



National Cyber Olympiad

The actual test paper has 50 questions. Time allowed : 60 minutes. There are 3 sections: 15 questions in section I, 15 in section II and 20 in section III.

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.

Section – II (Logical and Analytical Reasoning) : Verbal and Non-verbal Reasoning.

Section – III (Computers and IT) : Basics of IT, Operating System, Word Processing Tool, Networking, Multimedia, MS-Power Point, HTML, Internet, MS-Excel, Hardware, Software, Input & Output Devices, Memory & Storage Devices.



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, 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.



International Mathematics Olympiad

The actual test paper has 50 questions. Time allowed : 60 minutes. There are 3 sections: 20 questions in section I, 20 in section II and 10 in section III.

SYLLABUS

Section – I (Logical Reasoning) : Direction Sense Test, Mathematical Operations, Number Ranking & Time Sequence Test, Coding-Decoding, Distance, Speed, Time and General Reasoning Based on Prescribed Syllabus.

Section – II (Mathematical Reasoning) : 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.

Section III (Everyday Mathematics) : The Syllabus of this section will be based on the syllabus of Mathematical Reasoning.



International English Olympiad

The actual test paper consists of 50 questions. Time allowed : 60 minutes. There are 3 sections.

SYLLABUS

Section-I: Word and Structure Knowledge : Concord, Question forms, Tenses, Conditionals, Modals, Collocations, Phrasal verbs, Idioms, Homonyms and homophones, Words related to weather, Countries, Language and people, Global problems, etc.

Section-II: Reading : Search for and retrieve information from various text types like Encyclopedias, Dictionaries, etc., Understand information presented in instruction manual format, Message format and others , Acquire broad understanding of and look for specific information in longer texts like editorials, Essays, etc., Make inferences from advanced texts

Section-III: Spoken and Written Expression : Ability to understand situation-based variations in functions like Giving/accepting compliments, Agreeing, Disagreeing, Requesting, Seeking information, etc.



National Cyber Olympiad

MENTAL ABILITY

- A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball then the number of blue balls in the bag is
(A) 10 (B) 5 (C) 8 (D) 7
- Which of the following equations have the same graph?
I. $y = x + 3$ II. $y = \frac{x^2 - 9}{x - 3}$ III. $(x - 3)y = x^2 - 9$
(A) I and II only (B) I and III only
(C) II and III only (D) All of these.
- The value of the real number x satisfying $\log_9 x - \log_9 \left(\frac{x}{10} + \frac{1}{9} \right) = 1$ is
(A) 3 (B) 4 (C) 9 (D) 10
- The sum of first 24 terms of the sequence whose n th term is $a_n = 3 + \frac{2}{3}n$, is
(A) 275 (B) 272 (C) 280 (D) 270.

LOGICAL & ANALYTICAL REASONING

- In a group of five people, K, L and M are ambitious, M, N and R are honest, L, M and N are intelligent and K, M and R are industrious. Among these, neither industrious nor ambitious person(s) would include
(A) K alone (B) L and R (C) M and N (D) N alone
- On another planet, the local terminology for earth, water, light, air and sky are 'sky', 'light', 'air', 'water' and 'earth' respectively. If someone is thirsty there, what would he drink?
(A) Sky (B) Water (C) Air (D) Light.
- Step 1** : Multiply by 2
Step 2 : Subtract 1
Step 3 : If less than 10, jump to step 1 and continue from there; otherwise proceed to step 4
Step 4 : Add 7
Step 5 : Divide by 2
Step 6 : Add 2
Step 7 : Multiply by 2
If you start with a value of 6 then calculate **how many times** you had to jump to step 1.
(A) 4 (B) 5 (C) 3 (D) 0
- A, B, C, D, E, F and G are members of a family consisting of four adults and three children, two of whom, F and G are girls. A and D are brothers and A is a doctor. E is an engineer married to one of the brothers and has two children. B is married to D and G is their child. Who is C?
(A) G's brother (B) F's father (C) E's daughter (D) A's son

COMPUTERS & INFORMATION TECHNOLOGY

- <SCRIPT>...</SCRIPT> tag can be placed within _____.
(A) Header (B) Body (C) Both (A) and (B) (D) None of these
- The processing speed of a computer is measured in
(A) Mega byte (B) 16 bit (C) Mega hertz (D) Milli seconds
- While working in MS-Excel cell address \$A4 in a formula means it is a _____.
(A) Mixed cell reference (B) Absolute cell reference
(C) Relative cell reference (D) Initial cell reference

