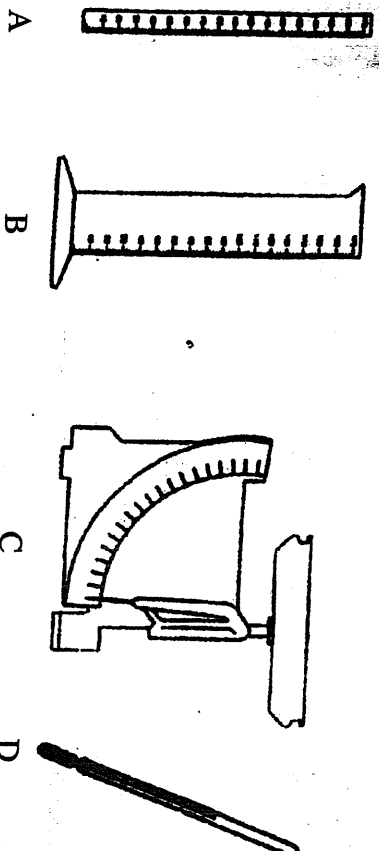
For each question there are FOUR possible answers labelled A, B, C and D. Choose the ONE you consider correct and record your choice by circling the LETTER next to the answer of your choice in the booklet.

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

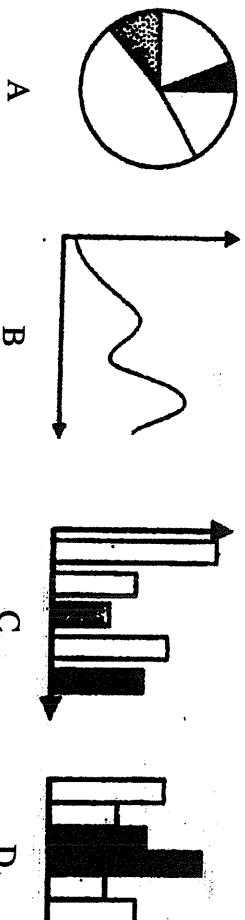
Calculators are permitted, however NO graphing calculators are allowed.

FOR EXAMINER'S USE	
TOTAL	

1. Which piece of apparatus is used to find the mass of a stone?



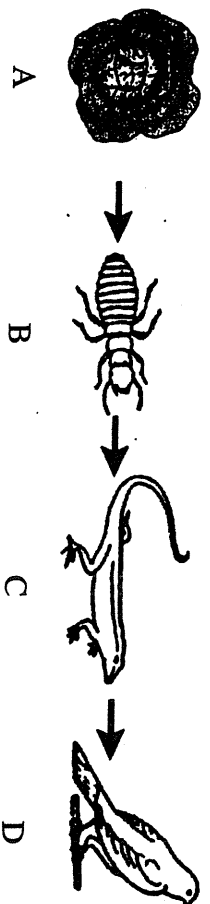
2. Which is a line graph?



3. At which level of organization is the heart?

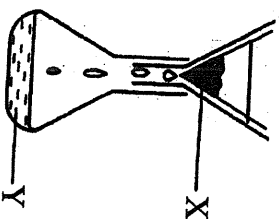
- A cell
- B organ
- C system
- D tissue

4. The diagram shows a simple food chain.



- Which letter represents a producer?

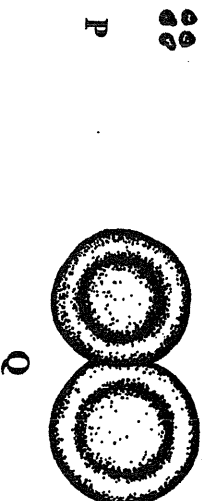
5. The diagram shows the separation of a mixture.



Which process is shown in the diagram?

- A crystallization
- B distillation
- C evaporation
- D filtration

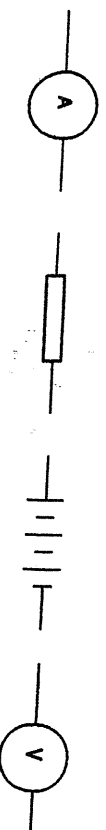
6. The diagram shows TWO components of blood.



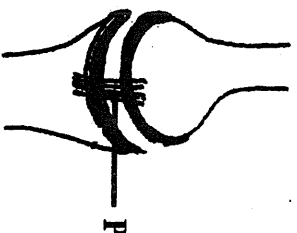
What are the functions of these components?

P		Q	
A	causes blood to clot		carries oxygen
B	carries oxygen		produces antibodies
C	causes blood to clot		engulfs bacteria
D	produces antibodies		carries oxygen

7. Which symbol shows a resistor?



8. The diagram shows a synovial joint.



What is the function of P?

- A connects muscle to bone
- B connects bone to bone
- C reduces friction between the bones
- D connects bone to cartilage

9.

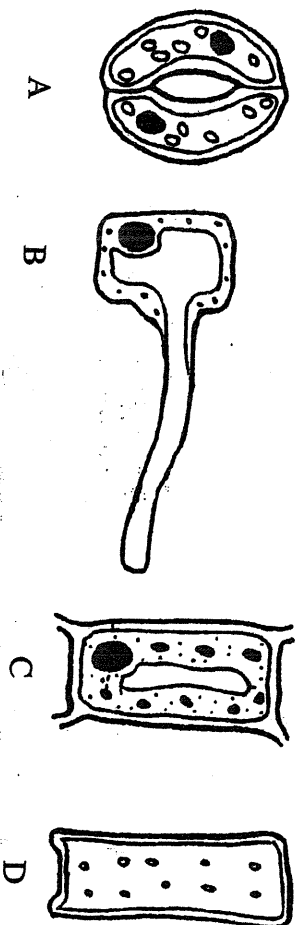
Which reaction requires heat energy?

- A an endothermic reaction
- B an exothermic reaction
- C combustion of fuels
- D oxidation of glucose

10. 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

11. Which cell takes water and mineral salts from the soil?



12. Which structure of the alimentary canal is matched with its function?

Structure		Function
A	anus	assimilation
B	large intestine	digestion
C	mouth	ingestion
D	stomach	egestion

13. Which does not allow the passage of sound waves?

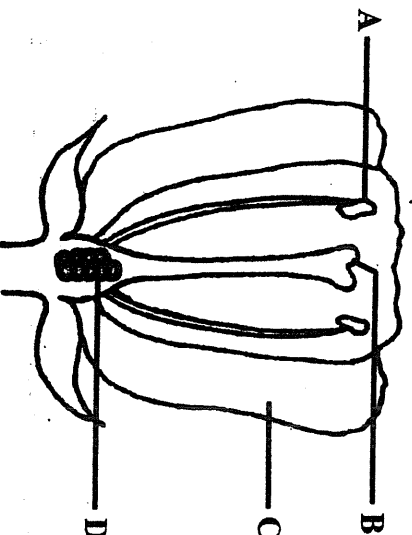
- A gas
B liquid
C solid
D vacuum

14. Why is this reaction a chemical change?

magnesium + oxygen → magnesium oxide

- A a new substance has been formed
B light is produced
C oxygen is present in the air

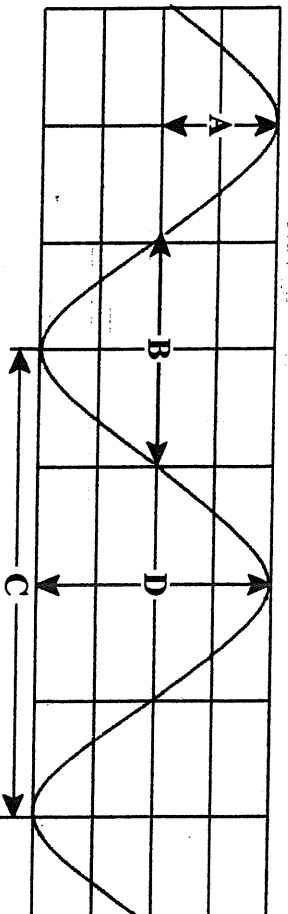
15. Which part of the flower is responsible for the production of female gametes?



