

CLASS

10

SAMPLE PAPER



# 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) :** Real Numbers, Polynomials, Pair of Linear Equations in Two Variables, Quadratic Equations, Arithmetic Progressions, Triangles, Coordinate Geometry, Introduction to Trigonometry, Some Applications of Trigonometry, Circles, Constructions, Areas Related to Circles, Surface Areas and Volumes, Statistics, Probability, Direction sense test, Mathematical operations, Number ranking & Time sequence Test, Coding-Decoding, Distance, Speed, Time and general reasoning based on prescribed syllabus.

**Section – II (Science) :** Chemical Reactions and Equations; Acids, Bases and Salts; Metals and Non-metals; Carbon and its Compounds; Periodic Classification of Elements; Life Processes; Control and Coordination; Reproduction in Organisms; Heredity and Evolution; Light-Reflection and Refraction, Human Eye and Colourful World; Electricity; Magnetic Effects of Electric Current; Sources of Energy; Our Environment and its Management.



# National Science Olympiad

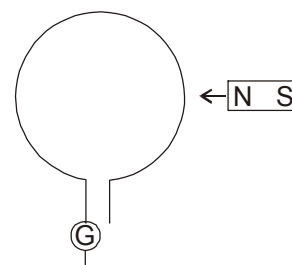
## MENTAL ABILITY

- In an office with 21 staff members,  $\frac{1}{3}$  are men and  $\frac{2}{3}$  are women. To obtain a staff in which  $\frac{1}{4}$  are men, how many women should be hired?  
(A) 7 (B) 5 (C) 3 (D) 2
- A jogger desires to run a certain course in  $\frac{1}{4}$  less time than she usually takes; by what percent must she increase her average running speed to accomplish this goal?  
(A) 20% (B) 25% (C)  $33\frac{1}{3}\%$  (D) 50%.
- A salesman makes a commission of  $x$  percent on the first Rs. 2,000 worth of sale in any given month and  $y$  percent on all further sales during that month. If he makes Rs. 700 from Rs. 4,000 of sales in October and he makes Rs. 900 from Rs. 5,000 of sales in November, what is the value of  $x$ ?  
(A) 2% (B) 5% (C) 10% (D) 15%.
- A magician wants to ship a magic wand to the location of his next show. The rectangular box he has available for this purpose measures 6 inches wide by 8 inches long by 10 inches high. What is the longest cylindrical wand of negligible diameter that can be shipped in this box?  
(A) 10 inches (B)  $8\sqrt{2}$  inches (C)  $8\sqrt{3}$  inches (D)  $10\sqrt{2}$  inches
- The price of sugar increased 20 percent in 2000 and 10 percent in 2001. By approximately what percent would the price at the end of 2001 have to be decreased to restore the price of the sugar to its pre-2000 price?  
(A) 40% (B) 32% (C) 30% (D) 24%.

## SCIENCE

- Cornea is a transparent spherical structure which  
(A) Reflects light (B) Scatters light  
(C) Refracts light (D) None of these.
- A virtual image is formed by a concave mirror when object is placed  
(A) Between focus and centre of curvature  
(B) Beyond C (C) At infinity (D) Behind the mirror
- No heat loss occurs during flow of charge in super conductors because  
(A) Speed of charge is slow in it (B) It is bad conductor of heat  
(C) It offers zero resistance (D) It generates very small voltage
- How do we know that fission isn't responsible for the sun's energy?  
(A) Fission doesn't produce enough energy per gram of fuel  
(B) If fission were going on in the sun, the sun would explode  
(C) If fission were going on in the sun, the sun's mass would increase  
(D) There isn't very much fissionable material in the sun.
- Which of the following groups of instruments is required to have communication line between two television relay centres?  
(A) Microwave link, booster relay, satellite  
(B) Radio telescope, microwave link, booster relay, telephone  
(C) Microwave link, telephone, booster relay, satellite  
(D) All of these

11. In a circular coil of wire if the current is flowing in the anticlockwise direction, the face will be north pole. When there is no current in the coil, if the north pole is brought near the coil, during that time, the current induced in the coil will be
- (A) Clockwise  
 (B) Anticlockwise  
 (C) The current will be in the same direction whether the north pole is brought near or taken away  
 (D) (A) and (C) are correct



12. During calcination of the ore
- (A) The lower oxides are converted into higher oxides  
 (B) The metal gets oxidised to its highest oxide  
 (C) Volatile impurities are expelled  
 (D) Sulphur present in the ore is converted into  $\text{SO}_2$
13. Which of the following statements is NOT true regarding iron?
- (A) It is hard and brittle. (B) It can be tempered.  
 (C) It cannot be welded. (D) It contains 4 - 5% of carbon
14. When the stopper of a bottle containing colourless liquid was removed, the bottle gave a smell like that of vinegar. The liquid in the bottle could be:
- (A) Hydrochloric acid solution (B) Sodium hydroxide solution  
 (C) Acetic acid solution (D) Saturated sodium bicarbonate solution.
15. When acetylene is passed through a red hot tube, the compound produced is
- (A) Ethylene (B) Ethane (C) Rubber (D) Benzene.
16. Which of the following gases forms a stable complex compound (leading to death) with haemoglobin of the human blood ?
- (A) Oxygen (B) Carbon dioxide  
 (C) Carbon monoxide (D) Nitrogen
17. When copper is heated with concentrated  $\text{H}_2\text{SO}_4$  the products obtained are
- (A)  $\text{CuSO}_4 + \text{H}_2$  (B)  $\text{CuSO}_4 + \text{SO}_2 + \text{H}_2$   
 (C)  $\text{CuSO}_4 + \text{SO}_2 + \text{H}_2\text{O}$  (D)  $\text{CuO} + \text{SO}_3 + \text{H}_2$
18. Lathyrism due to consumption of khesari dal is characterised by
- (A) Skeletal deformation and thinning of collagen fibres  
 (B) Skeletal deformities, diabetes mellitus and reproductive failure  
 (C) Retarded growth, precocious puberty and renal dysfunction  
 (D) Cardiovascular abnormalities, mental retardation and delayed puberty.
19. Which one yields more energy?
- (A) Direct burning of cowdung  
 (B) Burning of biogas derived from cowdung  
 (C) Burning of manure derived from cowdung  
 (D) Burning of semidecayed cowdung
20. Mark the incorrect match.
- | Nutrient                 | Deficiency | Symptom   |
|--------------------------|------------|---|
| (A) Iron                 | Anaemia    | Deficiency of haemoglobin in R.B.C.               |
| (B) Vitamin $\text{B}_1$ | Beri beri  | Water logging of the tissue, paralysis            |
| (C) Vitamin $\text{B}_4$ | Pellagra   | Pigeon chest, loss of teeth                       |
| (D) Vitamin C            | Scurvy     | Loosening of teeth, swelling and bleeding of gums |

