Olympiad

Date: 06-10-2024 | Model Test -1 | **Duration**: 1 Hr

Class: IX | Science Olympiad | **Total Marks** : 25

Instruction to the Students

- Write only question numbers clearly outside the margin (1, 2, 3.i, 5.b, 4.c.ii, etc.).
- Do not write questions or any titles. (For example - Do not write any II. Answer the following).
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Section

Choose the appropriate answer

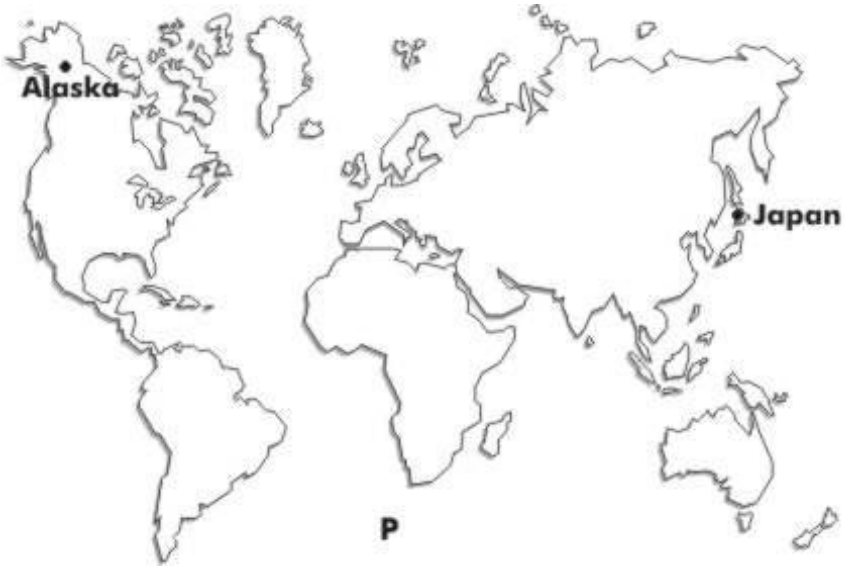
(25 x 1 = 25)

1. A spacecraft moves in a circular orbit around Earth. If the spacecraft's speed is increased slightly, which of the following will occur?
   a) The spacecraft will move into a lower orbit
   b) The spacecraft will move into a higher orbit
   c) The orbit will remain circular
   d) The spacecraft will lose speed

2. A toy car is rotating in a horizontal circle of radius 0.5 m at a constant speed of 2 m/s. What is the work done by the centripetal force after one complete revolution?
   a) Zero b) 2 J c) 4 J d) 1 J

3. A particle moves in a horizontal circle of radius 2 m with a constant angular speed. If its angular velocity is doubled, what happens to the centripetal acceleration?
   a) It remains the same b) It doubles
   c) It quadruples d) It reduces by half

4. Which of these maps is better to use if we want to get a rough estimate of how far Alaska (a state in north-western USA) is, from Japan?



a) Map P is better.
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5. A car takes a turn around a curved road of radius 100 m at a speed of 72 km/h. What minimum coefficient of friction is required between the tires and the road to prevent skidding? (Take $g=10m/s^2$)

a) 0.36 b) 0.24 c) 0.64 d) 0.42

6. A satellite is orbiting the Earth in a circular orbit at a constant speed. Which of the following is true regarding its velocity and acceleration?

a) Both velocity and acceleration are constant
b) Velocity changes, but acceleration remains constant
c) Velocity is constant, but acceleration changes
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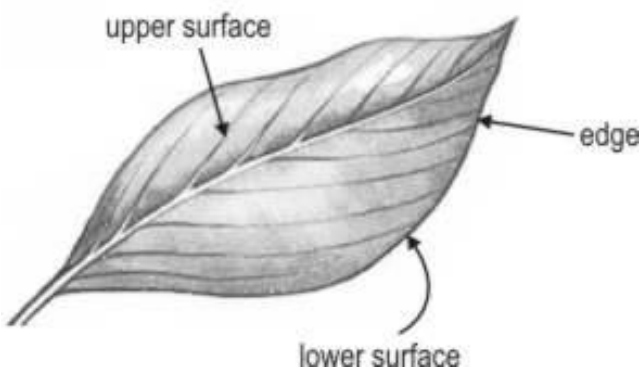
7. In a leaf, chloroplast-containing cells are known to be the sites of photosynthesis. In which part of the leaf are the majority of chloroplast-bearing cells likely to be found?