16. Which waste product is carried in the blood?

- A fibrin
- B sweat
- C urea
- D urine

17. The drawing shows a wave.



Which letter represents its wavelength?

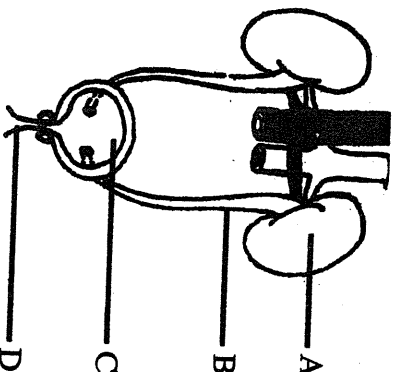
18. Which colour change occurs when a drop of iodine solution is placed on a piece of bread?

- A yellow to black
- B yellow to brown
- C yellow to orange
- D yellow to red

19. The pH of a solution is 7. What will be its colour when tested with Universal Indicator?

A blue
B green
C purple
D red

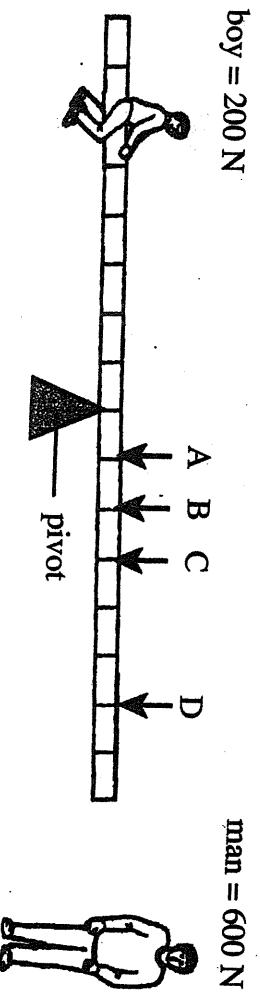
20. Which structure stores urine?



21. Which structure is a characteristic of the red mangrove plant?

A breathing roots
B brown stem
C prop roots
D salt glands

22. A boy of weight 200 N is sitting on a see-saw, as shown in the diagram.



At which labelled position must the man sit to balance the see-saw?

23. Which process best describes maintaining a constant internal environment?

- A excretion
- B homeostasis
- C osmoregulation
- D sensitivity

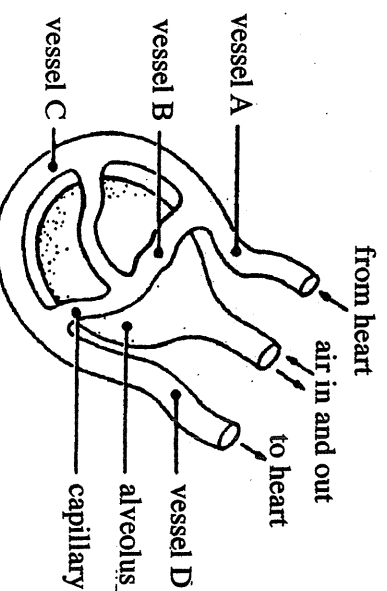
24. Which substance will be a liquid at room temperature (20°C)?

substance	melting point (°C)	boiling point (°C)
A	-101	-38
B	34	357
C	0	100
D	114	183

25. Why is yeast used in the beer-brewing and bread-making industries?

- A does not need oxygen for respiration
- B feeds on sugars for respiration
- C produces carbon dioxide and water by respiration
- D produces carbon dioxide and alcohol by respiration

26. The diagram shows an alveolus surrounded by blood capillaries.



Which blood vessel will have the lowest oxygen content?

23. Which process best describes maintaining a constant internal environment?

- A excretion
- B homeostasis
- C osmoregulation
- D sensitivity

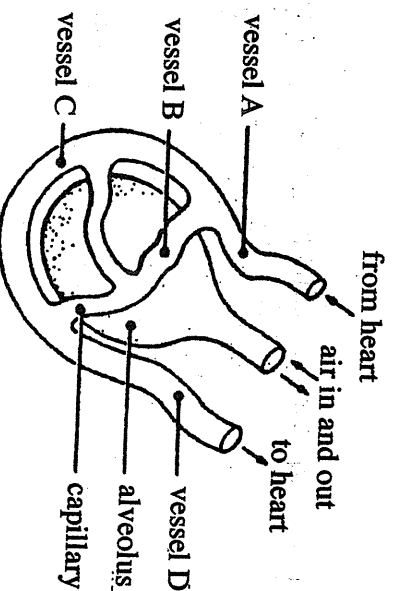
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26. The diagram shows an alveolus surrounded by blood capillaries.



27. Which statement best describes the molecules in a gas?

- A They are close together and moving slowly.
- B They are close together and moving quickly.
- C They are far apart and moving quickly.
- D They are far apart and moving slowly.

28.

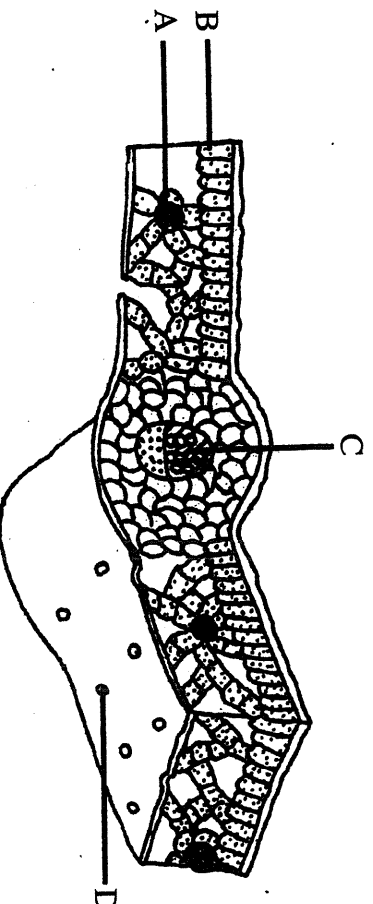
Which device converts chemical energy into electrical energy?

- A alternator
- B cell - battery?
- C solar panel
- D spark plug

29. Which substance is biodegradable?

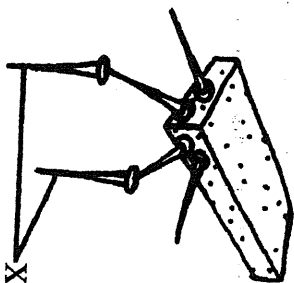
- A aluminium foil
- B glass
- C nylon rope
- D wood

30. The diagram shows the internal structure of a leaf.



Which structure allows transpiration to occur?

