IEA - Data Enhancement Project

Questionnaire printing

Study: SC2

Population: 3

Instrument: STN_3

Student Test understanding Nature of sc. (3N) Population 3

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1 When viewed from the Earth the Sun and the Moon appear to be about the same size in the sky. What is the reason?

A They are both large bodies compared to the Earth.
B The Moon reflects the Sun's light.
C The Moon is smaller than the Earth.
D The distance from the Sun to the Earth is greater than the distance from the Moon to the Earth.
E They are both important parts of the solar system.

P3N01

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2 Why is a day on the planet Mars slightly longer than a day on Earth?

A The distance from the Sun to Mars is greater than the distance from the Sun to Earth.
B It takes longer for Mars to complete one revolution around the Sun.
C It takes longer for Mars to complete one turn on its axis.
D Mars has two moons but Earth has only one.
E Mars has a smaller diameter than the Earth.

P3N02

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3 A solar collector for a water heater is placed outside, on the sunny side of a house, tilted 34ø from the horizontal. At which position of the Sun would the heat collector receive the most intense solar radiation?

[Picture]

A Position A
B Position B
C Position C
D Position D
E Position E

P3N03

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4 Which statement best describes how the surface of the Earth changes over billions of years?

A A flat surface is gradually pushed up into steeper and steeper mountains until the world is covered with mountains.
B Very steep mountains gradually wear down until most of the world is worn down to sea level.
C Very steep mountains gradually wear down into flat surfaces that may be again pushed up into mountains, and so on over and over again.
D Very steep mountains and flat plains stay side by side for billions of years with little change.
E Very steep mountains are gradually pulled down by gravity into flat surfaces that may be again pushed up into mountains, and so on over and over again.

P3N04

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5 An experiment was conducted to determine whether bile aided in the digestion of fats. Whenever pancreatic juice was mixed with fats a small amount of the fat was digested. Whenever pancreatic juice and bile were mixed with fat, the fat was completely digested. When bile was mixed alone with fat, there was no digestion. This was interpreted as showing that bile aided in the digestion of fats.

Which of the following statements best describes this interpretation?

A justified
B unjustified because it does not answer the question
C unjustified because the experiment lacks a control
D unjustified because the data are inadequate
E unjustified because it is contradicted by the data

P3N05

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6 Seeds are planted in a flask as illustrated below. Water is added to the flask each day for two weeks. The flask shows a daily loss of weight. Which of the following is the best explanation of this weight loss?

[Picture]

A The original water evaporates within the first day.
B Carbon dioxide is lighter in weight than ordinary air.
C Seed material is changed to leaves and roots that weigh less.
D The seedlings use starch in the seeds and give off gases that escape.
E Dry air enters through the stopper and replaces the moist air in the flask.

P3N06

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7 When is an egg released in human females?

A about 2 days after menstruation begins
B about 9 days after menstruation begins
C about 14 days after menstruation begins
D about 20 days after menstruation begins
E about 28 days after menstruation begins

P3N07

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8 Why are human females more likely than males to be carriers of venereal (sexually transmitted) diseases?

A Early symptoms are not as obvious in females.
B It is easier for females to catch venereal diseases.
C It is more difficult to cure venereal diseases in females.
D Hormones in the male weaken the effects of the disease.
E The symptoms are suppressed by some contraceptive methods used by females.

P3N08

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9 Which one of the following is the most plausible reason why giraffes have long necks?

A Stretching to get food in high trees has made their necks longer.
B There is something inside a giraffe causing its neck to grow continually.
C Giraffe food contains vitamins which cause vertebrae to lengthen.
D Giraffe necks have gradually grown longer over a period of time, but we don't know why.
E Giraffes born with the longest necks have been able to stay alive when food was scarce and have passed this trait on to their offspring.

