Part I : Each multiple choice Question (A, B, C, D, E) is worth 2 points.

1. Alex measured the length of some objects by using measurement tools. He wrote the result in the table below:

Object	Length
F	41.7 cm
G	12.51 mm
H	10.00 cm
I	82.5 mm
J	400.010 cm

Which objects that Alex measure using a vernier calliper?

A. F, H and J
B. G and I
C. H and I
D. G and H
E. Only J

2. A solar cell is black or dark colored at the top side that faces the Sun so it could...

A. Absorb more heat from the Sun.
B. Not dazzle the eyes.
C. Absorb all the colored light.
D. Reflect more light.
E. Absorb the heat and reflect the light from the Sun.

3. Which organisms are able to survive at 113 °C?

A. Prokaryote
B. Archaea
C. Eukaryotes
D. Eubacteria
E. Fungi

4. Which animals belong to arthropods?

A. Jellyfish, coral, sea star

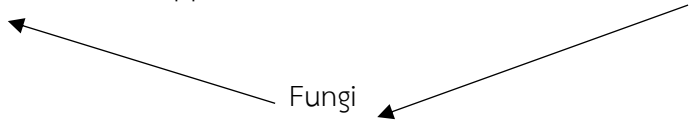
B. Sea anemone, coral, snake sea

C. Bird, fish, frog

D. Bes, mosquito, roundworm

E. Spider, crabs, millipedes

5. Grass ⟶ Grasshopper ⟶ Bluebird ⟶ Snake ⟶ Owl



Based on the food chain illustrated above, if the population of bluebird decreases, the true statement is _____.

A. The population of grasshopper increases

B. The population of snake increases

C. The population of owl increases

D. The population of fungi increases

E. It has no effect on the food chain

6. A glass initially contains water and ice, while the ice melts, the water level in the glass_____.

A. is increasing

B. is decreasing

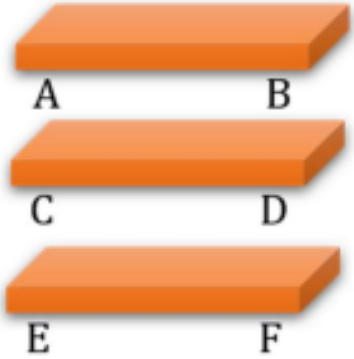
C. remains the same

D. is increasing at first and then decreasing

E. is decreasing at first and then increasing

7. Three bar magnets, each end is marked with the letters A to F. From several experiments it is known that:

- ✓ A and C repel each other
- ✓ B and E also repel each other
- ✓ F is a magnetic north pole



The correct conclusion from the experiments is:

A. A and C are magnetic south poles
B. D and E are magnetic south poles
C. B and E are magnetic north poles
D. B and D are magnetic north poles
E. C and E are magnetic south poles

8. It is known that the Moon is slowly moving away from the Earth. Let say after a very long time, the Earth-Moon distance become twice the current distance. What will change in our observation?

A. The solar eclipse will become less common
B. The solar eclipse will become more common
C. We will not be able to see solar eclipse anymore
D. There will be no lunar eclipse anymore
E. There will be no full moon anymore

9. Which part of the eye helps us to see in dim light?

A. rod cells
B. cone cells
C. iris
D. cornea
E. lens

10. In daily live we usually hear the word weight and the unit is kilogram. However, in physics, mass has the unit of kilogram and weight is another quantity with unit of Newton. Can we change the measure of mass and weight in physics?

A. Both mass and weight cannot be change

B. Mass cannot be change, but weight can be change if we move the object to another planet with different gravity.

C. Weight cannot be change, but mass can be change if we move the object to another planet with different gravity.

D. Both mass and weight can be change if we move the object to another planet with different gravity

E. We can change the mass by putting it inside a liquid, and we can change the weight by moving it to another planet with different gravity.