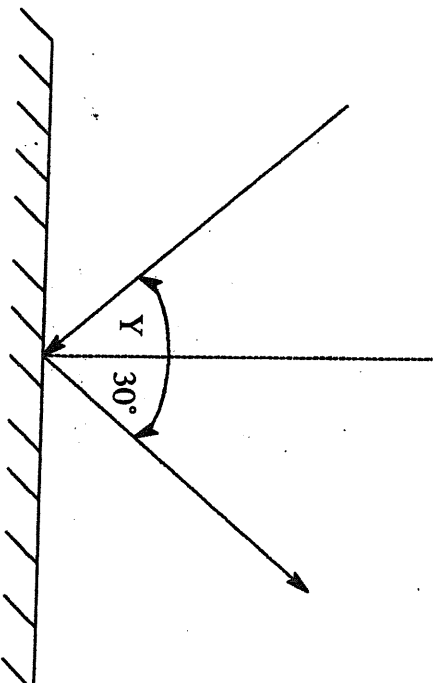
31. A strong magnet is used to attract pins.



Why will the pins labelled X be able to attract even more pins?

- A electromagnetism
- B ferromagnetism
- C magnetic attraction
- D magnetic induction

32. The diagram illustrates how light is reflected from a plane mirror.

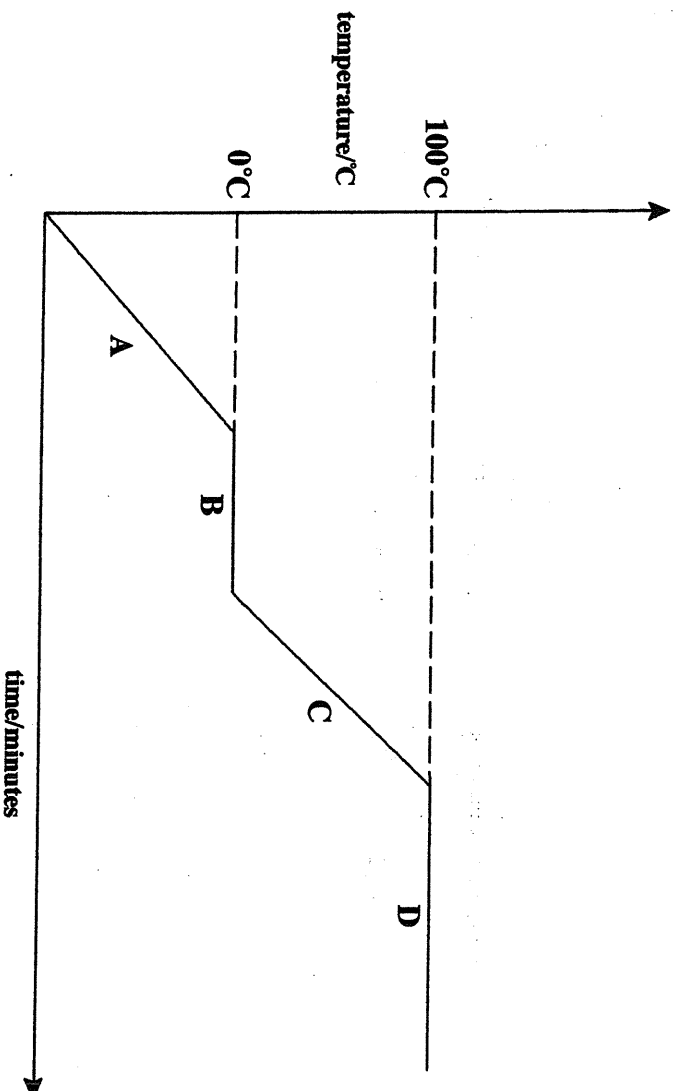


What is angle Y ?

- A 20°
- B 30°
- C 60°
- D 90°

Answer questions 33 and 34 using information from the diagram.

A solid substance was heated using a small, constant flame. The graph shows the temperature of the substance against the time of heating.



Which letter shows a part of the graph in which:

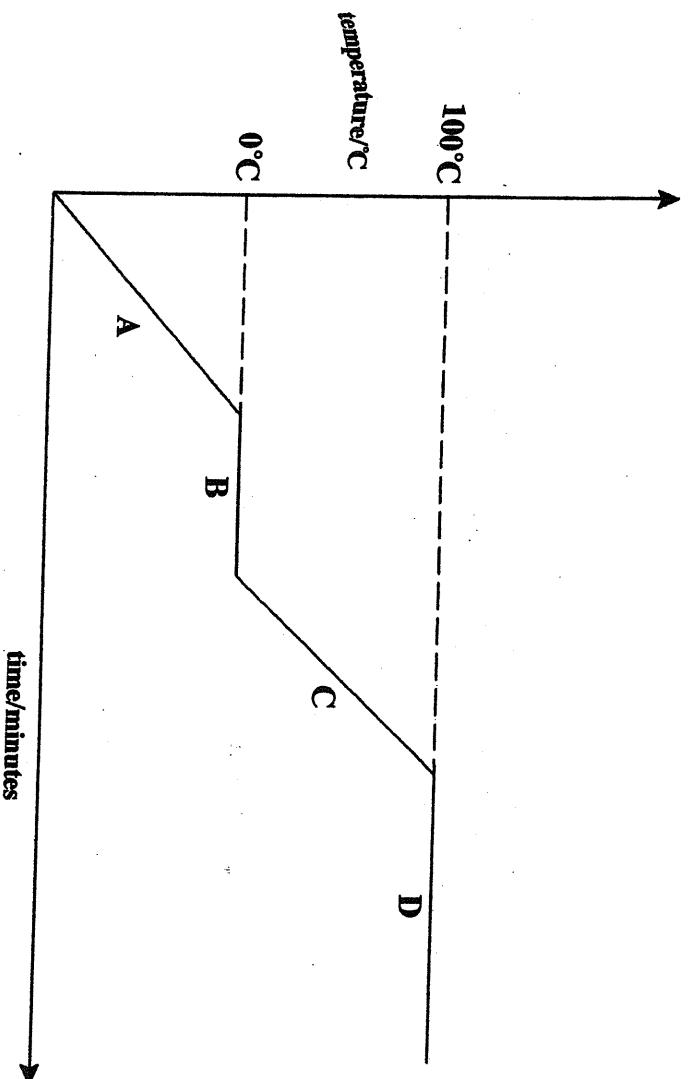
33. the solid is melting; A B C D
34. only liquid is present? A B C D

35. John's sandwich contains lettuce, which substance in the lettuce is John unable to digest?

- A cellulose
- B glucose
- C starch
- D sucrose

Answer questions 33 and 34 using information from the diagram.

