

ALL QUESTIONS WORTH 4 POINTS

1. Which of the following objects does not refract light?



A) magnifier



B) prism



C) microscope



D) mirror



E) a full glass of water

2. The raw sap contains water and mineral substances that are absorbed by the plant. The direction of their flow through the woody tissue of the plant is:



A) leaf ⇌ stem ⇌ root

C) stem ⇌ leaf ⇌ root

E) leaf ⇌ flower ⇌ fruit

B) root ⇌ stem ⇌ leaf

D) root ⇌ leaf ⇌ stem

3. The gaseous state of a substance is due to:

A) the strong bonds between particles

B) the attractions between electrostatically charged particles

C) the high inertia of the small particles

D) the high inertia of the large particles

E) the high-speed motion of particles

- 4. If at the top of a hill there is a garden with blooming roses, on a summer evening, after sunset, the smell of roses will be best felt:**



- A) At the top of the hill, near the garden**
B) At the base of the hill
C) All over
D) In the evening, after sunset, the smell of roses is no longer felt
E) After cooling, the smell of roses goes up in the atmospheric air
- 5. What substance used in photosynthesis does the plant get through its stomata?**
- A) carbon dioxide** **B) sugar** **C) water**
D) oxygen **E) mineral substances**
- 6. If a thermometer is broken, the mercury can be isolated by surrounding it with:**
- A) sulphur** **B) iron powder** **C) phosphorus**
D) water **E) coal dust**
- 7. Which of the following is a false statement?**
- A) The hottest stars have 28000°C and look blue**
B) Our solar system is part of the Milky Way galaxy
C) Distances between stars are measured in light-year
D) A light-year is a measure of distance that light covers in one year
E) The last stage of a star's life is called a white dwarf

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Cadet Level (Class 7 & 8)

Time Allowed: 90 minutes

8. The arteries and veins have the following common character:

- A) They carry the blood away from the heart
- B) They carry oxygenated blood
- C) They carry the blood towards the heart
- D) They are connected by capillaries
- E) They carry non-oxygenated blood

9. Plasma is one of the fundamental states of matter and consists of a:

- A) liquid at high temperature
- B) totally or partially ionized gas, electrically neutral
- C) partially ionized gas, with electric charge
- D) partially ionized liquid
- E) partially ionized liquid, electrically neutral

10. The separation of the white light into its component colors is called:

- A) Optical Mirage
- B) Total reflection
- C) Refraction
- D) Polarization
- E) Dispersion

11. In the ecosystem of a coniferous forest, the fir tree is:



- A) Primary consumer
- B) Decomposer
- C) Secondary consumer
- D) Producer
- E) Tertiary consumer

12. A property that cannot be attributed to the electron is:

- A) particle with negligible mass
- B) particle without electric charge
- C) negatively charged particle
- D) fundamental particle
- E) particle placed in the electronic shell

13. Which of the following statements regarding measuring devices is true?

- A) Both the ammeter and the voltmeter are always connected in series
- B) The ideal ammeter, of zero resistance, is connected in series with the element through which we measure the current
- C) Both the ideal ammeter and the ideal voltmeter have infinitely high resistances
- D) The voltmeter, of infinitely high resistance, is connected in series with the resistor for which the potential difference is measured
- E) A multimeter can directly measure the energy produced by the battery

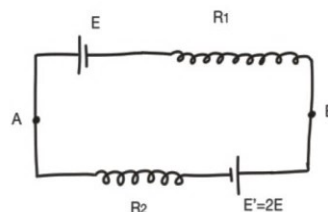
14. Andrew is eating roasted potatoes. Indicate the place where their digestion begins:

- | | | |
|--------------------|--------------------|------------|
| A) Oral cavity | B) Pharynx | C) Stomach |
| D) Small intestine | E) Large intestine | |

15. Many electrical devices have been developed to repel or to kill mosquitoes. Some of them heat chemical tablets that release vapours which are toxic for mosquitoes. In this case the tablets are subjected to the physical process of:

- | | | |
|----------------|-----------------|-----------------|
| A) boiling | B) sublimation | C) condensation |
| D) evaporation | E) vaporization | |

16. Regarding the circuit in the figure we can state that:



- A) The two resistors are connected in parallel
- B) The current through resistor R_1 flows from A to B
- C) The current through the two resistors is the same
- D) The current through resistor R_2 flows from B to A
- E) The two voltage sources are connected in parallel