12. What is the function of an operating system?
 (A) Manages computer's resources very efficiently.
 (B) Takes care of scheduling jobs or execution.
 (C) Manages the flow of data and instructions.
 (D) All of these.
-
13. In MS-Word, setting up page margins is done through
 (A) Text formatting (B) Page formatting
 (C) Text editing (D) Word-wrap
-
14. Name the smallest addressable set of bits of the computer memory.
 (A) Byte (B) Word (C) Pixel (D) Digit
-
15. Which of the following is not a hardware component?
 (A) Mouse (B) LAN
 (C) Chip (D) Semiconductor memory.
-



National Science Olympiad

MENTAL ABILITY

1. 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
-
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%.
-
3. A salesman makes a commission of x percent on the first ₹ 2,000 worth of sale in any given month and y percent on all further sales during that month. If he makes ₹ 700 from ₹ 4,000 of sales in October and he makes ₹ 900 from ₹ 5,000 of sales in November, what is the value of x ?
 (A) 2% (B) 5% (C) 10% (D) 15%.
-
4. 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
-
5. 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

6. Cornea is a transparent spherical structure which
 (A) Reflects light (B) Scatters light (C) Refracts light (D) None of these.
-
7. 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) Between focus and pole
-

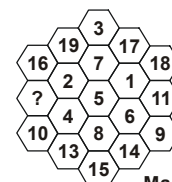
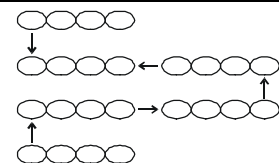
8. No heat loss occurs during flow of charge in super conductors because
 (A) Speed of charge is slow in it (B) It is bad conductor of heat
 (C) It offers zero resistance (D) It generates very small voltage
-
9. How do we know that fission isn't responsible for the sun's energy ?
 (A) Fission doesn't 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.
-
10. 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 SO₂
-
11. Which of the following statements is NOT true regarding cast iron?
 (A) It is hard and brittle. (B) It can be tempered.
 (C) It cannot be welded. (D) It contains 4 - 5% of carbon
-
12. 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.
-
13. 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.
-
14. 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
-
15. Mark the incorrect match.
- | Nutrient | Deficiency | Symptom |
|----------------------------|------------|---|
| (A) Iron | Anaemia | Deficiency of haemoglobin in R.B.C. |
| (B) Vitamin B ₁ | Beri beri | Water logging of the tissue, paralysis |
| (C) Vitamin B ₄ | Pellagra | Pigeon chest, loss of teeth |
| (D) Vitamin C | Scurvy | Loosening of teeth, swelling and bleeding of gums |



International Mathematics Olympiad

LOGICAL REASONING

1. There are 6 short pieces of link chain, each having 4 links. It takes 10 seconds to cut a link and 25 seconds to weld it back together. What is the shortest possible time to make the longest chain?
 (A) 175 seconds (B) 210 seconds
 (C) 150 seconds (D) 60 seconds
-
2. What should come at the place of '?' so that every column or diagonal has the same sum?
 (A) 19 (B) 12
 (C) 13 (D) 15



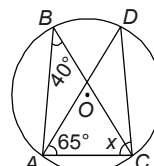
Magic Hexagon

3. A child was looking for his father. He went 90 metres in the East before turning to his right. He went 20 metres before turning to his right again to look for his father at his uncle's place 30 metres from this point. His father was not there. From here he went 100 metres to the North before meeting his father in a street. How far did the son meet his father from the starting point?
 (A) 80 metres (B) 100 metres (C) 140 metres (D) 260 metres
4. If + stands for 'division', × stands for 'addition', − stands for 'multiplication' and ÷ stands for 'subtraction', then which of the following equations is correct?
 (A) $36 \times 6 + 7 \div 2 - 6 = 20$ (B) $36 \div 6 + 3 \times 5 - 3 = 45$
 (C) $36 + 6 - 3 \times 5 \div 3 = 24$ (D) $36 - 6 + 3 \times 5 \div 3 = 74$

MATHEMATICAL REASONING

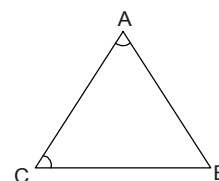
5. If O is the centre of the circle, find the value of x in the following figure.