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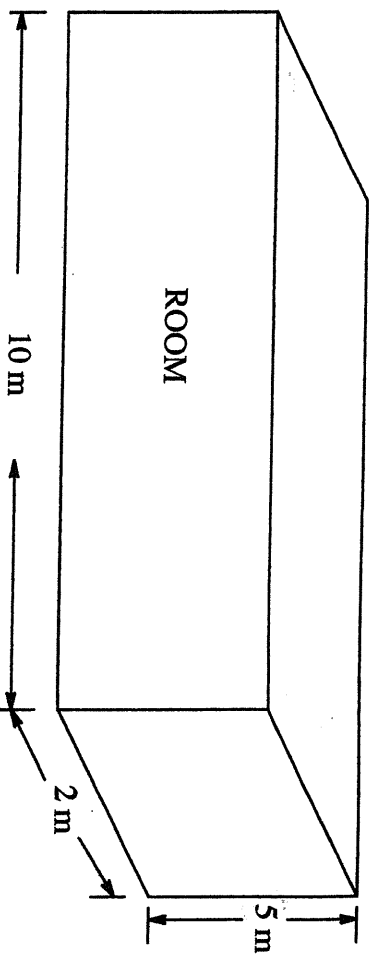
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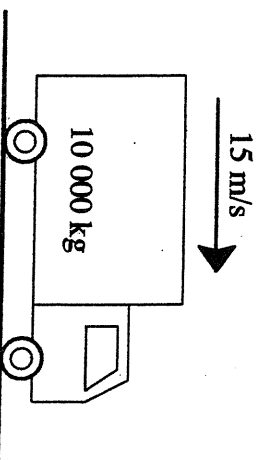
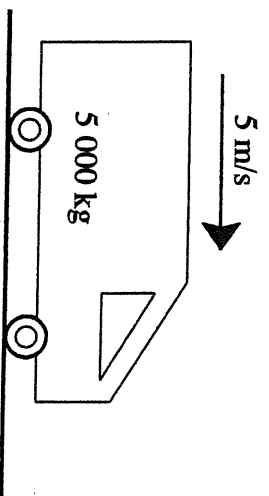
- A cellulose
B glucose
C starch
D sucrose

36. What is the mass of the air in the room shown if air has a density of 1.5 kg/m^3 ?



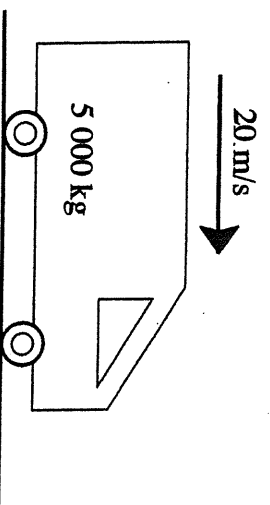
- A 13 kg
B 26 kg
C 150 kg
D 180 kg

37. Which vehicle has a momentum of $150\,000 \text{ Nm}$?

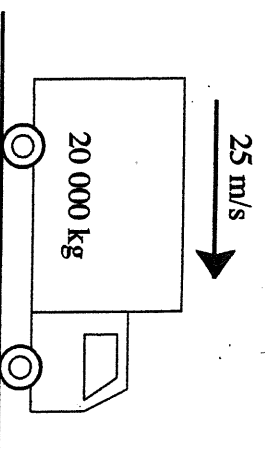


A

B



C



D

38.

What is the number of neutrons in an atom that has a proton (atomic) number of 58 and a nucleon (mass) number of 140?

- A 58
- B 82
- C 140
- D 198

39.

Which molecule has only TWO covalent bonds?

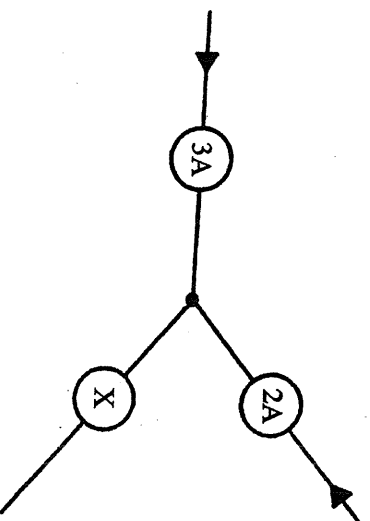
- A CH_4
- B NH_3
- C H_2O
- D HCl

40.

Why will a young, herbaceous, well-watered seedling often wilt after being transplanted?

- A shortage of air
- B shortage of leaves
- C shortage of root hairs
- D shortage of salts in the soil

41. The diagram shows the junction of three wires.

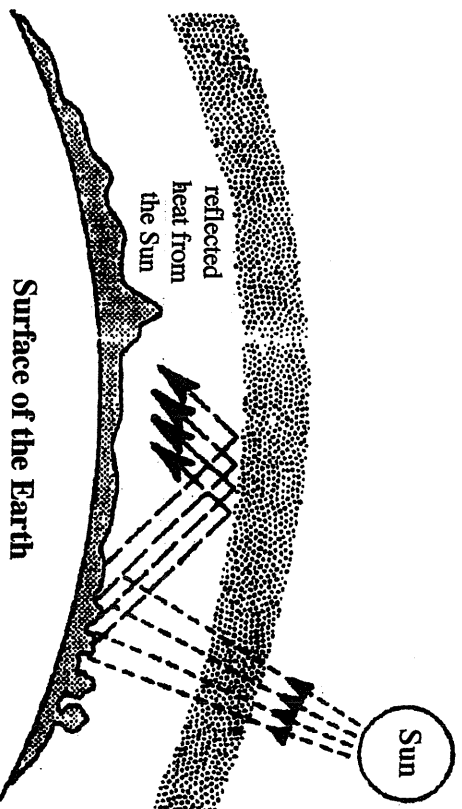


What is the amount of current and its direction as it flows through X?

- A 1 A, towards the junction
- B 1 A, away from the junction
- C 5 A, towards the junction
- D 5 A, away from the junction

42.

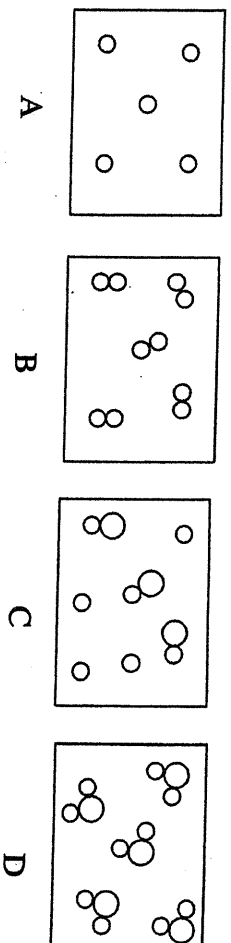
This is a simplified diagram illustrating the greenhouse effect.



Which gas in the atmosphere is mainly responsible for reflecting the heat?

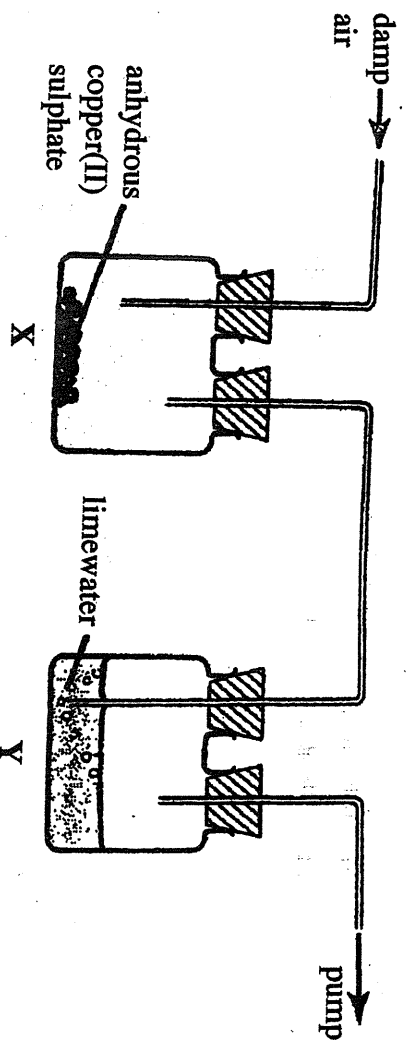
- A carbon dioxide
- B nitrogen
- C oxygen
- D ozone

43. The diagrams represent **FOUR** different particle arrangements.



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

44. This apparatus is used to detect the presence of water and carbon dioxide in air.



What results would be expected?