a) upper surface of the leaf
b) lower surface of the leaf
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8. Among the following, which has the highest BRAIN TO BODY LENGTH ratio?

a) Human b) Monkey c) Rabit d) Squirrel

9. A potometer with its functioning is described below: shoot is held in place in the tube using a rubber stopper with a hole. A bubble is introduced into the capillary. The position of the bubble is set at the start of the experiment by turning the tap on the reservoir. The distance the bubble travels in a given time is noted. What does the potometer probably measure?
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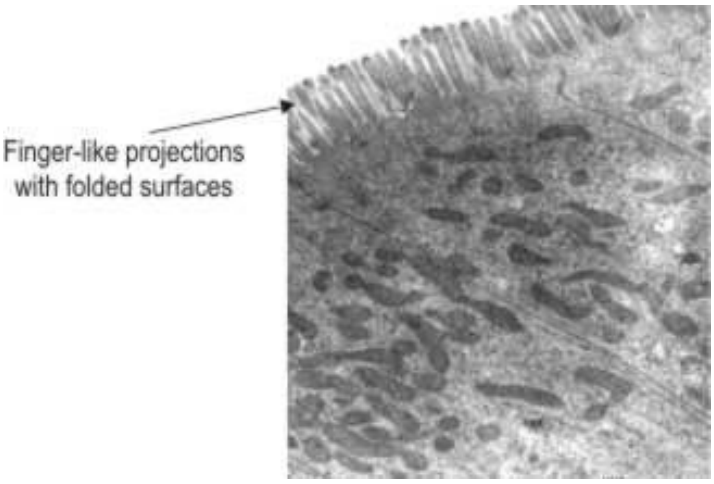
10. Cell theory states that all organisms are made up of one or more similar units of organization called cells. Which of the following organisms do not strictly adhere to this theory?
   a) protozoa
   b) bacteria
   c) viruses
   d) algae

11. Outer surfaces of some cells are folded into finger-like projections as shown in the figure here. Which of the following could be the function of such folded surfaces?



   a) to increase the absorption of nutrients by the cell
   b) to increase the rate of cell division of the cell
   c) to help the cell move about much more effectively
   d) to increase the energy production in the cell

12. The diameter of a field of view while using a 10X objective in a microscope is determined to be 2 millimetres (mm). From the picture of the cells as observed in the picture, the average length of each cell is about: (1mm = 1000 micrometres)

a) 250 micrometres b) 1000 micrometres c) 2000 micrometres
d) 4000 micrometres

13. Sunil views a slide of onion root cells in a compound microscope under low power objective. He wants to increase the magnification to see the slide better. His teacher tells him to centre the portion of the slide he wants to see in the field of view, before he shifts to the high power objective. This is important because_____
    a) Under high power a smaller area of the slide is observed.
    b) Under high power a larger area of the slide is observed.
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14. How would the function of phloem be affected if its cells were not elongated?
    a) Food transport would be faster b) No significant effect
    c) Food transport would slow down d) Food storage would increase

15. Which organelle's malfunction would affect the division of labor in a cell the most?
    a) Mitochondria b) Ribosomes c) Golgi bodies d) Nucleus

16. What key difference allows multi-cellular organisms to live longer than unicellular ones?
    a) Division of labor among cells b) Larger size of cells
    c) Higher energy consumption d) Their ability to change cell shape