P3N09

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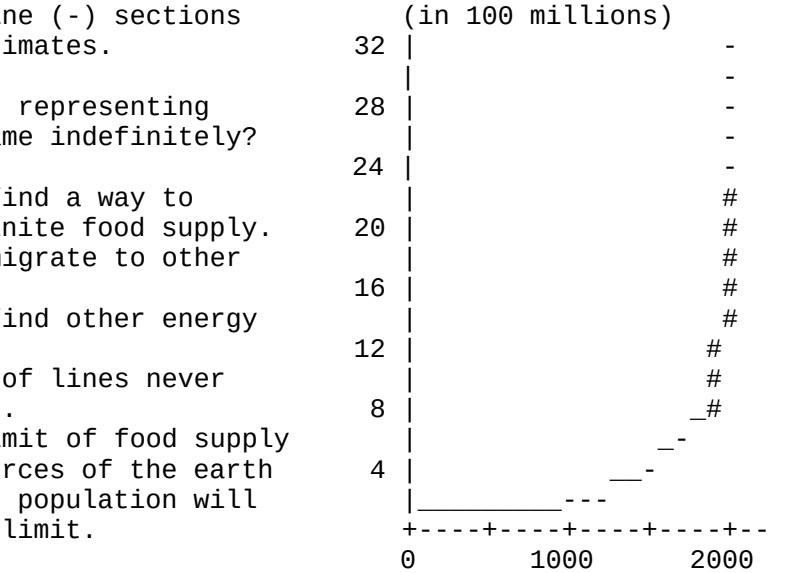
10 The graph refers to the growth of human population. The solid-line (#) section of the curve is based on actual data, while the dashed-line (-) sections are based on computer estimates.

Can the slope of the line representing actual data remain the same indefinitely?

A Yes, man will find a way to produce an infinite food supply.
B Yes, man will migrate to other planets.
C Yes, man will find other energy sources.
D No, the slopes of lines never remain the same.
E No, when the limit of food supply and other resources of the earth is reached, the population will also reach its limit.



P3N10

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11 It has been noticed in recent years that the proportion of insects surviving after exposure to certain insecticides has shown a gradual increase with succeeding generations. Of the following, which is the best explanation?

A World changes in climate have provided a new environment.
B Offspring of insects which have been exposed to the insecticide have inherited an immunity.
C Elimination of the less resistant strains gives the resistant ones a greater chance of success.
D Changes in the habits of the insects have enabled them to survive.
E The insecticide causes favourable mutations.

P3N11

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12 The freezing point of a liquid is the temperature at which it freezes. The boiling point is the temperature at which it boils.

Which one of the entries in the following table shows how the freezing point and boiling point of salt water compare with those of pure water?

	Freezing point of salt water	Boiling point of salt water
A	lower than pure water	lower than pure water
B	lower than pure water	higher than pure water
C	higher than pure water	lower than pure water
D	higher than pure water	higher than pure water
E	same as pure water	same as pure water

P3N12

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13 The Galapagos Islands in the Pacific are believed never to have been connected to the mainland. In the Islands there are about 14 species of finch-like birds with few obvious relatives except on the South American mainland. The finches vary from island to island. There is a close resemblance between species in plumage, calls, nests, and eggs, but each species differs greatly in beak structure according to the diet. The species do not interbreed and do not compete for food.

It is stated on this evidence that isolation from the South American mainland and different habitats on the Islands are important factors in the production of new species.

A The statement is supported by the information given.
B The statement is not supported by the information given.
C The statement is contradicted by the information given.
D The statement is known to be false but this is not supported by the information given.
E No relevant information is given.

P3N13

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14 Paint applied to an iron surface prevents the iron from rusting. Which one of the following provides the best reason?

A It prevents nitrogen from coming in contact with the iron.
B It reacts chemically with the iron.
C It prevents carbon dioxide from coming in contact with the iron.
D It makes the surface of the iron smoother.
E It prevents oxygen and moisture from coming in contact with the iron.