Results		
	X	Y
A	blue	clear
B	blue	cloudy
C	white	clear
D	white	cloudy

45.

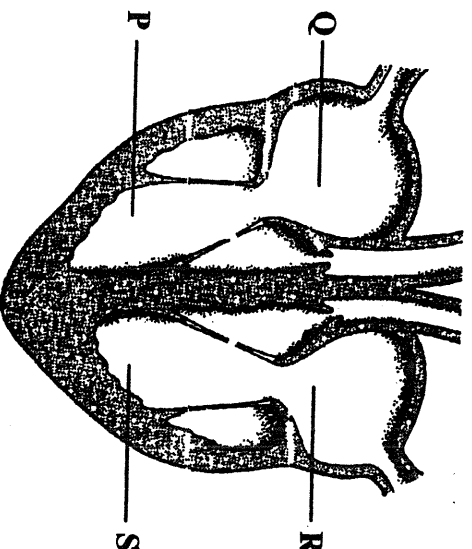
When a plastic rod is rubbed with a dry cloth, the rod gains electrons from the cloth.

What is the charge on the rod and on the cloth, and the nature of the force between them?

	sign of charge on the rod	sign of charge on the cloth	nature of force exerted between them
A	negative	positive	attractive
B	negative	negative	attractive
C	positive	positive	repulsive
D	negative	negative	repulsive

46.

The diagram shows a longitudinal section of the heart.



Which chambers contain oxygenated blood?

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

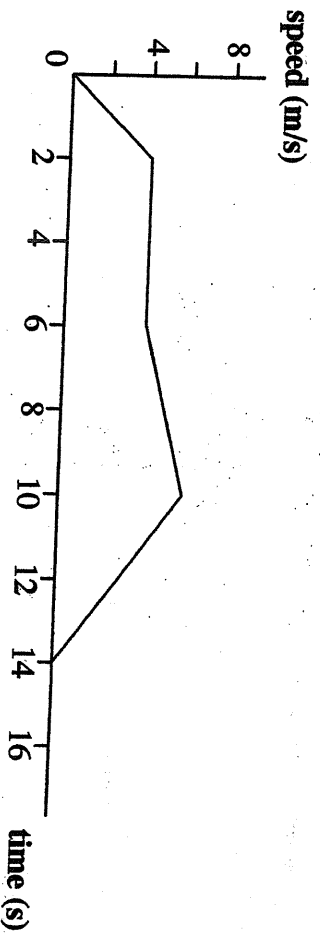
47. Food labels give information about the composition of a product. This label on a cereal box provides information about the amount of calories.

Energy value
1 505 kilojoules per 100 g
350 calories per 100 g

How much energy would 200 g of this cereal provide?

- A 700 calories
- B 1 155 calories
- C 1 505 calories
- D 1 855 calories

48. The speed-time graph is for a cyclist.



During which 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

49. Element X belongs to group 4 and element Y belongs to group 7. What is the correct formula for the compound formed by the elements X and Y?

- A X_4Y_7
- B X_4Y_4
- C Y_7X_4
- D Y_7X_7

50. Nitrogen, phosphorus and potassium are elements needed by plants and supplied in fertilizers.

Which compound contains **TWO** of these elements?

- A ammonium nitrate
- B ammonium phosphate
- C aluminium nitrate
- D potassium chlorate

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2011 12.00 – 1.15 P.M.

Additional material
Paper for rough work

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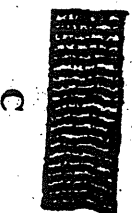
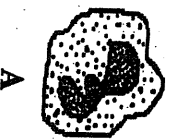
FOR EXAMINER'S USE

TOTAL

This question paper consists of 22 printed pages and 2 blank pages.

1. The diagrams show four cells found in the human body.

Which cell transports oxygen around the body?



2. Which food is the best source of carbohydrate?

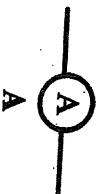
- A bread
- B butter
- C egg
- D pork chop

3.

Which period of the Periodic Table contains sodium?

- A Period 1
- B Period 3
- C Period 4
- D Period 5

4. Which symbol shows a resistor?

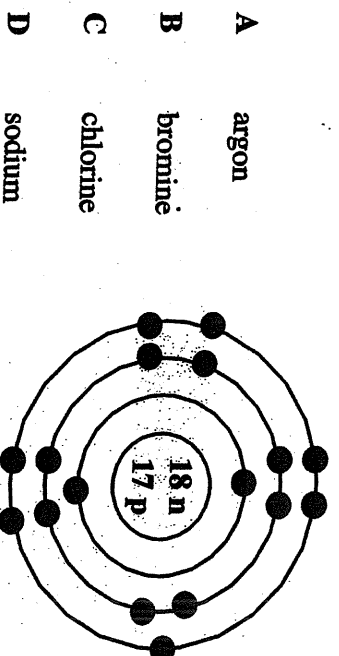


5. Which letter correctly shows a food chain?

- A larva → grouper → nurse shark
- B leaf → bug → lizard
- C rat → worm → rabbit
- D worm → sparrow → cat

6.

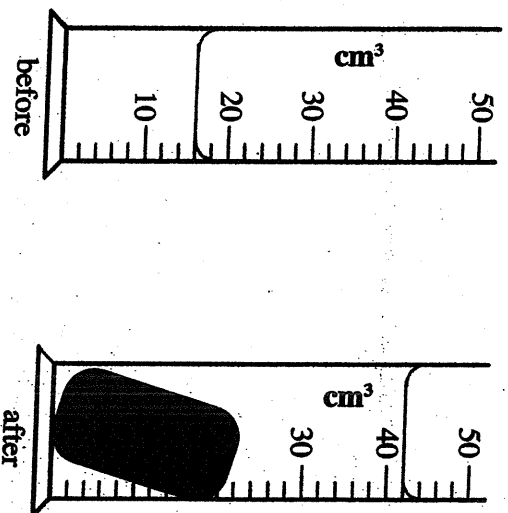
Which element is represented by the atom shown?



7.

An experiment to find the volume of a lump of plasticine was set up as shown.

The diagram shows the level of the water before and after the lump of plasticine was lowered into the cylinder.



What is the volume of the plasticine?