11. We usually know that water boil at 100 °C. But this this fact true for all situation?

A. No, it depends on the air pressure, the higher the pressure, the higher the boiling temperature.

B. No, it depends on the air pressure, the higher the pressure, the lower the boiling temperature.

C. Yes, it does not depend on either pressure or humidity of the air.

D. No, it depends on the air humidity, the higher the humidity, the higher the boiling temperature.

E. No, it depends on the air humidity, the higher the humidity, the lower the boiling temperature.

12. Five different foods labelled A, B, C, D, and E were tested for glucose, starch, and protein. The color of the solutions after the tests are shown in the following table.

Solution	Color after testing for glucose	Color after testing for starch	Color after testing for protein
A	blue	orange	purple
B	brick-red	blue-black	purple
C	green	orange	blue
D	brick-red	orange	blue
E	blue	blue-black	blue

Which food solution contains high concentration of glucose but not starch and protein?

A. A
B. B
C. C
D. D
E. E

13. During your school visit to a museum, you and your friends see an old standing clock that has big pendulum swinging back and forth. Your friend wondered what are the quantities that determine how long does it take for the pendulum to swing from one end to the other end. You are given several options. Which one is the correct one?

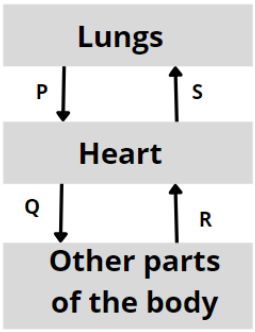
A. The mass of the pendulum
B. The length of the pendulum
C. Both the mass and the length of the pendulum
D. The material that made the pendulum
E. The air humidity

14. A student was instructed to draw a diagram of the human circulatory system. She was told to use arrows and letters P, Q, R, and S to represent the flow of blood around the body. The following information was given to the student:

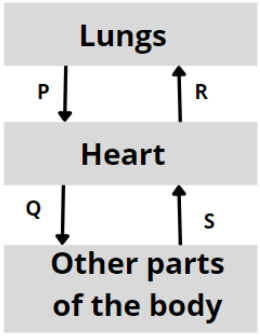
- Blood at P contains less carbon dioxide than blood at R.
- Blood at S contains the least amount of carbon dioxide.
- Blood at Q contains the most amount of carbon dioxide.

Which of the following graphs shows the correct diagram the student must make?

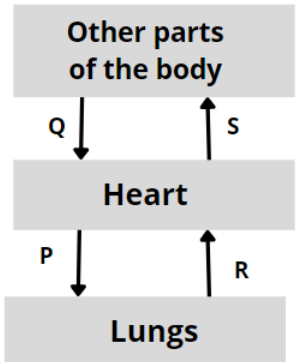
A.



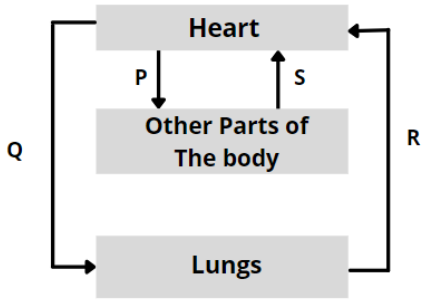
B.



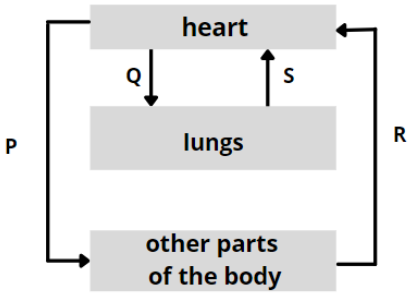
C.