17. In a hypothetically non-dividing skin cell, what would be the consequence for the organism?
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18. Robert Hooke observed "cells" in a slice of cork. What major contribution did this discovery make to biology?
    a) Identification of life in plants
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19. What would happen if a cell's surface area grew disproportionately to its volume?
    a) The cell would function more efficiently
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20. If nerve cells were spherical instead of elongated, what would be the primary effect on their function?
    a) Faster transmission of impulses
    b) Reduced communication efficiency across the body
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21. A particle starts from rest and moves with a uniform acceleration. The ratio of the distances covered by the particle in the 5th second to the distance covered in the first 5 seconds is:
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22. A body is dropped from a height of 80 m. Simultaneously, another body is projected horizontally with a velocity of 20 m/s from the same height. Find the time taken by both bodies to reach the ground. ($g = 10\ m/s^2$)
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23. A rocket accelerates from rest with a constant acceleration of $10\ m/s^2$. After how long will it reach a velocity of 200 m/s, and how far will it have traveled during that time?
    a) 20 s, 2000 m b) 10 s, 1000 m c) 30 s, 3000 m d) 40 s, 4000 m

24. A velocity-time graph of a body shows a straight line making an angle of 45° with the time axis. What is the acceleration of the body?
    a) $1\ m/s^2$ b) $2\ m/s^2$ c) $0.5\ m/s^2$ d) $5\ m/s^2$

25. A body starts from rest and accelerates uniformly at $3\ m/s^2$. What will be its velocity after covering 54 meters?
    a) 18 m/s b) 36 m/s c) 24 m/s d) 12 m/s

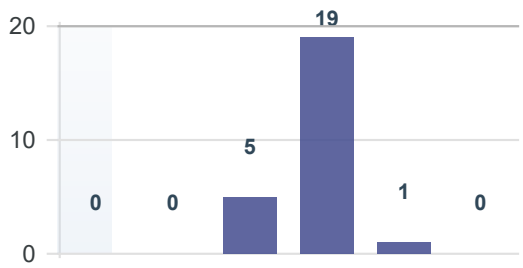
QUESTION PAPER SUMMARY
Olympiad
G9_Science Olympiad_Model Test 1

Class : IX
Subject : Science Olympiad
Total Marks : 25

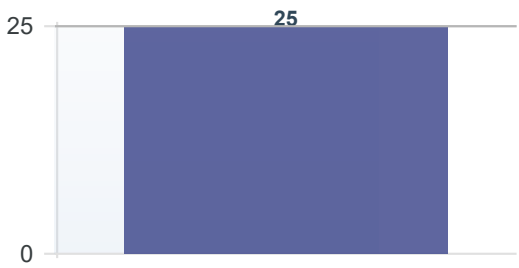
MARK DISTRIBUTION:

Type	No of Questions
Choose	25

BLOOMS DISTRIBUTION:



QUESTION DISTRIBUTION:



CHAPTERS - TOPIC COVERED:

Chapter	Topic	No of Questions
Motion	-	11
Tissues	-	4
Cell-The Fundamental Unit Of Life	-	10

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   Answer

   b) The spacecraft will move into a higher orbit (1)

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   Answer

   a) Zero (1)

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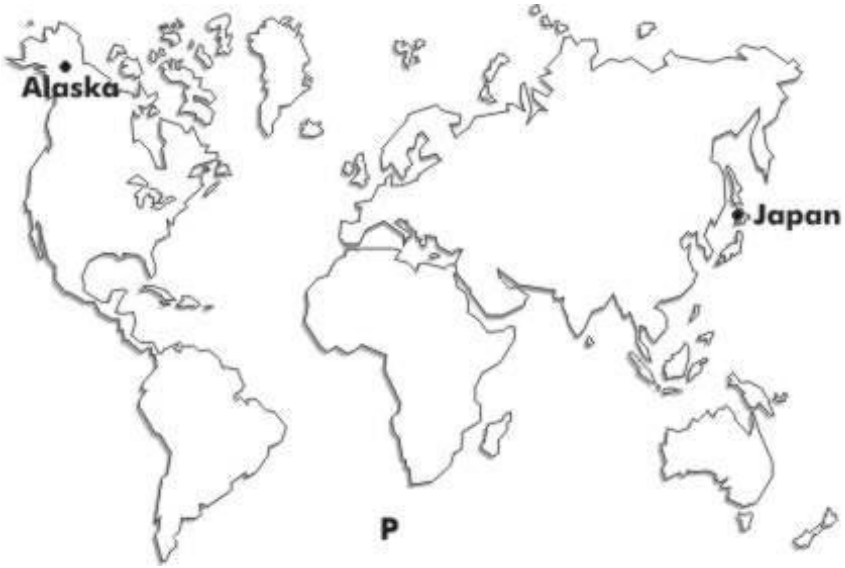