P3N14

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15 A solution of substance X is added to a solution of substance Y. No colour change is observed. Which of the following would provide evidence that a chemical reaction had taken place although there was no change in colour?

A Any product is soluble in water.
B The solutions of X and Y can be mixed in all proportions and still give the same result.
C There is a rise of temperature when the two solutions are mixed.
D The final liquid is shown to be neutral by using an indicator.
E The experiment gives the same result when different concentrations of the two solutions are used.

P3N15

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16 A person made the following statement.

"Some carbon atoms in the bread I ate last night may have once been part of a dinosaur's body."

Which one of the following is the best appraisal of the statement?

A This statement contradicts the law of conservation of matter.
B This statement could not be true because dinosaurs lived so long ago.
C This statement could be true because atoms are rarely created or destroyed.
D This statement could only be true if the bread was grown in soil containing dinosaur fossils.
E This statement could not be true because dinosaurs were animals but wheat is a plant.

P3N16

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17 What poisonous gas will accumulate if a car motor is left running in a closed garage?

A oxygen
B carbon dioxide
C water vapour
D carbon monoxide
E nitrogen

P3N17

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18 Which one of the following packaging materials is broken down most rapidly by the action of bacteria in the environment?

A glass
B aluminium
C plastic
D paper
E rubber

P3N18

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19 Which one of the following is the best estimate of the mass of a motor car?

A 100 kg
B 1,000 kg
C 10,000 kg
D 100,000 kg
E 1,000,000 kg

P3N19

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20 Salt water is more dense than fresh water. A person loads up a boat in a fresh water river, and then sails down the river towards the sea. What will happen when the boat reaches the salt water?

A There will be no difference in the level at which the boat floats.
B The boat will sink a little deeper into the water.
C The boat will float a little higher in the water.
D The volume of water displaced by the boat will increase.
E The volume of water displaced by the boat will remain the same.

P3N20

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21 A heavy ball is attached to a string and swung in a circle. The string breaks. Which arrow in the diagram below best represents the direction in which the ball will travel just after the string breaks?

A arrow 1 [Picture of ball in orbit]
B arrow 2
C arrow 3
D arrow 4
E arrow 5

P3N21

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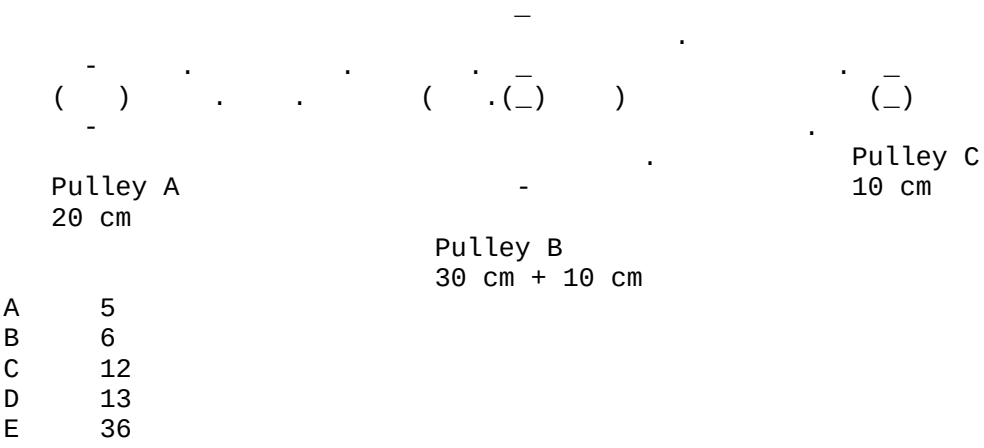
22 The diagram below shows a system of pulley wheels linked by belts. Pulley A has a diameter of 20 cm. Pulley B consists of a large pulley of diameter 30 cm and a small pulley of 10 cm fixed together. Pulley C has a diameter of 10 cm. If Pulley A is turned through one complete revolution, how many revolutions are made by Pulley C?



