Markhor Junior Contest ®

Pioneer Level (Class VII & VIII)
Science 2025

There are 25 questions, each carrying two marks.

1. **Which statement BEST distinguishes science from pseudoscience?**
   a) Science explains natural events
   b) Science uses advanced tools
   c) Science is popular worldwide
   d) Science relies on testable and repeatable evidence
   e) None of these

2. **STEM integration is MOST clearly shown when students:**
   a) Memorize formulas
   b) Read science history
   c) Use only computers
   d) Design a bridge using physics, math, and technology
   e) None of these

3. **Which process releases energy for cellular activities?**
   a) Photosynthesis
   b) Diffusion
   c) Osmosis
   d) Cellular respiration
   e) None of these

4. **Why do energy pyramids have fewer organisms at higher trophic levels?**
   a) Predators eat less
   b) Energy increases upward
   c) Plants use more energy
   d) Energy is lost as heat at each level
   e) None of these

5. **A gene is BEST described as:**
   a) A whole chromosome
   b) A cell organelle
   c) A type of protein
   d) A segment of DNA carrying instructions
   e) None of these

6. **Vaccination protects a community by:**
   a) Eliminating all microbes
   b) Strengthening only adults
   c) Increasing body temperature
   d) Creating herd immunity
   e) None of these

7. **Which bond involves sharing of electrons?**
   a) Ionic
   b) Metallic
   c) Hydrogen
   d) Covalent
   e) None of these

8. **Which reaction is an example of neutralization?**
   a) Metal + oxygen
   b) Fuel burning
   c) Zinc + copper sulfate
   d) Acid + base → salt + water
   e) None of these

9. **A substance with pH = 2 is:**
   a) Neutral
   b) Weak base
   c) Strong base
   d) Strong acid
   e) None of these

10. **Which method can separate alcohol from water?**
    a) Filtration
    b) Chromatography
    c) Decantation
    d) Distillation
    e) None of these

11. **According to Newton's Second Law, force depends on:**
    a) Speed only
    b) Distance only
    c) Time only
    d) Mass and acceleration
    e) None of these

12. Power is defined as:

a) Work × time
b) Energy stored
c) Force applied
d) Work done per unit time
e) None of these

13. Increasing resistance in a circuit will:

a) Increase current
b) Stop voltage
c) Increase power
d) Decrease current (Ohm's Law)
e) None of these

14. Electric motors work on the principle of:

a) Static electricity
b) Gravity
c) Chemical reaction
d) Electromagnetism
e) None of these

15. Seafloor spreading provides evidence for:

a) Weathering
b) Erosion
c) Volcanic ash
d) Plate tectonics
e) None of these

16. **The layer of Earth responsible for magnetic field generation is the:**
    a) Crust
    b) Upper mantle
    c) Lithosphere
    d) Outer core
    e) None of these

17. **Climate mitigation refers to:**
    a) Ignoring climate change
    b) Predicting weather
    c) Adapting to disasters
    d) Reducing greenhouse gas emissions
    e) None of these

18. **A town replaces coal-based electricity with solar energy, improves home insulation, and increases green cover. After two years, scientists record the following data:**
    - **Total electricity use increases**
    - **Carbon dioxide emissions decrease**
    - **Average indoor temperature remains stable despite hotter summers**
    - **Local air quality index improves**

    Which explanation BEST accounts for all **the observations?**

a) Increased electricity use directly caused lower carbon emissions
b) Solar energy and insulation reduced fossil-fuel dependence while trees moderated local heat and improved air quality
c) Trees absorbed heat and replaced the need for insulation
d) Stable indoor temperatures prove climate change did not affect the town
e) None of these

19. A lake ecosystem shows the following changes over five years:

- **The number of algae increases rapidly**
- **Fish populations decline**
- **Dissolved oxygen levels decrease**
- **Nearby farms have started using more chemical fertilizers**

Which explanation BEST connects all these observations?

a) Fertilizers directly poison fish, causing oxygen levels to drop
b) Algae use oxygen at night, killing fish regardless of fertilizer use
c) Excess nutrients cause algal blooms that reduce oxygen, leading to fish deaths
d) Fish consume algae, which increases competition for oxygen

e) None of these

20. During a heat wave, students compare two identical school buildings:

- **Building A has a dark roof, poor ventilation, and sealed windows**
- **Building B has a light-colored roof, cross-ventilation, and nearby trees**