17. Constipation occurs in people whose diet has a low content of:

- A) Fats
- B) Proteins
- C) Roughage
- D) Vitamins
- E) Minerals

18. Iron is the most commonly found chemical element on Earth. The element Fe contains 26 electrons, and its atomic mass is 56. We conclude that in the nucleus of the atom of Fe there are:

- A) 26 neutrons
- B) 30 photons
- C) 56 nucleons
- D) 30 protons
- E) 56 protons

19. Which of the following is not the reason why mercury is suitable for making a laboratory thermometer?

- A) Being a metal, it is a good thermal conductor
- B) Its specific heat is quite low
- C) Being liquid, it dilates uniformly
- D) The temperature of the solidification is very low (- 38.9°C)
- E) It is very toxic and cannot have other uses

20. The level of oxygen in the inhaled air is:

- A) 79%
- B) 21%
- C) 51%
- D) 16%
- E) 4%

21. In a positive ion:

- A) the number of protons is equal to the number of electrons
- B) the number of electrons is equal to the number of neutrons
- C) the number of electrons is greater than the number of protons
- D) the number of electrons is smaller than the number of protons
- E) the number of electrons is greater than the atomic number

22. Which of the following is not a property of the optical fiber?

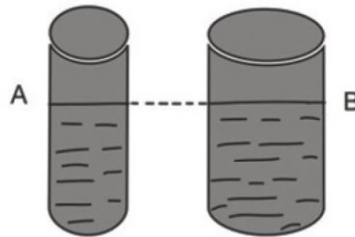
- A) light transmission through the optical fiber is based on total internal reflection of light
- B) use in telecommunications
- C) use in endoscope operation
- D) light can enter the fiber only at certain angles
- E) light transmission through the optical fiber requires the decomposition of light through a prism

23. Select the correct statement about breathing:

- A) Lung cancer is caused by infections
- B) The passage of oxygen into the blood takes place at the level of the bronchi
- C) Physical exercises stimulate the diseases of the respiratory system
- D) Inhaling occurs by relaxation of diaphragm
- E) Breathing is a process common in plants and animals

24. In a fertilizer composition there are *K, N, P* but it may also contain:

- A) *Zn* and *Br*
- B) *Cl, I*
- C) *Na, Cd*
- D) *Fe, Mn*
- E) *S, Ca*

25. Two tanks look like in the next figure. The wrong statement is:

- A) If both tanks are filled with water, the pressure exerted on the base will be higher in tank *B*.
- B) If tank *A* is filled with fresh water and *B* with salt water, the pressure exerted on the base will be higher in tank *B*.
- C) The pressures exerted on the base will be equal if there is the relation:
 $\alpha_A \cdot h_A = \rho_B \cdot h_B$ between the density of the liquid and the height of the column of liquid.
- D) If both tanks are filled with water, the pressure exerted on the base will be the same.
- E) If in the first tank we have water at 20°C and in the second we have an equal column of water at 100°C, then the pressure exerted on the base is higher in tank *A*.

26. Which of the following is an adaptation of plants to dryness?

- A) The modification of leaves into traps
- B) The formation of widened leaves
- C) The transformation of leaves into thorns
- D) The presence of a large number of stomata
- E) The presence of a thin epidermis

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27. The chlorine isotopes have:

- A) the same number of nucleons
- B) the same atomic mass
- C) the same number of neutrons
- D) different number of electrons
- E) different number of neutrons

28. A hair-dryer is powered by the home power grid. After a while, the resistance wire of the device is much hotter than the wires of the power cable, which are almost cold, because:

- A) the electric current does not flow through the power cable
- B) the electric current through the power cable is different from the electric current through the device
- C) the power cable is much longer and has a higher resistance than the device
- D) both of them have the same electrical resistance, but operate at different time intervals
- E) equal currents flow through both of them, but the hair dryer has a much higher electrical resistance

29. Which of the following ways of plant reproduction is an asexual one?

- A) Fruit formation in lemon tree
- B) Pollen formation in stamens
- C) Pine seed formation
- D) Spore formation in mosses
- E) Rose flower formation

30. Which of the following is an atmospheric pollutant?

- A) CO
- B) P_2O_5
- C) H_2O
- D) O_2
- E) N_2