A 5
B 6
C 12
D 13
E 36

P3N22

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23 Nuclear fission reactors contain a moderator, which may be made of graphite, "heavy" water, etc. What is the main function of the moderator?

A to reduce the number of neutrons in the reactor
B to slow down existing neutrons in the reactor
C to prevent reactions which release more than one neutron
D to prevent the reactor from overheating
E to tranfer the heat generated by the nuclear reactions to the steam turbines

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P3N23

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24 Some air is pumped out of a sealed can and the can collapses. Which of the following best explains why this happened?

A Air inside the can collapsed.
B Pumping out the air weakened the can.
C The air inside the can condensed to form water.
D The air pressure inside the can became less than the pressure outside the can.
E Pumping the air out of the can increased the number of air molecules around the can.

P3N24

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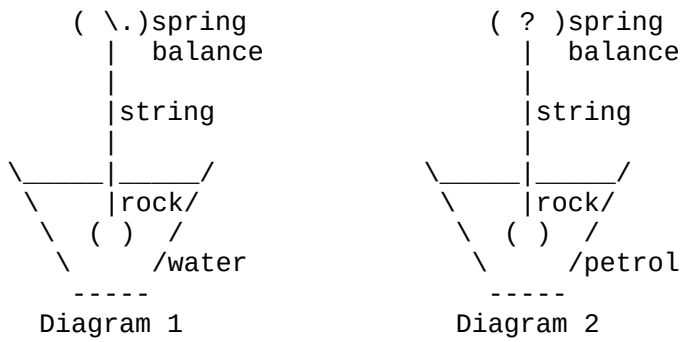
25 Diagram 1 represents a rock suspended in water being weighed using a spring balance. Diagram 2 represents the same rock being weighed in petrol.



How would the readings of the spring balance on the two occasions compare?

A The reading of the spring balance in Diagram 1 would be greater than the reading in Diagram 2.
B The reading of the spring balance in Diagram 1 would be the same as the reading in Diagram 2.
C The reading of the spring balance in Diagram 1 would be less than the reading in Diagram 2.
D It would depend on the type of rock.
E It would depend on the air pressure.

P3N25
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26 If a person is unconscious as a result of an accident, which one of the following first-aid measures should *not* be applied?

A Give the person a warm drink.
B Check that there are no objects in the mouth that interfere with breathing.
C Apply resuscitation if the person has stopped breathing.
D Check that the person is kept warm.
E Keep the person still.

P3N26
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27 Some people were trapped in a room when a building caught fire. In which part of the room would they be most likely to find air free of smoke?

A near the ceiling
B in the centre of the room
C near the floor
D near the walls of the room
E in a corner

P3N27
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28 If a person is bleeding as the result of a deep cut on the arm, which one of the following first-aid measures should *not* be applied?

A Raise the arm above the level of the heart.
B Apply a bandage firmly to the cut area.
C Apply pressure to the artery on the upper arm.
D Lie the person on a flat surface.
E Place the arm in a warm salt solution.

P3N28

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29 Vitamin C is found in fresh fruit and is important to the health of humans. Which of the following is the most likely effect on a person whose food intake does not have enough Vitamin C?

A The blood fails to clot properly if the person receives a cut.
B Ulcers develop on the skin and inside the mouth.
C The person's hair starts to fall out.
D The bones become flexible and the legs start to bend.
E The person's ability to see objects in the dark is reduced.

