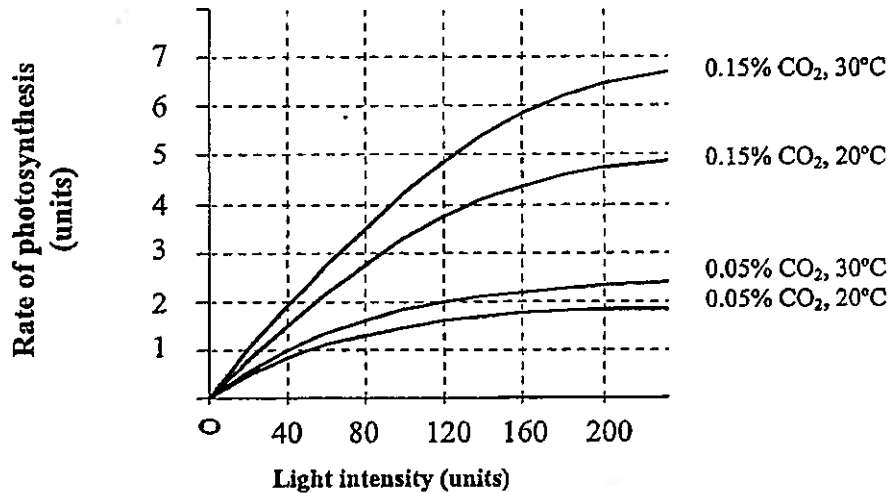


Set 3: Multiple Choice Practice

Use the following information to answer Questions 1 and 2

The graph shows some information about the *rate of photosynthesis* in a plant species, under different conditions.



1.

What is the rate of photosynthesis when carbon dioxide concentration is 0.15%, air temperature is 30°C and light intensity is 120 units?

- (A) 2.0 units
- (B) 3.8 units
- (C) 4.9 units
- (D) 6.6 units

2.

Which conclusion can be drawn from this data?

- (A) Rate of photosynthesis is affected most by temperature.
- (B) Rate of photosynthesis is directly proportional to light intensity.
- (C) Light intensity is affected by rate of photosynthesis and temperature.
- (D) Rate of photosynthesis is affected by the light intensity range tested.

Use the following information to answer Questions 3 and 4

'Brand A' claims that its dry cell battery delivers more energy than brands 'B', 'C' and 'D'. Students decided to test this claim.

The students put a 'brand A' battery in a toy car, 'W'.

Brands B, C and D's dry cell batteries were placed in three different toy cars (X, Y and Z respectively).

The cars were operated around a circular track. The number of laps each car completed before battery discharge was recorded as results.

The same experiment was repeated with a second battery from each brand.

Battery used	Results using first battery	Results using second battery
A	Car W - 47 laps	Car W - 43 laps
B	Car X - 42 laps	Car X - 27 laps
C	Car Y - 35 laps	Car Y - 48 laps
D	Car Z - 49 laps	Car Z - 40 laps

- 3 Which choice correctly identifies the *dependent* and *independent* variables in this experiment?

	Dependent variable	Independent variable
(A)	Number of laps completed	Brand of battery used
(B)	Number of laps completed	Type of car used
(C)	Brand of battery used	Number of laps completed
(D)	Type of car used	Number of laps completed

- 4 Which statement about *reliability* of the experiment is correct?

- (A) The experiment is reliable, because the results for car W were almost the same for each battery.
- (B) The experiment is reliable, because more than one set of readings was taken for each battery.
- (C) The experiment is **not** reliable, because laps varied greatly between the first and second batteries for some brands.
- (D) The experiment is **not** reliable, because the number of laps done by each brand varied.

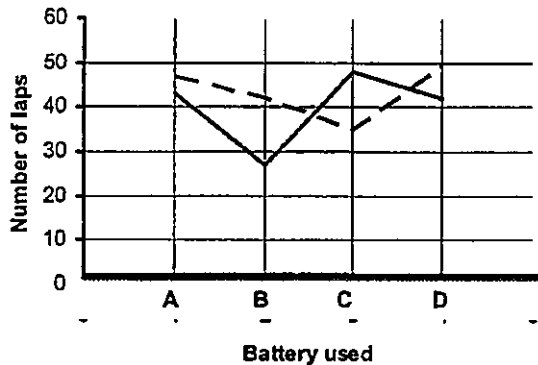
5

Which statement best describes the *validity* of this experiment?

