

### ALL QUESTIONS WORTH 4 POINTS

1. Select the correct association between the digestive juice and the organ that produces it.

- |                                 |                                       |
|---------------------------------|---------------------------------------|
| A) Gastric juice - stomach      | B) Saliva - pharynx                   |
| C) Bile - gall bladder          | D) Intestinal juice - large intestine |
| E) Pancreatic juice - esophagus |                                       |

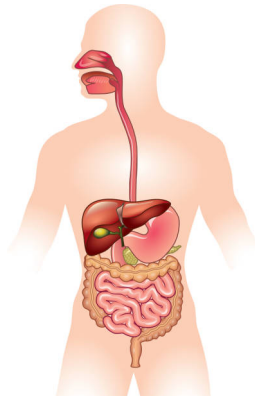
2. A point of light source is located 20 cm in front of a plane mirror. The distance between the light source and its image formed in the plane mirror is:

- |          |          |          |
|----------|----------|----------|
| A) 20 cm | B) 0     | C) 10 cm |
| D) 40 cm | E) 30 cm |          |

3. Which parts of plants are used for vegetable oil production?

- |            |                     |         |
|------------|---------------------|---------|
| A) Leaves  | B) Roots            | C) Stem |
| D) Flowers | E) Fruits and seeds |         |

4. In which of the following organs of the digestive system does pancreatic juice digest food?



- |                    |                    |          |
|--------------------|--------------------|----------|
| A) Large intestine | B) Stomach         | C) Liver |
| D) Pancreas        | E) Small intestine |          |

5. The Sun-Earth distance is  $d \approx 1.5 \cdot 10^8 \text{ km}$ , and the speed of light is  $c = 3 \cdot 10^8 \text{ m/s}$ . The time interval in which the light emitted by the Sun reaches the surface of the Earth is approximately:

- |          |           |        |
|----------|-----------|--------|
| A) 5 h   | B) 5 min  | C) 5 s |
| D) 500 s | E) 50 min |        |

**6. The mass of the atom:**

- A) Depends on the mass of protons and electrons
- B) Depends on the isotope mass
- C) Depends on the mass of neutrons and electrons
- D) Depends on the mass of protons and neutrons
- E) Does not depend on the mass of its particles

**7. About the atmospheric air we know that it contains 21% oxygen. Which one of the following represents its correct path through the body?**

- A) Nose → trachea → larynx → bronchus → lungs
- B) Lungs → bronchus → trachea → pharynx → larynx → nose
- C) Nose → pharynx → larynx → trachea → bronchus → lungs
- D) Lungs → bronchus → trachea → larynx → pharynx → nose
- E) Nose → larynx → pharynx → bronchus → trachea → lungs

**8. The SI unit of the ratio between the power developed by the engine of a car and its speed is**

- A) J
- B) W
- C)  $\text{ms}^{-1}$
- D) N
- E) kg

**9. Which of the following is an organic substance?**

- A) Caustic soda
- B) Methane gas
- C) Chalk
- D) Water
- E) Vinegar

**10. The following events occur during the inspiration process:**

- 1 - Air enters the lungs.
- 2 - The diaphragm muscle contracts.
- 3 - The volume of the chest increases.

**What is the correct order in which they occur?**

- A) 1-2-3
- B) 2-3-1
- C) 1-3-2
- D) 2-1-3
- E) 3-2-1

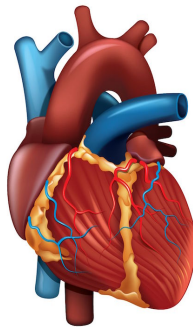
11. A simple electric circuit consists of a battery of emf  $E$  and internal resistance  $r$  and a resistor of resistance  $R$ . If the battery is short-circuited by connecting a conductor of zero resistance to its terminals, then:

- A) The terminal voltage of the battery is null
- B) The intensity of the current through the battery is null
- C) The power on the external circuit is maximal
- D) The intensity through the resistor  $R$  is null
- E) The resistor  $R$  may melt because the heat released in it becomes very high

12. Where is the element that contains 19 protons situated?

- A) 1st group, 4th period
- B) 1st group, 3rd period
- C) 9th group, 3rd period
- D) 10th group, 3rd period
- E) 8th group, 3rd period

13. Which of the following statements is true about a healthy heart?



- A) It sends blood through the vena cava.
- B) It contracts 20 times per minute.
- C) It absorbs blood through the aorta.
- D) It contracts 70 times per minute.
- E) It is located in the abdomen.