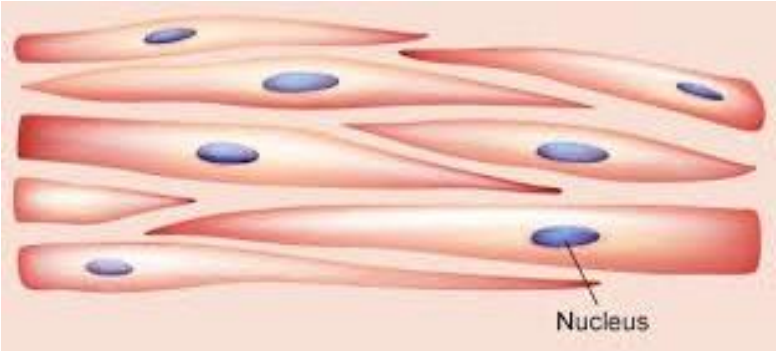
D.



E.



15. The following picture shows structure of a muscle in human body.



What organs that have the above muscle structure?

1. heart
2. Stomach
3. Intestine
4. Biceps
5. Triceps
6. blood vessels

A. 1, 2, 3
B. 1, 3, 5
C. 2, 4, 5
D. 2, 3, 6
E. 4, 5, 6

Part II: Each short answer is worth 3 points.

16. If we drop two plates of the same size, one made of paper and one of copper, which one reaches the floor first, and why?

17. If we rub plastic into our hair and hold it close to small pieces of paper, what will happen to these pieces of paper? Note that the plastic acquires negative charges in the rubbing process

18. Type of vitamin that prevents scurvy is .....

19. There are 3 iron rods, namely 1, 2 and 3. It is known that rod 1 is a magnet with ends A and B. Rod 2 has ends C and D, and rod 3 has ends E and F. End A is known to be the north pole. The following results are obtained from an experiment: the ends A and C attract, the ends A and F repel, and the ends D and F attract. From this experiment it can be concluded that the rod ____(A)____ is ordinary iron (not magnetized), and the other rod is a magnet with the end ____(B)____ is the north pole and the end ___(C)____ is the south pole.

20. Pair the correct leaf types and plants!

Leaf Types	Plant
Parallel	Rose
Pinnate	Grass
Palmate	Papaya

Parallel - _____(A)____

pinnate - _____(B)____

palmate – ____(C)____

21. A person cannot see clearly at a distance of more than 2 meters. To correct this condition, he use a pair of glasses that are made of ___(A)___lenses with focal lengths of ___(B)___ meters.

22. If we drop a piece of iron and a feather from the same height on the surface of the moon, the time it takes for the iron to hit the surface of the moon will be ___(A)___ the time it takes for the feather to hit the surface of the moon.
If we drop the same piece of iron from the same height on the surface of the earth, the time it takes for the iron to hit the surface of the earth will be ___(B)___ the time it takes to hit the surface of the moon.

23. Galileo used a telescope to confirm the heliocentric model, which state that ___(A)___ is the center of the solar system. He observed that the planet Venus sometimes appears in ___(B)___ phase, while in the geocentric model the planet Venus can only appear in ___(C)___ Phase

24. Abdul, Benny, and Caca give consecutively 3 N, 4 N, and 5 N Force. If all the forces act at one object, the maximum resultant force is ___(A)___ N and the minimum resultant force is ___(B)___ N

25. The apparent movement of the Sun is the movement of the sun towards the north or south in a year. In October, the sun is moving from the equator line to ___(A)___ So, in that month, the northern hemisphere of the earth is in ___(B)___ (season) and at southern hemisphere is in ___(C)___ (season).

Part III: Essay (Total 40 points.)

26. A bat can detect small objects by the sound signals it emits. The size of the smallest object it can detect is roughly the same as the wavelength of the sound it emits. Assume that a bat emits sound with a frequency of 50.0 kHz, its flying speed is 40 m/s, and the speed of sound in the air is 340 m/s.

(A) What is the term for a sound with a frequency of 50.0 kHz?

(B) What is the smallest size it can detect when the bat is still?

(C) What is the smallest size it can detect when the bat is flying?

27. A bottle of unknown mass made of a certain glass. Its total volume is 500 ml including the cavity inside it. The bottle cavity is 400 ml. Now this empty bottle is put into a certain liquid of unknown density. The volume of displaced liquid is 300 ml. Now if 45 ml of water is poured into the bottle and the experiment is repeated, the displaced liquid is 350 ml. It is known that the density of water is 1 gram/ml.

