CLASS

9

SAMPLE PAPER

SCIENCE OLYMPIAD FOUNDATION

National Science Olympiad

The actual test paper has 50 questions. Time allowed : 60 minutes. There are 2 sections: 15 questions in section I and 35 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, Logical (Verbal and Non-verbal) and Analytical Reasoning.

Section – II (Science) : Motion, Force and Laws of Motion, Gravitation, Work and Energy, Sound, Matter in Our Surroundings, Is Matter Around Us Pure, Atoms and Molecules, Structure of the Atom, The Fundamental Unit of Life, Tissues, Diversity in Living Organisms, Why Do We Fall Ill, Natural Resources, Improvement in Food Resources.

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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.

2. The heights (in cm) of 9 students of a class are as follows:
155, 160, 145, 149, 150, 147, 152, 144, 148
Find the median of this data.
(A) 145 cm (B) 150 cm (C) 160 cm (D) 149 cm

3. A certain liquid fertilizer contains 10 percent mineral X by volume. If a farmer wishes to treat a crop with 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.

4. Chandra spent 2/5 of her income of January for rent, and 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.

5. The hollow sphere in which the circus motorcyclist performs his stunts has a diameter of 7 m. Find the area available to the motorcyclist for riding.
(A) 154 m^2 (B) 160 m^2 (C) 272 m^2 (D) 616 m^2.

SCIENCE

6. Suppose you are pushing 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.

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 options 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}.

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.

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.

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.

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.

12. Newton's first law is based in part on the work of
(A) Dalton (B) Davy (C) Galileo (D) Joule.

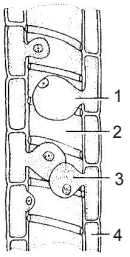
13. Filtration as a method of separation can be used for mixtures that are
(A) homogeneous and liquid-in-gas mixtures
(B) heterogeneous and liquid-in-liquid mixtures
(C) homogeneous and solid-in-liquid mixtures
(D) heterogeneous and solid-in-liquid mixtures.

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.

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.

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

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

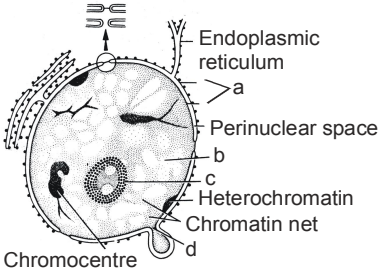


(A) 1 - Tracheid, 2 - Pit, 3 - Tyloses, 4 - Parenchyma
(B) 1 - Parenchyma, 2 - Tracheid, 3 - Tyloses, 4 - Pit
(C) 1 - Pit, 2 - Tracheid, 3 - Tyloses, 4 - Parenchyma
(D) 1 - Tyloses, 2 - Parenchyma, 3 - Pit, 4 - Tracheid.

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.

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.

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.

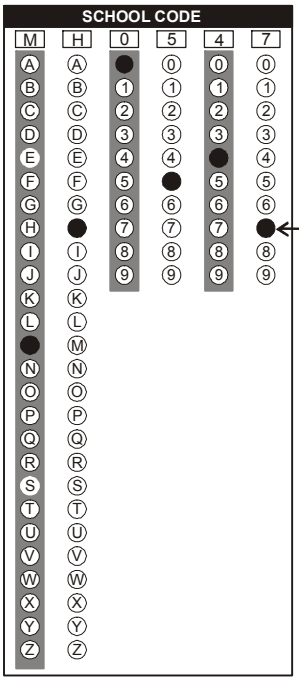
SAMPLE ANSWER SHEET

1. NAME : If your name is SACHIT A IYER, then you should write as follows :

S	A	C	H	I	T		A		I	Y	E	R													

2. Father's Name : If your father's name is SATISH KUMAR SHARMA, then you should write as follows :

S	A	T	I	S	H		K	U	M	A	R		S	H	A	R	M	A							

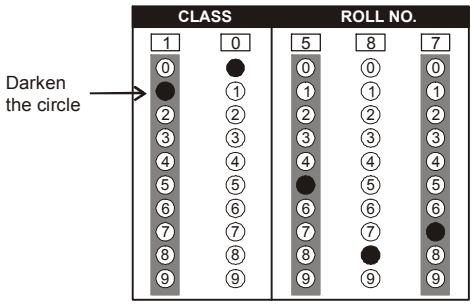


3. SCHOOL CODE
Write your school code i.e. if your school code is MH0547 darken as follows :

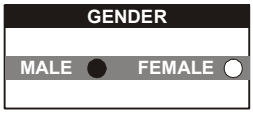
Darken the circle

4. CLASS
If you are in Class 10, then you should darken as follows :

5. ROLL NO.
If your roll no. is 587, then you should write and darken the circles as follows :



6. GENDER
If you are a boy, then darken **Male** circle



7. If your choice for Answer 1 is C, then you should darken the circle as follows : **1.** Ⓐ Ⓑ ● Ⓓ

MARK YOUR ANSWERS WITH HB PENCIL/BALL POINT PEN (BLUE/BLACK)

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

ANSWERS

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