- A 16 cm³
B 20 cm³
C 26 cm³
D 42 cm³

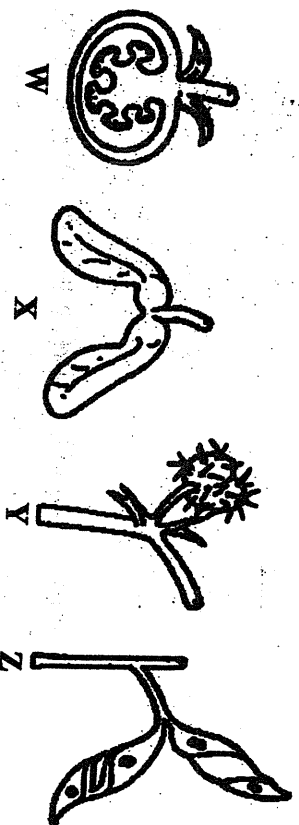
8. The table shows characteristics of **FOUR** vertebrate animals.

features	vertebrates			
	P	Q	R	S
has hair	✓		✓	
has feathers		✓		
has scales				✓
constant body temperature	✓	✓	✓	
lays eggs		✓		✓
internal fertilization	✓	✓	✓	✓
produces milk	✓			✓

Which **TWO** vertebrates are most closely related?

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

9. Which fruits are dispersed by animals?



- A W and X
B W and Y
C W and Z
D V and V

10. In which state of matter do particles have the most kinetic energy, at a given temperature?

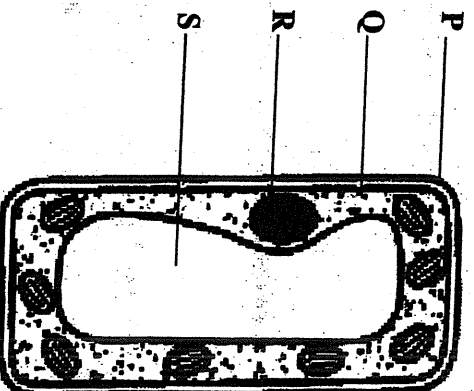
A solid
B liquid
C gas
D water

11. What is the main purpose of an electric fan?

Transfers electrical energy to

A chemical energy
B heat energy
C kinetic energy
D sound energy

12. The diagram shows a typical plant cell.



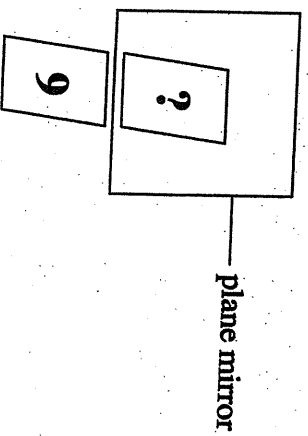
Which structures would NOT be found in an animal cell?

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

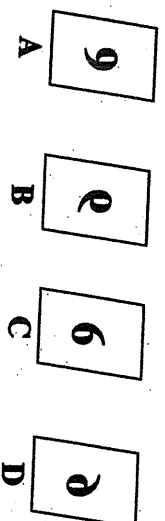
13. Which organism causes H1N1 influenza?

A bacterium
B fungus
C mosquitos
D virus

14. The number 9 was drawn on a piece of paper and placed in front of a plane mirror as shown.



Which image would be seen in the mirror?



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

Use these methods to answer question numbers 15, 16 and 17.

A crystallisation

B distillation

C filtration

D magnetism

Which method of separation can be used to

15. obtain sand from dirty/muddy water,

A **B** **C** **D**

16. obtain pure water from seawater,

A **B** **C** **D**

17. iron from a mixture of sulphur and iron?

A **B** **C** **D**

18. Which name is given to a group of similar cells working together to perform the same function?

A organ

B organism

C tissue

D system

19. Which type of substance acts as a catalyst to speed up chemical activities in the body?

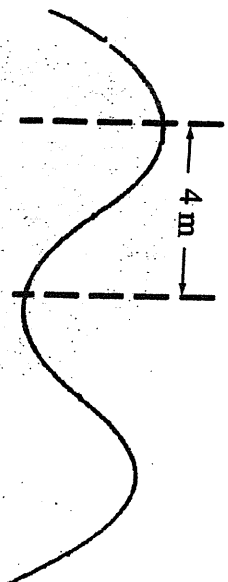
A antibody

B enzyme

C hormone

D vitamin

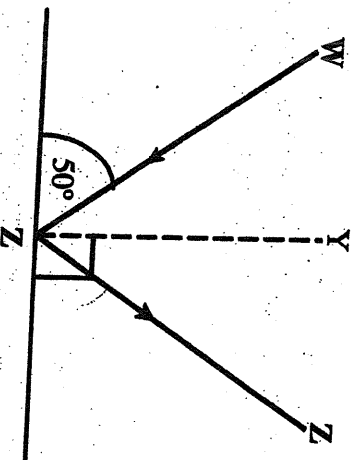
20. The diagram represents a transverse wave.



What is the speed of the wave if its frequency is 2 Hz?

- A 2 m/s
- B 4 m/s
- C 8 m/s
- D 16 m/s

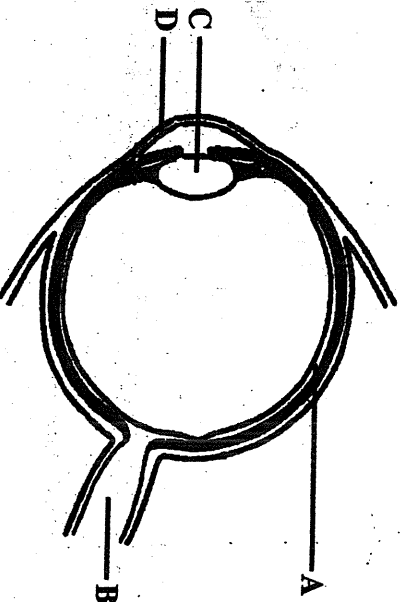
21. The diagram shows the path of a light ray, W X, reflected from a plane mirror.



What is the angle of reflection?

- A 40°
- B 50°
- C 80°
- D 90°

Use the diagram of the eye to answer questions 22 and 23.



Which structure

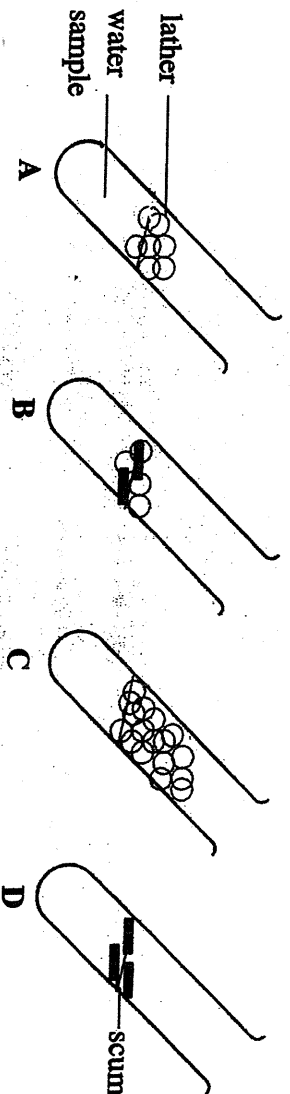
22. contains light-sensitive cells,

- A B C D

23. alters the amount of refraction?

- A B C D

24. 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.