- (A) 75° (B) 40°
 (C) 65° (D) 90°



6. What is the complete solution to the equation $|3 - 6x| = 15$?
 (A) $x = 2; x = 3$ (B) $x = -2; x = 3$ (C) $x = 2; x = -3$ (D) $x = -2; x = -3$

7. In the figure given here, $AB > BC$.
 If we assume that $m\angle A = m\angle C$, it follows that $AB = BC$. This contradicts the given statement that $AB > BC$. What conclusion can be drawn from this contradiction?



- (A) $m\angle A = m\angle B$ (B) $m\angle A \neq m\angle B$
 (C) $m\angle A = m\angle C$ (D) $m\angle A \neq m\angle C$

8. Which polynomial represents $(3x^2 + x - 4)(2x - 5)$?
 (A) $6x^3 - 13x^2 - 13x - 20$ (B) $6x^3 - 13x^2 - 13x + 20$
 (C) $6x^3 + 13x^2 + 3x - 20$ (D) $6x^3 + 13x^2 + 3x + 20$

9. $2x + 7 \overline{) 2x^4 + 21x^3 + 35x^2 - 37x + 46} =$

- (A) $x^3 + 7x^2 - 7x + 6 - \frac{4}{2x+7}$ (B) $2x^3 + 14x^2 - 14x + 12 - \frac{4}{2x+7}$
 (C) $x^3 - 7x^2 + 7x - 6 + \frac{4}{2x+7}$ (D) $x^3 + 7x^2 - 7x + 6 + \frac{4}{2x+7}$

10. There are two numbers with the following properties.

- 1) The second number is 3 more than the first number.
 2) The product of the two numbers is 9 more than their sum.

Which of the following represents possible values of these two numbers?

- (A) $-6, -3$ (B) $-4, -1$ (C) $-1, 4$ (D) $-3, 6$

11. If $i = \sqrt{-1}$, what is the value of i^4 ?

- (A) i (B) $-i$ (C) 1 (D) -1

12. A copper sphere of diameter 18 cm is drawn into a wire of diameter 4 mm. Find the length of the wire.

- (A) 240 m (B) 242 m (C) 243 m (D) 245 m

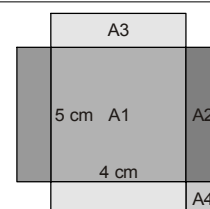
EVERYDAY MATHEMATICS

13. Three ducks and two ducklings weigh 32 kg. Four ducks and three ducklings weigh 44 kg. All ducks weigh the same and all ducklings weigh the same. What is the weight of two ducks and one duckling?

- (A) 20 kg (B) 40 kg (C) 60 kg (D) 64 kg

14. A rectangular sheet of wood has four small squares removed from the corners. It is then cut to make a box that is 5 cm by 4 cm with a volume of 60 cm^3 . (Four pieces of size A4 are removed.) Find the original area of the sheet of wood.

- (A) 200 cm sq. (B) 110 cm sq.
 (C) 96 cm sq. (D) 100 cm sq.

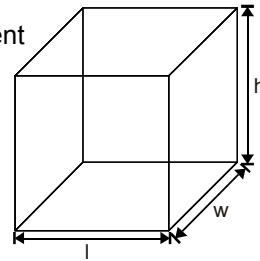


15. A cereal company decided to increase the height of its boxes by 30 percent and reduce the width in order to maintain the same volume.

Initially, length = 20 cm, height = 40 cm, width = 30 cm

What will the new width be if the length stays the same?

- (A) 52 cm (B) 20 cm
(C) 23.08 cm (D) 23 cm



International English Olympiad

WORD AND STRUCTURE KNOWLEDGE

Direction (Q. No. 1 and 2) : Choose the most suitable word/phrase for each blank.

- We have to let the law _____ and wait for the court verdict in this matter.
(A) Take it course (B) Make its course (C) Take a course (D) Take its course
- This colour has gone _____ fashion.
(A) Out from (B) From (C) Out of (D) Off
- Choose the correct spelling.
(A) Pseudonym (B) Pseudnym (C) Pseudoname (D) Seudonum
- Select the correct phrase.
(A) Take it and leave it (B) Take it or give it
(C) Take it or leave it (D) Leave it or take it

Direction (Q. No. 5 and 6) : Fill in the blanks in the following sentences by choosing one of the four options given below the sentence.