After several days, measurements show:

- **Building A has higher indoor temperatures**
- **Building B uses less electricity for cooling**
- **Carbon dioxide levels indoors are lower in Building B**
- **Students in Building B report better concentration**

Which explanation BEST accounts for all the observations?

a) Light-colored roofs reflect more solar radiation, ventilation removes heat and CO_2, and trees reduce heat through shading and transpiration
b) Trees absorb carbon dioxide and directly cool students inside classrooms
c) Lower electricity use automatically leads to lower indoor temperatures
d) Dark roofs increase electricity production, raising indoor carbon dioxide

e) None of these

21. A class investigated how different surfaces affect the motion of the same toy car. The car was released from the same height on three tracks: one covered with smooth plastic, one with sandpaper, and one with cloth. On the plastic track, the car traveled the farthest. On sandpaper, it stopped much sooner. On cloth, it traveled farther than on sandpaper but less than on plastic. The mass of the car and slope angle were unchanged throughout. Which inference BEST explains the pattern of motion observed?

a) Heavier objects move faster on smooth surfaces
b) The car gained extra energy on the plastic surface
c) Frictional force differed between the surfaces and affected the car's motion
d) Sandpaper absorbed the car's kinetic energy permanently
e) None of these

22. Students investigated how two factors—surface type and load—affect the motion of a cart rolling down a ramp.
In Trial 1, a light cart rolled down a smooth ramp and traveled a long distance.
In Trial 2, the same cart rolled down a rough ramp and stopped quickly.

In Trial 3, extra mass was added to the cart, and it rolled down the same rough ramp, traveling farther than in Trial 2 but still less than in Trial 1.

All trials used the same ramp angle and starting height. Which conclusion BEST fits all three results together?

a) Increasing mass always reduces the effect of friction
b) Smooth surfaces eliminate friction completely
c) Friction depends on surface type, and added mass can increase the cart's momentum enough to travel farther despite friction
d) Heavier objects move farther because gravity is stronger on them
e) None of these

23. A group of students tested how the length of a pendulum affects the time it takes to complete one swing. Pendulum A had a longer string than Pendulum B. Both used the same metal bob, were released from the same height, and were tested in the same room. The students noticed that Pendulum A took more time for one complete swing than Pendulum B. When they increased the mass of both bobs, the time for one swing did not change. Which conclusion is

MOST scientifically valid based on this investigation?

a) The mass of the bob determines the speed of the pendulum
b) The height of release controls the swing time
c) The time period of a pendulum depends on the length of the string, not its mass
d) Increasing mass increases gravitational force and slows motion
e) None of these

24. A School lab tested how light intensity and leaf color affect the rate of photosynthesis in plants. Two sets of identical plants were used: **green leaves** and **purple leaves. Each set was exposed to low light and high light conditions. Observations**:

- **Green leaves in high light produced the most oxygen bubbles.**
- **Green leaves in low light produced fewer bubbles.**
- **Purple leaves in high light produced some oxygen bubbles, but less than green leaves in high light.**
- **Purple leaves in low light produced the fewest bubbles.**

Which conclusion BEST explains these results?

a) Light intensity alone determines photosynthesis rate, regardless of leaf color
b) Purple leaves block all sunlight, so they cannot photosynthesize
c) Both leaf color and light intensity affect photosynthesis; green leaves absorb light more efficiently than purple, and higher light increases oxygen production
d) Purple leaves produce more oxygen in low light than high light
e) None of these

25. Two identical metal plates were placed outdoors under direct sunlight for the same amount of time. One plate was painted black, while the other was painted white. Both plates had the same size, thickness, and material, and the weather conditions such as wind speed and sunlight intensity remained constant during the experiment. After some time, it was observed that the black plate became significantly hotter than the white plate. Based on this observation, which explanation BEST accounts for the difference in temperature between the two plates?

a) The black plate absorbed more solar radiation than the white plate
b) The white plate produced less heat because it was painted

c) The black plate created heat through a chemical change
d) The white plate cooled faster because it had less mass
e) None of these