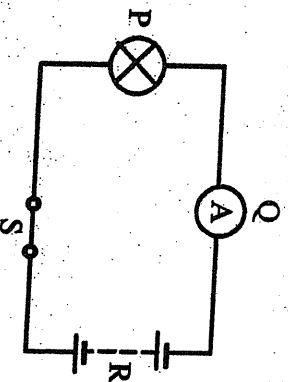


Which test tube contains the softest water sample?

25. What does power measure?

- A the force which produces motion
- B the rate of change of energy
- C the rate of change of momentum
- D total work done

- 26.. The diagram represents an electric circuit.



Which labelled component pushes electrons through the circuit?

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

27. Which of the following is NOT an alloy?

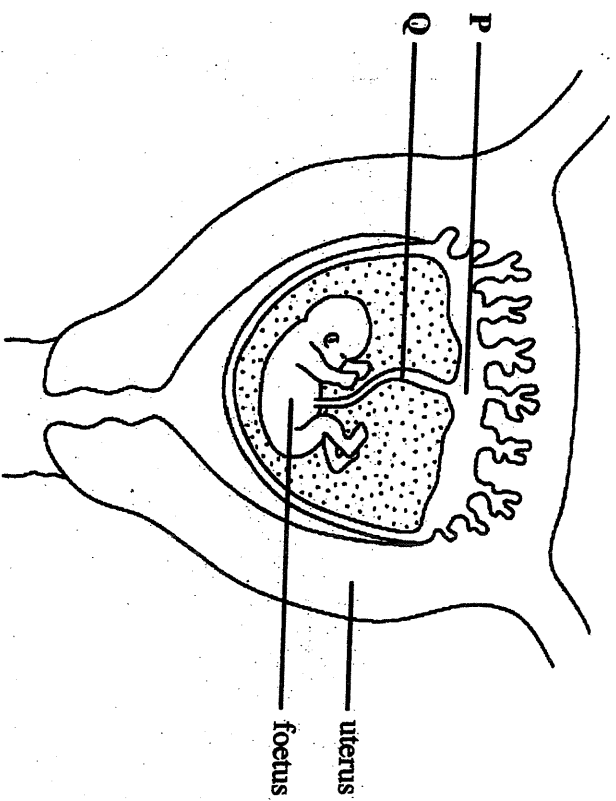
- A brass
- B bronze
- C copper
- D steel

28. Magnesium + oxygen \rightarrow magnesium oxide

Why is this reaction classified as a chemical change?

- A a new substance has been formed
- B all reactions produce light
- C oxygen is present in the air
- D there is no change in mass

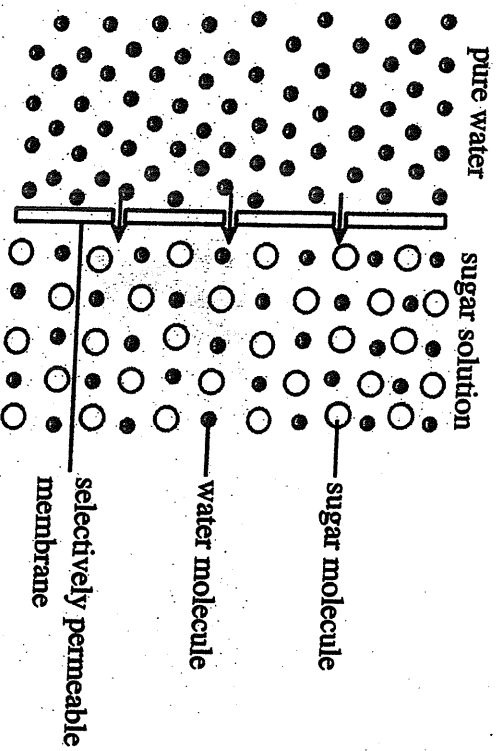
29. The diagram shows a developing foetus.



Which TWO substances which 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

30. The diagram shows water molecules passing into a sugar solution.



What is the process shown known as?

- A active transport
- B evaporation
- C osmosis
- D transpiration stream

31. What renewable energy source is most easily obtainable world-wide?

- A biomass
- B geothermal
- C hydro
- D solar

32.

A Royal Bahamas Defence Force Marine sees the flare from a distress rocket in the sky and 5 s later he hears the sound blast.

How far is the distress rocket from the marine?
(speed of sound in air 330 m/s)

A 66 m

B 325 m

C 825 m

D 1 650 m

33.

Which TWO elements will have similar chemical properties?

A aluminium and silicon

B calcium and strontium

C fluorine and argon

D oxygen and chlorine

34.

Which cells destroy invading bacteria in the body?

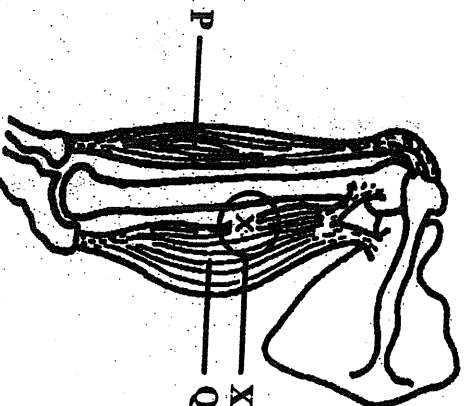
A amoebocytes

B erythrocytes

C phagocytes

D thrombocytes

35. The diagram shows the joints in a human arm with two muscles P and Q.



What would be the effect of severing the muscle at X?

- A arm cannot be flexed
- B arm cannot be extended
- C muscle P cannot contract
- D muscle P cannot relax

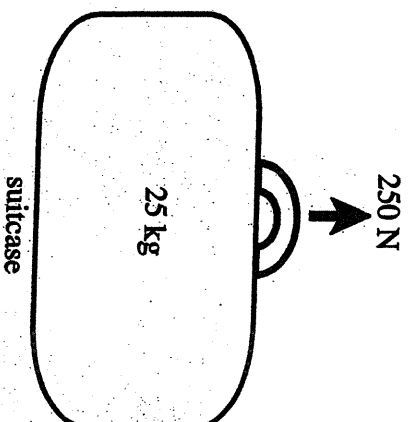
36. Equal masses of two salts, X and Y, were separately dissolved in equal volumes of water. The initial temperatures of the water and the final temperatures of the solutions were recorded in the table.

salt	initial temperature of water/ $^{\circ}\text{C}$	final temperature of solution/ $^{\circ}\text{C}$
X	25.1	30.2
Y	27.4	20.9

Which statement about salts X and Y is true?

- A dissolving of both salt X and salt Y is exothermic
- B dissolving of both salt X and salt Y is endothermic
- C dissolving of salt X is endothermic and dissolving of Y is exothermic
- D dissolving of salt X is exothermic and dissolving of Y is endothermic

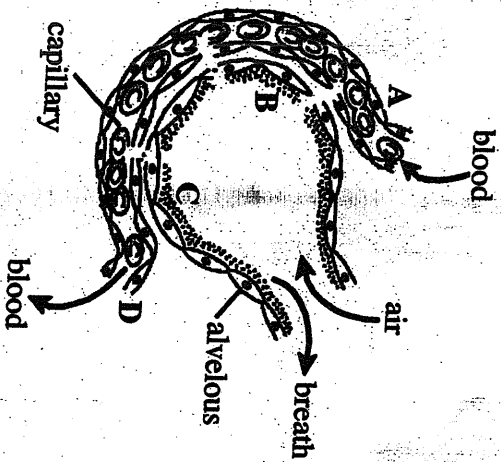
37. A suitcase was lifted with a force of 250 N. The work done was 1 250 J. What distance was the suitcase lifted?