- (A) The experiment is valid, because the number of laps for each car is a good indicator of the amount of energy stored in the battery.
- (B) The experiment is **not** valid, because results between battery brands differ.
- (C) The experiment is valid, because repeated measurements are made for each toy car.
- (D) The experiment is **not** valid, because some variables, (such as the type of toy car) are not controlled.

6

The graph shows the students' results.

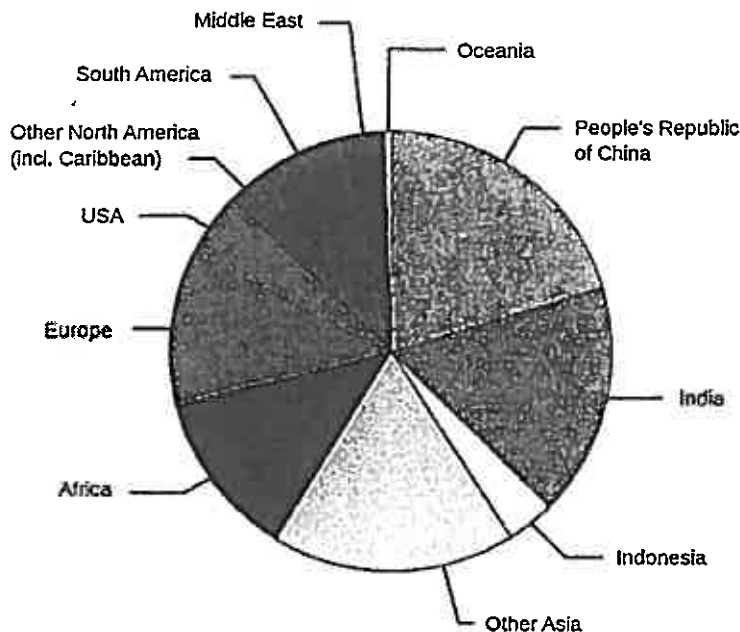


Which statement is best supported by these results?

- (A) Battery D is much better than the other three batteries.
- (B) Battery C is the most efficient battery.
- (C) The efficiency of the batteries varied widely.
- (D) The results are inconclusive. Improved testing is required.

7

The pie chart shows the distribution of the world's population in 2005.

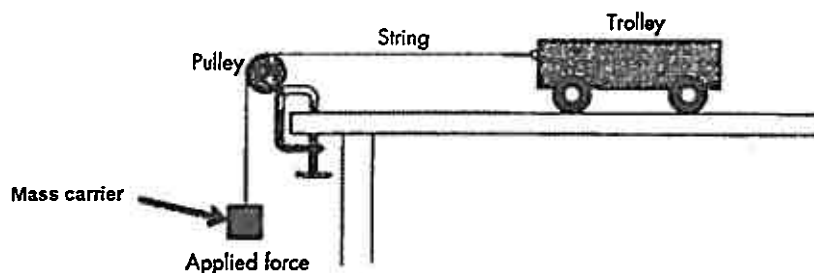


Approximately what proportion of the world's population was in Europe in 2005?

- (A) 6%
- (B) 11%
- (C) 33%
- (D) 40%

Use the following information to answer Questions 8 to 12

A trolley was connected to a mass carrier by a piece of string, over a pulley. The mass carrier applied a force to the trolley.



During this experiment, students varied the force applied by the mass carrier and measured the time it took the trolley to travel 1.0 m across the bench top.

The students used their results to calculate the acceleration of the trolley.