(A) Determine the density of the liquid, give your answer in gram/ml.

(B) Determine the density of the glass that made the bottle, give your answer in gram/ml.

(C) Determine the volume of water that need to be filled into the bottle so that the bottle sink, give your answer in ml.

28. A traveller drove a car from town A to town B. He decided to drive exactly half way between the towns with speed 40 km/hour and another half with speed 60 km/hour.

(A) Determine his average speed.

(B) Afterward the traveller drove back from town B to town A. This time he decided to drive exactly half of the time with speed 40 km/hour and another half with speed 60 km/hour. Determine his average speed.

(C) The distance between the two locations that he changed his speed is 20 km. Determine the distance between the two towns.

29. A helicopter is dropping the goods for the citizen. The helicopter should stay in that position, 100 meters above the ground. If the mass of the helicopter and the passengers is 2000 kg.

(A) What is the mechanical energy that the helicopter and the passengers have?

(B) What is the Lifting force of the helicopter to stay in that position?

(C) What is the work that the helicopter does by the lifting force?

30. Bono has a container filled with seawater. Then Bono put an object in the water and the object is submerged in the seawater.

(A) If Bono adds some fresh water to the container, what happened to the object in the water? Explain your answer.

(B) If the seawater is heated until the temperature rises significantly, what happened to the object? Explain your answer. (Assume that during heating, there is no water evaporating)

National Selection : ASMOPSS Thailand 2023 (2nd Round – Science Primary)

Answer Key :

Part I : Each multiple choice Question (A, B, C, D, E) is worth 2 points.

No.	Answers	No.	Answers	No.	Answers
1.	C	6.	C	11.	A
2.	C	7.	B	12.	D
3.	B	8.	C	13.	B
4.	E	9.	A	14.	E
5.	A	10.	B	15.	D

Part II : Each short answer is worth 3 points. (Total 30 points.)

No.	Answers
16.	The copper ones will arrive first, since it the weight is much larger compared with the friction force.
17.	It will be pulled even though it is neutral, since it will be polarized by the electric field
18.	Vitamin C
19.	(A) = 2 , (B) = F , (C) = E
20.	Parallel - grass; pinnate - rose; palmate – papaya
21.	(A) negative/divergent/concave (B) -2
22.	(A) the same as; (B) shorter than/less than
23.	(A) The Sun (B) Full (C) Crescent
24.	(A) 12 N (B) 0 N
25.	(A) South/Southern hemisphere/tropic of Capricorn; (B) Autumn; (C) Spring

Part III : Essay (Total 40 points.)

No.	Answers
26.	(A) Ultrasound (B) 6.8 mm (C) 6.0 mm
27.	(A) 0.9 gram/ml (B) 2.7 gram/ml (C) 180 ml
28.	(A) 48 km/hour (B) 50 km/hour (C) 200 km
29.	(A) What is the mechanical energy that the helicopter and the passengers have? Helicopter has only Potential Energy no Kinetic Energy So the total Mechanical Energy is = m . g . h ME = 2000 . 10 . 100 = 2000000 J or 2 MJ (4 points) (B) What is the Lifting force of the helicopter to stay in that position? Lifting force of the engine is equal to its weight = m . g F = 2000 . 10 = 20000 N (4 points) (C) What is the work that the helicopter does by the lifting force? Total Work done by the lifting force is 0. Because it is stay on the position (no displacement) (4 points)
30.	(A) The object will sink to the bottom of the container. (3 points) Because when he added the fresh water, the density of the liquid will decrease. Now the object has higher density than the solution, so it will sink. (3 points) (B) The object will sink. (3 points) When the water and object is heated, their volume will expand. The thermal expansion in solid is smaller than in liquid, so the volume expansion of object expands less than the water. The density of the object less decrease than the water, and the density of the object still greater to the density of the water. So, it will sink. (3 points)