

CLASS

9

SAMPLE PAPER

Science
Olympiad
Foundation

For Excellence in Science, Maths & IT

NATIONAL SCIENCE OLYMPIAD

The actual test paper has 50 questions. Time allowed : 60 minutes. There are 2 sections, 20 questions in section I and 30 in section II.

SYLLABUS

Section – I (Mental ability) : Number Systems, Polynomials, Coordinate Geometry, Linear Equations in Two Variables, Introduction to Euclid's Geometry, Lines and Angles, Triangles, Quadrilaterals, Areas of Parallelograms and Triangles, Circles, Constructions, Heron's Formula, Surface Areas and Volumes, Statistics, Probability.

Section – II (Science) : Motion, Force and Laws of Motion, Gravitation, Work, Power & Energy, Sound, Matter, Atoms, Molecules and Bonding, Structure of the Atom, Diversity & Biological Science, Ecology & Biology in Human Welfare, Diseases

MENTAL ABILITY

1. A person is standing on a staircase. He walks down 4 steps, up 3 steps, down 6 steps, up 2 steps, up 9 steps, and down 2 steps. Where is he standing in relation to the step on which he started?
(A) 2 steps above (B) 1 step above (C) The same place
(D) 1 step below (E) None of these.
2. On a certain day, a news vendor began the day with P papers. Between opening and noon, he sold 40 percent of the papers, and between noon and closing, he sold 60 percent of the papers which remained. What percent of the original P papers did he sell?
(A) 0% (B) 20% (C) 24% (D) 76% (E) None of these.
3. A certain liquid fertilizer contains 10 percent mineral X by volume. If a farmer wishes to treat a crop with $\frac{3}{4}$ of a litre of mineral X per acre, how many acres can be treated with 300 litres of the liquid fertilizer?
(A) 40 (B) 24 (C) 18 (D) 16 (E) None of these.
4. Chandra spent $\frac{2}{5}$ of her income of January for rent, and $\frac{3}{4}$ of the remainder on other expenses. If she put the remaining Rs. 180 in her savings account, how much was her income in January?
(A) Rs. 1,000 (B) Rs. 1,200 (C) Rs. 1,400 (D) Rs. 1,600 (E) None of these.
5. If the numerator of a fraction is decreased 25 percent and the denominator of that fraction is increased 25 percent, then the difference between the resulting and the original fractions represent what percentage decrease?
(A) 40% (B) 45% (C) 50% (D) 60% (E) None of these.

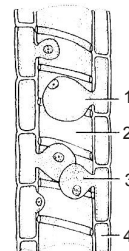
SCIENCE

6. Suppose you are pushing on a loaded shopping cart. Which of the following is true ?
(A) If action force always equals reaction force, you cannot move the cart because the cart pushes you backward just as hard as you push forward on the cart
(B) You push the cart slightly harder than the cart pushes you backward, so the cart moves forward
(C) You push before the cart has time to react, so the cart moves forward
(D) You are in contact with the earth through your high-friction shoes, while the cart is free to roll on its round wheels, so the cart moves
(E) None of these.
7. The speed c of surface waves of wavelength λ travelling in deep water is given by the equation $c = \sqrt{\frac{\lambda g}{2\pi}}$ where g is the acceleration due to gravity. Which one of the following option would give a straight line graph, given that f is the frequency of the waves ?
(A) f against λ^{-1} (B) f against λ (C) f against λ^2 (D) f^2 against λ^{-1} (E) None of these.
8. For a particle executing simple harmonic motion, the equilibrium position is at $x = 0$ and the amplitude at $x = A$. The kinetic energy of the particle will be equal to the potential energy
(A) At $x = 0$ (B) At $x = A$ (C) At $x = A/2$
(D) When x is greater than $A/2$ but less than A (E) None of these.
9. Elements having the same number of valence electrons in their atoms have
(A) Similar atomic sizes (B) Similar combining capacities
(C) Similar metallic character (D) Similar chemical properties (E) None of these.
10. What happens to the inertia of an object when its velocity is doubled ?
(A) The object's inertia becomes $\sqrt{2}$ times greater
(B) The object's inertia becomes 2 times greater
(C) The object's inertia becomes 4 times greater
(D) The object's inertia is unchanged (E) None of these.
11. If a piece of rock is brought from the moon to the Earth, its
(A) Volume, density and weight will remain the same as it was on the moon
(B) Volume and weight will remain the same as it was on the moon
(C) Density and weight will remain the same as it was on the moon
(D) Volume and density will remain the same as it was on the moon
(E) None of these.