- 8 What is the most suitable *aim* for this experiment?
- (A) To find the relationship between the force applied to the trolley and its acceleration
 - (B) To find the relationship between the mass of the trolley and its speed across the surface.
 - (C) To measure the speed of the trolley across the surface
 - (D) To find the relationship between the force applied to the trolley and its final speed
- 9 If the experiment is to be a *valid* test, what things need to be controlled?
- (A) The mass of the trolley and the applied force
 - (B) The mass of the trolley and its initial speed
 - (C) The initial speed of the trolley and the applied force
 - (D) The mass of the trolley and the time it takes to travel the 1.0 m
- 10 Which variable is *NOT* to be controlled in this experiment?
- (A) The mass of the trolley
 - (B) Size of the pulley
 - (C) The force applied to the trolley
 - (D) The distance the trolley travelled
- 11 What were the measured *variables* in this experiment?
- (A) The mass of the trolley and the applied force
 - (B) The force applied to the trolley and the distance travelled
 - (C) The initial speed of the trolley and its mass
 - (D) The time the trolley took to travel 1.0 m and the applied force
- 12 Which of the following is an appropriate *safety precaution* students should take when doing this experiment?
- (A) Ensure that students do not put their hands between the trolley and the pulley.
 - (B) Make sure that the height of the bench is more than a metre from the floor, so that the accelerating masses do not touch the floor.
 - (C) Make repeated measurements for each accelerating force; and use an average value in their calculations, so that the results are more reliable.
 - (D) Make sure that the pulley is lubricated, so that it does not increase friction during each run of the experiment.

Refer to the following information to answer Questions 13 and 14

The table compares some properties of two fruit juice drinks.

Drink	Sugar content (g/100 mL)	Protein (g/100 mL)	Energy content (kJ per 100 mL)
Brand X orange	11.1	Less than 0.5	180
Brand Y strawberry	4.4	Less than 0.3	75

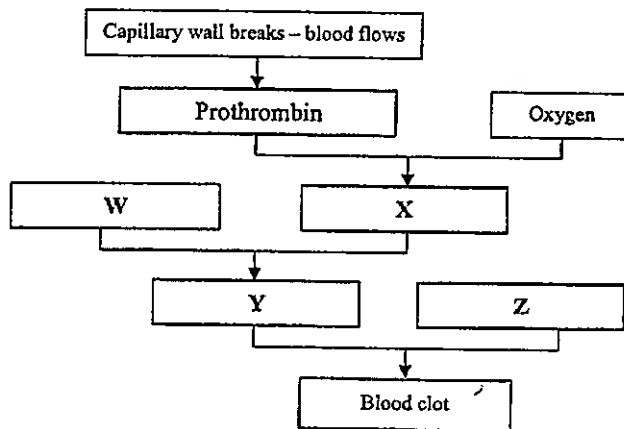
- 13 Which statement about these two juices is supported by the information in the table?
- (A) The orange juice will be better to drink before exercise than the strawberry juice.
 (B) The orange juice has less "goodness" in it than the strawberry juice.
 (C) The orange juice has about 240% of the energy content of strawberry juice.
 (D) The orange juice is less healthy to drink than the strawberry juice.

- 14 Which of the following statements is supported by the data in the table?
- (A) The energy content of the juice is linked to its sugar content.
 (B) The energy content of the juice is linked to its protein content.
 (C) There is *no* connection between sugar content of a juice and its energy content.
 (D) The more sugar a juice contains, the less protein it will have.

- 15 The passage describes the clotting of blood.

When you cut yourself, capillaries break and blood flows. Oxygen in the air causes prothrombin to change into thrombin. Thrombin combines with fibrinogen to produce fibrin. Fibrin, and the protein FSF, form an insoluble, mesh-like molecule which makes the blood clot.