14. A current-carrying solenoid behaves like a bar magnet. To reverse the magnetic poles of the solenoid:

- A) We reduce the number of coils in half
- B) We reverse the direction of the electric current through the solenoid
- C) We turn the solenoid by  $90^\circ$ , in a plane perpendicular to the initial plane
- D) We introduce a magnetic core inside the solenoid
- E) This is not possible

15. Choose the correct affirmation:



- A) Pollutants are solid, liquid or gaseous substances that have a harmful effect on plants and animals and cause climate changes
- B) Carbon and sulphur oxides are solids
- C) The soil is not polluted by the discharge of industrial waters
- D) The air is not polluted if it contains suspended solid particles
- E) Sulphur and nitrogen oxides do not pollute the air

16. Which of the following is a harmful habit for the human heart?

- A) Fruit consumption
- B) Avoiding smoking
- C) Eating fried foods
- D) Eating olive oil
- E) Practicing sports

17. The instrument used to determine the amount of radioactivity in a human body is:

- A) The X-ray tube
- B) The CT scanner
- C) The Geiger Muller counter
- D) The thermometer
- E) The barometer

18. Which of the following oxides, when it reacts with water, causes the formation of acid rain?



- A) CO
- B) SO<sub>2</sub>
- C) CaO
- D) Na<sub>2</sub>O
- E) I<sub>2</sub>O<sub>7</sub>

19. Which of the following statements is true about the transport of substances in the plantbody?

- A) Water and minerals are absorbed through root hairs.
- B) Water and organic substances are transported through xylem vessels.
- C) Water and minerals are transported through the phloem.
- D) Substances are conducted downward, through the xylem.
- E) Water and glucose are absorbed through root hairs.

20. When a cylindrical conductor is stretched, its length is doubled. How does its resistance change?

- A) It doubles
- B) It remains the same
- C) It is halved
- D) It increases four times
- E) It decreases four times

21. Which of the following substances does not create, amplify or contribute to global warming?

- A) SF<sub>6</sub>
- B) CO
- C) CO<sub>2</sub>
- D) CH<sub>4</sub>
- E) H<sub>2</sub>O (vapour)

22. Choose the correct statement about pollination.



- A) Pollen grains are formed in the stigma
- B) Each pollen grain grows a pollen tube
- C) The pollen tube enters the male sex cell
- D) Wind-pollinated flowers have large petals
- E) The female sex cell moves down the pollen tube

23. After we wash our hands with alcohol and let them dry without wiping, we sense:

- A) how they heat up, because the spirit heats up in order to evaporate
- B) how they heat up by receiving the heat given off by the evaporating spirit
- C) how they heat up, due to the friction with the air during the waving of the hands
- D) their cooling as they release heat, which in turn is transformed into kinetic energy of motion
- E) their cooling as the spirit evaporates, drawing heat away from them

24. Why is water considered a universal solvent?



- A) It's very acidic
- B) It freezes quickly
- C) It dissolves ionic substances and polar molecules
- D) It dissolves ionic substances and non-polar molecules
- E) It boils at a temperature that can be accurately determined

25. Which of the following adaptations occur in plants that live in the desert?

- A) Air spaces in leaves
- B) Arched roots
- C) Flexible stems
- D) Very deep roots
- E) Broad leaves

26. Two spherical bodies made of the same material have radii in the relation:

$$r_1 = 2r_2$$

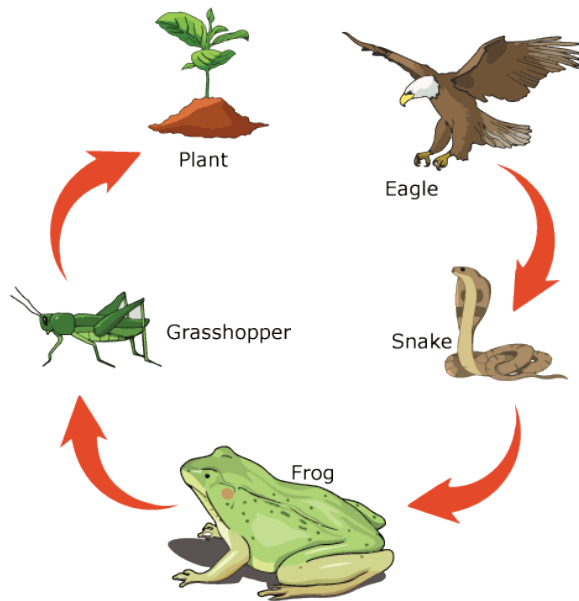
Find the ratio  $G_1/G_2$  of the weights of the two bodies:

- A) 8
- B) 4
- C) 2
- D) 1/4
- E) 1/2

27. Which of the following is a chemical phenomenon?

- A) Crushing salt
- B) Dissolving sugar
- C) Water evaporating
- D) Milk fermenting
- E) Butter melting

28. Observe the image below and select the correct statement.



- A) The image represents an aquatic food chain
- B) The plants are producers
- C) The image represents a nocturnal food chain
- D) The frog is a primary consumer
- E) The eagle is a decomposer

29. Arrange the following time periods 0.2 hours, 12000 milliseconds, 1/30 hours, 13 seconds in ascending order.

- A) 0.2 hours, 12000 milliseconds, 1/30 hours, 13 seconds
- B) 13 seconds, 1/30 hours, 0.2 hours, 12000 milliseconds
- C) 12000 milliseconds, 13 seconds, 1/30 hours, 0.2 hours
- D) 0.2 hours, 1/30 hours, 12000 milliseconds, 13 seconds
- E) 0.2 hours, 13 seconds, 1/30 hours, 12000 milliseconds

**30. Which of the following statements is correct about the atom?**

- A) It contains a different number of protons and electrons
- B) The atom is electrically neutral
- C) Its mass is concentrated in the electronic shell
- D) It contains protons and electrons in the nucleus
- E) The charge of the atom is given by the nuclear charge