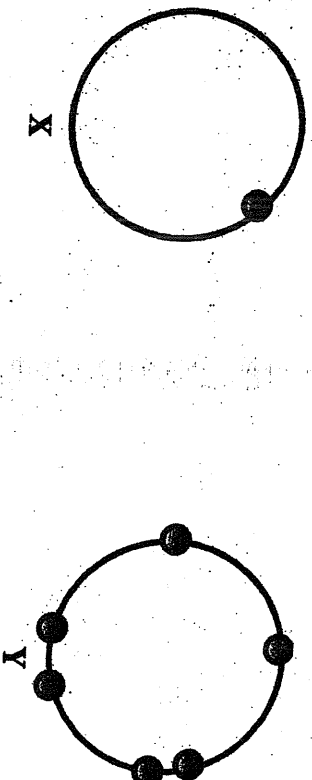
- A 2.5 m
B 5 m
C 12.5 m
D 50 m
38. Which effect causes a swimming pool to appear more shallow than it really is?

- A dispersion
B diffraction
C reflection
D refraction

39. The diagram shows gaseous exchange in an alveolus. At which labelled point A, B, C or D is diffusion of most carbon dioxide likely to occur?



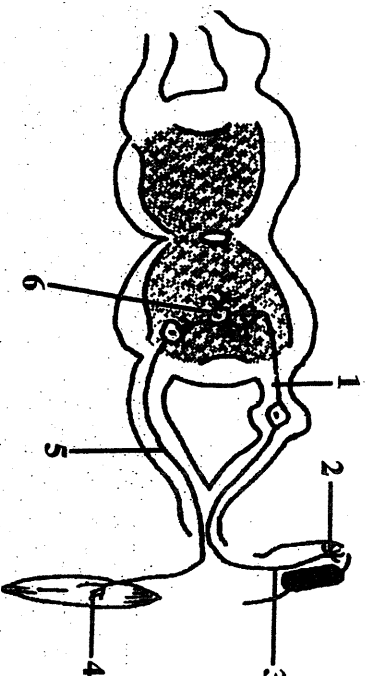
40. The diagrams represent the outer orbits of TWO different atoms X and Y.



What is the formula of the compound formed on bonding?

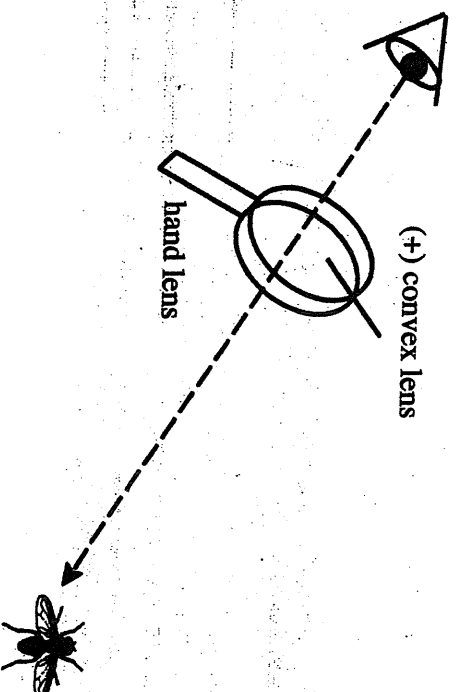
- A XY
 B XY_2
 C X_2Y
 D XY_3

41. The diagram shows part of the spinal cord, a fingertip and a muscle of the arm.



- A 1 → 6 → 5 → 4 → 3
 B 2 → 1 → 6 → 5 → 4
 C 3 → 4 → 6 → 2 → 5
 D 4 → 5 → 6 → 1 → 2

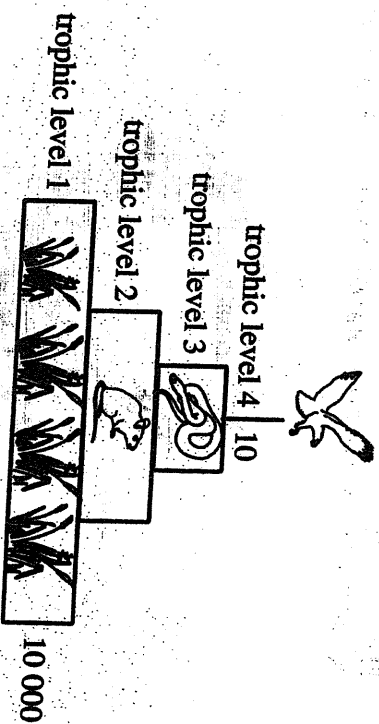
42. Which characteristics describe the images formed by convex lens when used in a magnifying glass?



The image is magnified,

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

43. The diagram shows the amount of energy at trophic levels 1 and 4. Only 10% of the energy is passed on to the next trophic level in this ecosystem.



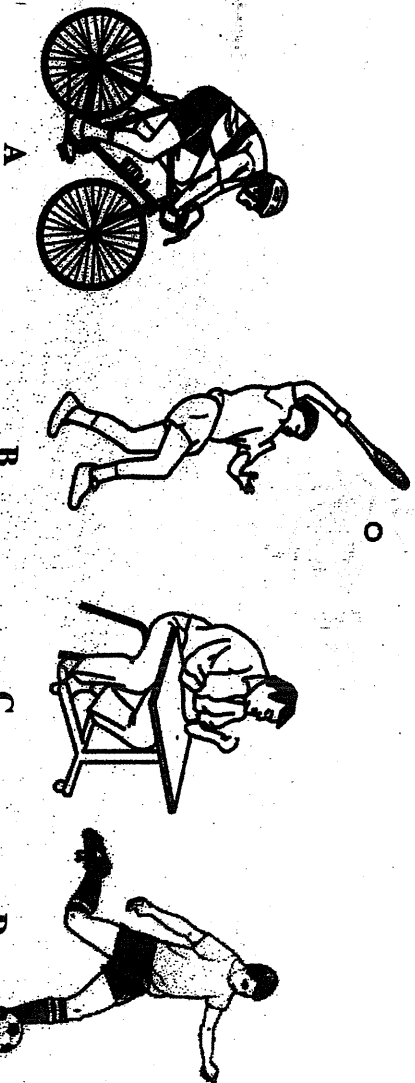
What is the total amount of energy in levels 2 and 3?

- A 100
- B 110
- C 1 100
- D 10 010
44. Burning fossil fuel produces a greenhouse gas which contributes to global warming. Which greenhouse gas is produced?

- A CO_2
- B H_2O
- C O_2
- D O_3

45. The diagrams show a variety of activities.

Which diagram **does not** show work being done?



46. Carbon dioxide is formed during the **complete** combustion of a fuel. Carbon monoxide is formed during the **incomplete** combustion of a fuel.

Which statement is **true** for both of these gases?

- A both gases are toxic to animals
- B carbon monoxide is an element and carbon dioxide is a compound
- C neither compound will burn in air
- D carbon dioxide gives a milky precipitate when bubbled into limewater, but carbon monoxide does not

47. The diagram shows a part of the digestive system.

Which structure produces a substance that lowers blood glucose after a meal?