The information could be put into a diagram like the partially completed flow diagram below:

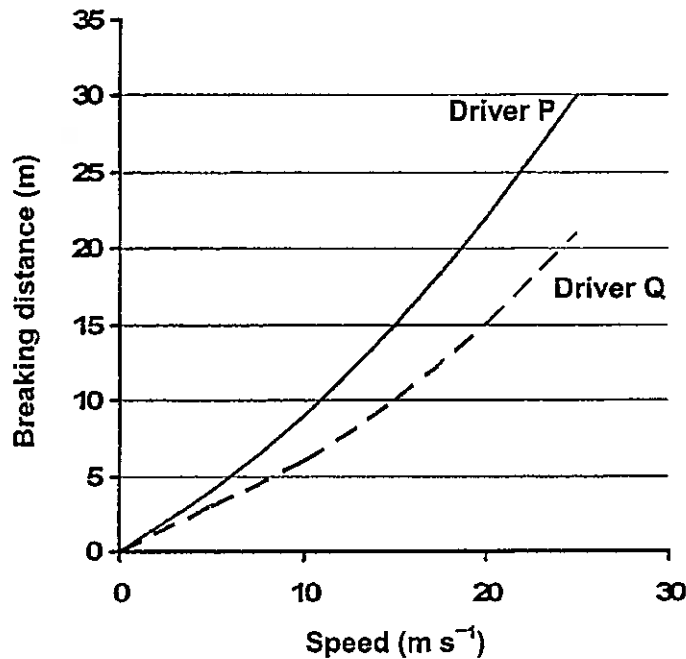


Which choice correctly identifies the names of the chemicals that should be placed in boxes W, X, Y and Z respectively?

	W	X	Y	Z
(A)	Thrombin	Fibrinogen	Fibrin	FSF
(B)	Thrombin	FSF	Fibrinogen	Fibrin
(C)	Fibrinogen	Fibrin	FSF	Thrombin
(D)	Fibrinogen	Thrombin	Fibrin	FSF

Refer to the following information to answer Questions 16 – 18

The graph shows the stopping distance from various initial speeds for two car drivers. Both drivers drive the same car over the same test course. Driver P (full line graph) is 60 years old and driver Q (dashed line graph) is 30 years old.

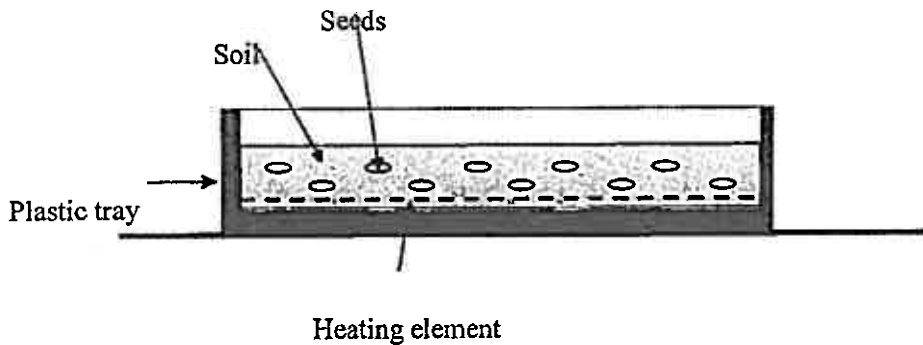


- 16 According to this data, what would be the stopping distance for the 60-year-old driver (Driver P), if he was initially moving at 23 m s^{-1} ?
- (A) 25 m
(B) 28 m
(C) 33 m
(D) Unable to estimate from this data
- 17 Which conclusion *cannot* be drawn from this data?
- (A) The 60 year old driver has slower reflexes than the 30 year old driver.
(B) The stopping distance is larger for the older driver at any speed measured.
(C) The faster a car is going, the longer the stopping distance for both drivers.
(D) Driver P takes longer to stop than driver Q.
- 18 What implication does this data have for car drivers?
- (A) The faster you drive, the more stopping distance you need.
(B) Younger drivers are likely to be safer drivers than older drivers.
(C) Younger drivers have fewer end-on collisions than older drivers.
(D) It is safer to drive much more slowly than the speed limit.