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Answer

d) Both velocity and acceleration change (1)

Answer Explanation

The velocity changes direction continuously in circular motion, while the acceleration (centripetal) is directed towards the center of the orbit.

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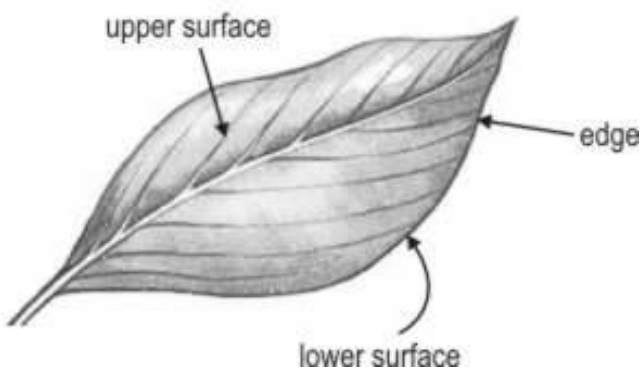

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a) upper surface of the leaf (1)

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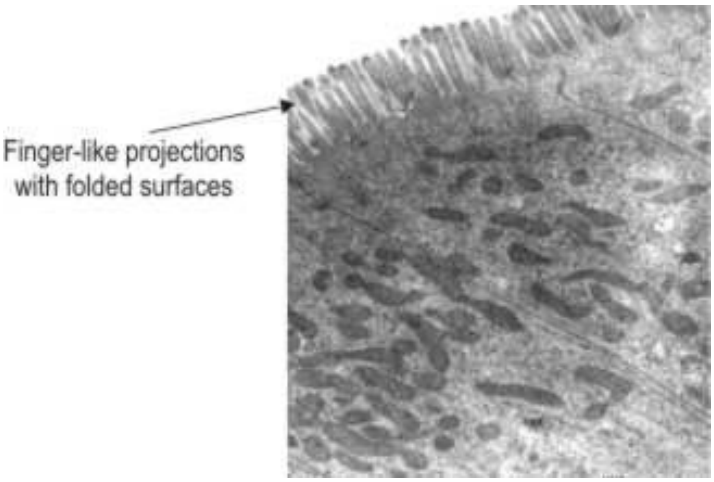

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Answer

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15. Which organelle's malfunction would affect the division of labor in a cell the most?

a) Mitochondria b) Ribosomes c) Golgi bodies d) Nucleus

Answer

d) Nucleus (1)

Answer Explanation

Since the nucleus is known as "the brain of the cell", if it were removed, **the cell would die almost instantly**. The nucleus controls all of the cell organelles, whether it be the mitochondria, endoplasmic reticulum, ribosomes, cytoplasms, or even the nucleolus.

16. What key difference allows multi-cellular organisms to live longer than unicellular ones?
    a) Division of labor among cells
    b) Larger size of cells
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Answer

a) Division of labor among cells (1)

Answer Explanation

Multicellular organisms have a higher chance of survival due to the **division of functions to various cells and advanced reproduction process** while unicellular face the risk of extinction due to parent cell loss caused by cell division

17. In a hypothetically non-dividing skin cell, what would be the consequence for the organism?
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Answer

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Answer

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Answer

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Answer Explanation

The large surface area to volume ratio of small cells makes the transport of substances into and out of cells extremely efficient.

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    Answer

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    Answer

    a) 18 m/s (1)