P3N29

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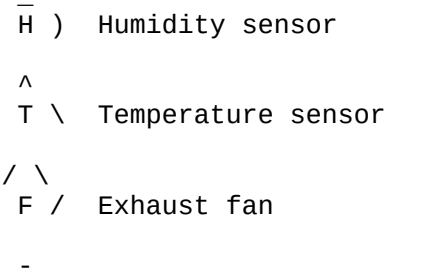
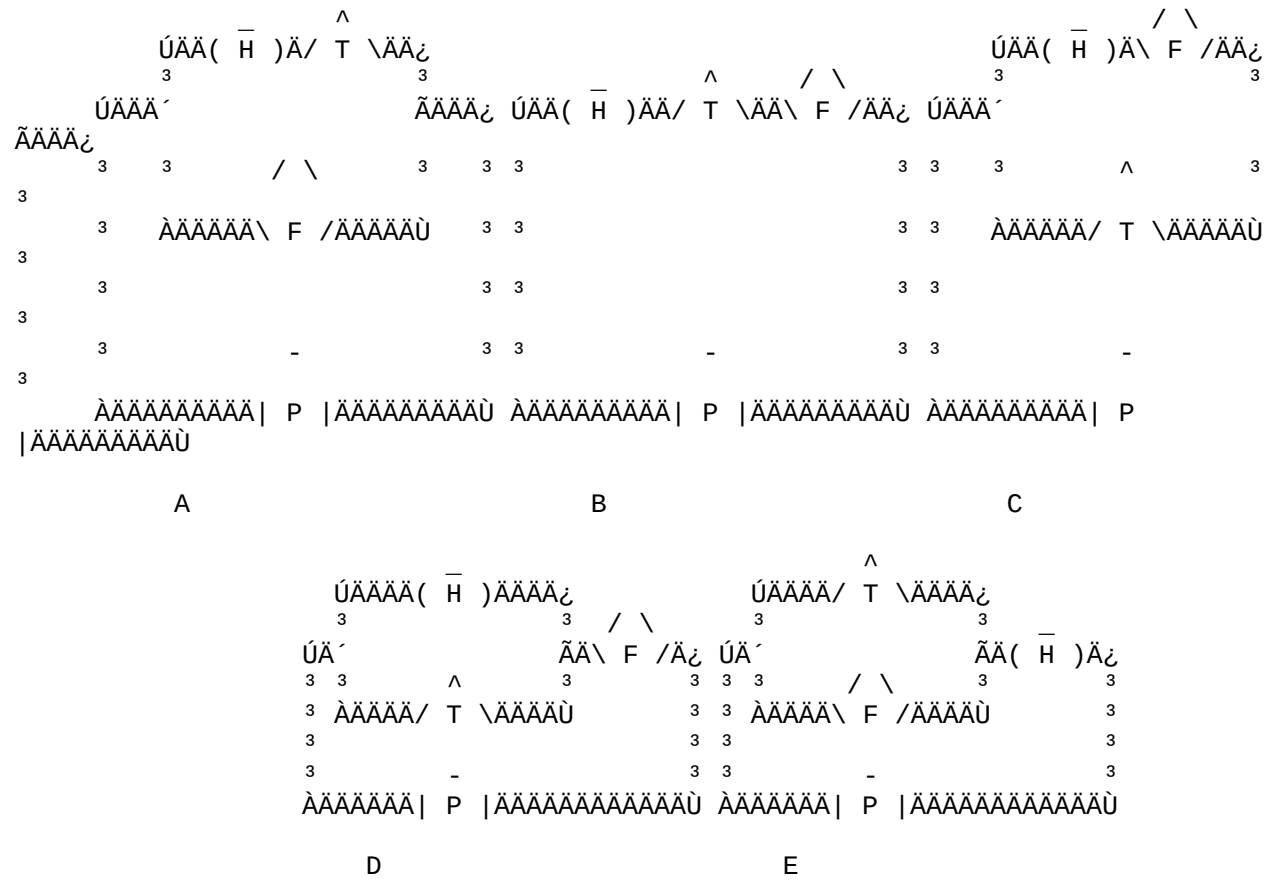
30 An electric exhaust fan is required to operate when a temperature sensor reads a temperature greater than 20 øC, or a humidity sensor detects a relative humidity greater than 20 per cent.



Which diagram best represents the circuit needed to accomplish this task?



P3N30