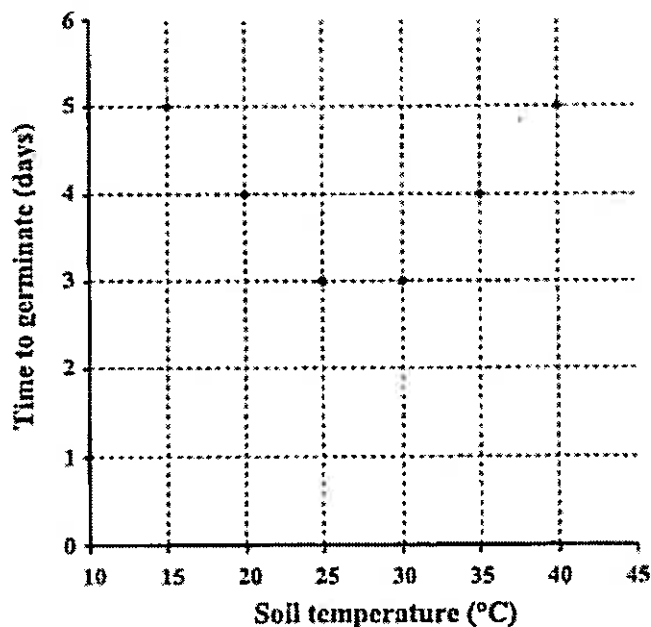
Refer to the following information to answer Questions 19 to 24

A student tested the effect of soil temperature on the rate of germination. The student used 1.0 kg of soil in each of six identical plastic containers. In each container, soil was kept moist by adding 15 mL of water each day and under-soil heating elements were adjusted to different temperatures. The diagram shows one of the six containers.

The student recorded the day on which the first green shoots broke through the soil surface at germination.



The student plotted her data and showed it to her teacher before completing the graph.



19 Which choice correctly identifies the *dependent* and *independent* variables for the results shown in the graph?

	<i>Dependent variable</i>	<i>Independent variable</i>
(A)	Height of plant growth	Soil temperature
(B)	Time to germinate	Height of plant growth
(C)	Soil temperature	Time to germinate
(D)	Time to germinate	Soil temperature

20

What information in the diagram of the plastic tray may indicate a problem with experimental design?

- (A) Not enough seeds have been used in each tray.
- (B) Not enough water has been used to ensure the plants survive.
- (C) No indication of the temperatures of the heating elements has been given.
- (D) The depth of planting the seeds has not been controlled.

21

What error has the student made in how 'time to germinate' was measured?

- (A) The student has dotted grid lines and replication was not used.
- (B) There is no mention of averaging the results, or how many shoots needed to appear before being recorded.
- (C) The temperature should have been cycled to mimic natural variations of temperature from day to night.
- (D) Variation in sunlight should have been added to the experiment.

22

Which is the most appropriate conclusion for these results?

- (A) The higher the soil temperature, the faster the seeds germinate.
- (B) The seeds germinate fastest at 27.5°C
- (C) Germination of seeds is independent of soil temperature.
- (D) Germination of seeds occurs more rapidly between 23°C and 32°C.

23

There is at least one other reason that the experimental design needs improving.

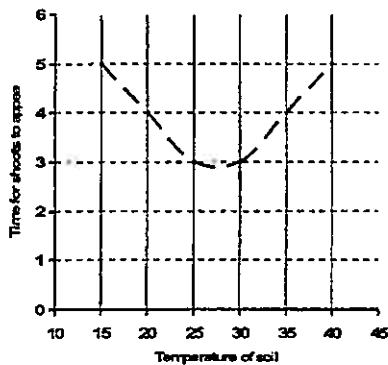
Which of the following identifies an *error* in the experiment?

- (A) Water would evaporate from the warmer containers much more quickly, thus causing variation.
- (B) At higher than 40°C the apparatus was probably too hot to handle safely and may have prevented germination.
- (C) The thermometer is easier to read if it starts somewhere below 10°C.
- (D) The temperature should have been kept constant.

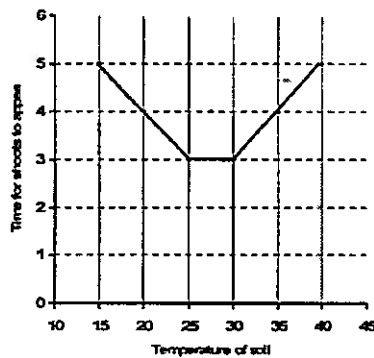
24

How should the student complete the graph?