- Mr. Prasanna is _____ and he works for a well-known computer firm.
(A) Dark tall man with an MBA from a Gujarat
(B) A tall dark man from Gujarat with an MBA
(C) An tall dark man from Gujarat with a MBA
(D) With an MBA from Gujarat a tall dark man
- The Director was so _____ his team that he was at a loss for words.
(A) Angry with (B) Angry by (C) Angry about (D) Angry on
- Read the sentences given below; decide if there is an error in one of the underlined parts, marked as A, B and C. If yes, mark that letter. If no error, mark D.**
He said that he would not be able /to come with all of us /because of his uncle's visit /No error.
(A) (B) (C) (D)

Direction (Q. No. 8 to 10) : Read the passage given below and then answer the questions that follow.

Once upon a time, everybody "did" science, for their own amusement and excitement. All of us, as children, are scientists too—testing substances on our tongues, discovering gravity, peering under rocks, seeing patterns in the stars, wondering what makes the night scary and the sky blue.

Partly because the educational system has taught science only in a reductionist, left-brain style and partly because of society's demands for practical applications of technology, the romance of science fades quickly for most youngsters. Those who love nature but dislike dissecting small animals soon learn to avoid high-school biology. Students who enroll in psychology courses, hoping to learn something about how people think and feel, find themselves learning more about rats and statistics than they ever wanted to know.

- According to the author, all children are scientists because
(A) They are amused and excited by science.
(B) They are curious about some things.
(C) They are taught science in school. (D) Enjoy peeping into things, tasting and wondering.

9. Children do not enjoy science in school because
 (A) They are made to study technology. (B) They are forced to dissect animals.
 (C) It is taught in a boring manner. (D) It is not taught in a romantic style.
-
10. According to the author a psychology course should focus on
 (A) The study of rats. (B) Problems in statistics.
 (C) An analysis of nature. (D) Understanding human beings.

SPOKEN AND WRITTEN EXPRESSION

Direction (Q. No. 11 and 12) : Find one sentence to complete the paragraph.

11. Namrata: Hey, come on, let's go and have some ice-cream before the test.
 Sujana: Sorry, I can't. I have a bad cold.
 Namrata: _____
 (A) Have a biscuit. (B) Come on, ice cream is good for a cold.
 (C) What's wrong with you? (D) Come on, you can study later.
-
12. Kartik: We're going trekking to the Narmada valley. Please come.
 Nisha: I wish I could come. _____
 (A) The trip sounds fantastic and I am sure will be great fun.
 (B) The Narmada is a river that must be seen.
 (C) But my grandparents will be visiting us and I have to be home.
 (D) It will be lovely to be with all of you for so many days.

Direction (Q. No. 13 to 15) : You need to select the two sentences that will complete the paragraph. Look at the choices given below and select the best option.

13. Sentence 1 : What is meat for the body at one age is poison at another.
 Sentence 2 : _____
 Sentence 3 : _____
 Sentence 4 : After 50, the toxicity of these metals comes into play and can damage cells, leading to diseases.
 P. For example, iron and copper are nutritionally essential minerals.
 Q. Iron deficiency can lead to anaemia and copper maintains hair colour and is a part of several hormones.
 R. But larger amounts of their intake are good only for younger people.
 (A) QR (B) PR (C) PQ (D) QP
-
14. Sentence 1 : If there is a neem or jamun tree in your backyard, check it regularly and just note down when they flower and fruit.
 Sentence 2 : _____
 Sentence 3 : _____
 Sentence 4 : The data base is important as India has several climatic zones and biodiversity.
 P. The National Centre for Biological Sciences plans to rope in people for creating an online database on the life cycle of plant species across the country.
 Q. You may soon realize that you are not just whiling time, but collecting data for scientific research.
 R. There is no information, however, that shows when a species flowers and fruits in a particular location.
 (A) PR (B) QP (C) PQ (D) QR
-
15. Sentence 1 : Satnam Singh detests wheat chapattis.
 Sentence 2 : _____
 Sentence 3 : _____
 Sentence 4 : He actually suffers from a disease known as celiac or wheat allergy.
 P. The four year old hails from a small village in Punjab, from Ambala.
 Q. If force fed, he shouts and cries loudly.
 R. The boy is not throwing a temper tantrum, or suffering from anorexia.
 (A) PR (B) QP (C) PQ (D) QR