12. Newton's First Law is based in part on the work of :
 (A) Dalton (B) Davy (C) Galileo (D) Joule (E) None of these.
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13. As compared to covalent compounds, electrovalent compounds generally have
 (A) Low melting points and low boiling points
 (B) Low melting points and high boiling points
 (C) High melting points and low boiling points
 (D) High melting points and high boiling points (E) None of these.
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14. Which of the following statements is incorrect?
 (A) The charge on an electron and on a proton are equal and opposite
 (B) Neutron has no charge (C) Electrons and protons have the same weight.
 (D) The mass of a proton and a neutron are nearly identical (E) None of these.
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15. Molten sodium chloride conducts electricity due to the presence of
 (A) Free molecules of NaCl (B) Free electrons (C) Free Na⁺ and Cl⁻ ions
 (D) Free atoms of sodium and chlorine (E) None of these.
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16. Which of the following is used to control only air pollution?
 (A) Wet scrubber (B) Cyclone collectors
 (C) Electrostatic precipitators (D) All of these (E) None of these.
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17. The given figure shows the anatomical structure of certain plant tissues. If you are to label the parts marked 1, 2, 3 & 4 you would choose

- (A) 1 - Tracheid, 2 - Pit, 3 - Tyloses, 4 - Parenchyma
 (B) 1 - Parenchyma, 2 - Tracheid, 3 - Tyloses, 4 - Pit
 (C) 1 - Pit, 2 - Tracheid, 3 - Tyloses, 4 - Parenchyma
 (D) 1 - Tyloses, 2 - Parenchyma, 3 - Pit, 4 - Tracheid
 (E) None of these.

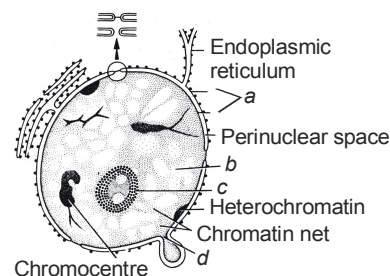


18. Species X are chlorophyllous plants which are autotrophic in their mode of nutrition & may be green, yellow, orange & red colour etc. Species X belongs to Y which are non-vascular plants and whose plant body is not differentiated into true roots, stems & leaves and have unicellular and nonjacketed sex organs. In the above passage species Y is
 (A) Bryophyta (B) Thallophyta (C) Pteridophyta (D) Gymnosperms (E) None of these
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19. Which of the following statements is wrong?
 (A) An atom and its ion have unequal number of protons.
 (B) The size of an anion is bigger than that of the corresponding atom.
 (C) An atom is electrically neutral.
 (D) The size of a cation is smaller than that of the corresponding atom (E) none of these.
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20. Refer the figure and identify from the marked alphabets (a, b, c, d) which is responsible for the following functions.

- (I) Means of localization of the chromosomes within the cell
 (II) Selective barrier, allowing certain substances in or out of the nucleus
 (III) Means of sequestering many of the mRNA processing activities from the cytosol and separating nuclear and cytoplasmic constituents

- (A) a (B) b (C) c
 (D) a and d (E) None of these.



ANSWER KEY

1. (A) 2. (D) 3. (A) 4. (B) 5. (A) 6. (D) 7. (D) 8. (C) 9. (D) 10. (D)
 11. (D) 12. (C) 13. (D) 14. (C) 15. (C) 16. (D) 17. (C) 18. (B) 19. (A) 20. (A)