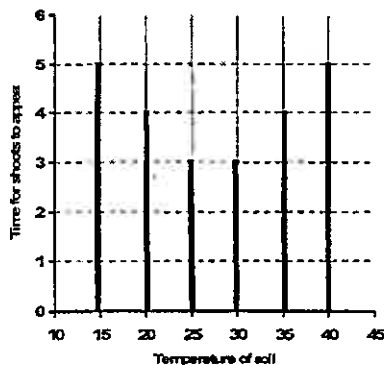
(A)



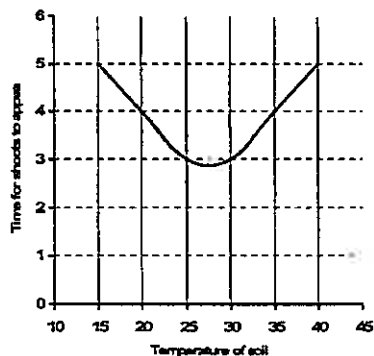
(B)



(C)



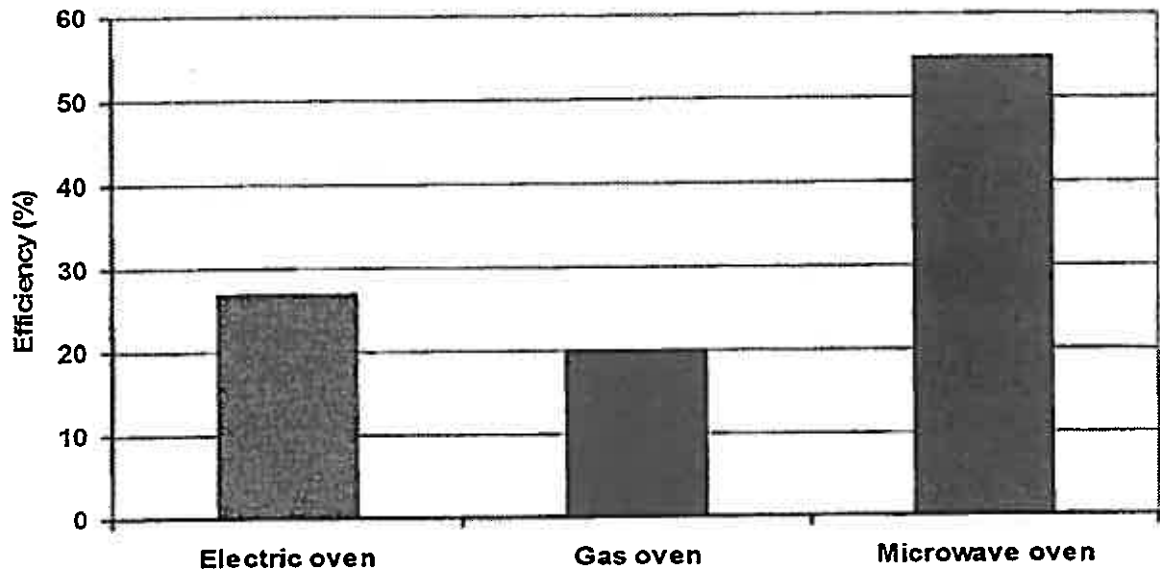
(D)



Refer to the following information to answer Questions 25 and 26

The graph shows information on the efficiency of three different types of ovens.

Efficiency is a measure of the amount of energy absorbed by the food, compared to the amount of energy used by the oven as the food inside is heated.



25

Based on this information, which statement is correct?

- (A) The electric oven is more efficient than the microwave oven at heating the same item.
- (B) The gas oven uses more energy to heat the same item compared to the electric oven.
- (C) The most efficient fuel is gas, followed by electricity, then microwave.
- (D) The microwave oven uses the most energy to heat the same food item.

26

If 10 000 kJ of energy was supplied to each oven, what quantity of this energy would be wasted in each oven?

	<i>Electric oven</i>	<i>Gas oven</i>	<i>Microwave oven</i>
(A)	2800	2000	5400
(B)	28%	20%	54%
(C)	7200	8000	4600
(D)	28%	80%	64%