

## SAMPLE PAPER



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)** : 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 (Logical and Analytical Reasoning)** : Problems Based on Figures, Find Odd Numeral Out, Series Completion, Coding-Decoding, Mathematical Reasoning, Analytical Reasoning, Mirror Images, Embedded Figures, Direction Sense Test, Cubes and Dice.

**Section – III (Computers and IT)** : Algorithms and Flowcharts in Programming, Visual Basic, Animations, HTML, Internet and Viruses, MS-Word, MS-Excel, MS-Power Point, Hardware, Software, Input & Output Devices, Memory & Storage Devices, Flash, Networking.



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 Atom, Cell - The Fundamental Unit of Life, Tissues, Diversity in Living Organisms, Why Do We Fall Ill, Natural Resources, Improvement in Food Resources.

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)** : Mathematical Operations, Series Completion, Arithmetical Reasoning, Problems on Cubes and Dice, Number Ranking & Time Sequence Test, Inserting Missing Character and General Reasoning Based on Prescribed Syllabus.

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

International  
English Olympiad

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

## SYLLABUS

**Section-I: Word and Structure Knowledge** : Concord, Question forms, Tenses, Conditionals, Modals, Reported speech. Collocations, Phrasal verbs, Idioms, Homonyms and homophones, Words related to social cause, Travel, Workplace, etc.

**Section-II: Reading** : Search for and retrieve information from various text types like flyers, Classifieds, 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.

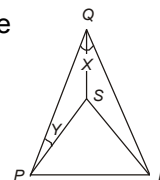
**Section-III: Spoken and Written Expression** : Ability to understand situation-based variations in functions like Giving advice, Stating preferences, Discussing probability, Making an offer, etc.



# National Cyber Olympiad

## MENTAL ABILITY

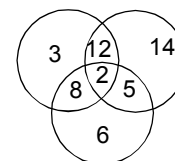
- Two clocks are set at the same time, one is seen to gain 40 seconds and other to lose 50 seconds in 24 hours. In how much time will they show a difference of 15 minutes?  
(A) 90 days (B) 10 days (C) 90 hours (D) 10 hours.
- Students of the psychology class in a college were getting ready to challenge and out-wit their new lecturer on her first day of teaching but became dumb-founded when she asked them to find the product of  $(x - a)(x - b)(x - c)(x - d) \dots (x - y)(x - z)$ . What do you think is the answer?  
(A) 0 (B) 1 (C) 2 (D)  $x^n - (a)(b)(c) \dots (z)$ .
- In the given figure if  $PQR$  is an isosceles triangle and  $PSR$  is an equilateral triangle and  $X = 26^\circ$  then the value of  $Y$  (in degrees) will be  
(A)  $17^\circ$  (B)  $27^\circ$   
(C)  $37^\circ$  (D)  $47^\circ$
- Each side of a rhombus is 5 cm and one of the diagonals is 8 cm. Calculate the length of another diagonal and the area of the rhombus.  
(A) 8 cm,  $32 \text{ cm}^2$  (B) 6 cm,  $24 \text{ cm}^2$  (C) 4 cm,  $16 \text{ cm}^2$  (D) 7 cm,  $28 \text{ cm}^2$ .



## LOGICAL & ANALYTICAL REASONING





- Step 1 :** Add 4  
**Step 2 :** Subtract 1  
**Step 3 :** If less than 15, jump to step 1 and continue from there; otherwise proceed to step 4  
**Step 4 :** Add 3  
**Step 5 :** If greater than 18, subtract 2

If you start with a value of 1 and then apply the above instructions, what is the end result?  
(A) 11 (B) 17 (C) 18 (D) 19.
- On planet X, the local terminology for earth, water, light, air and sky are light, air, earth, sky and water respectively. If someone is thirsty there, what would he drink?  
(A) Sky (B) Water (C) Air (D) Light.
- Consider the given Venn diagram.  
The numbers in the Venn diagram indicate the number of persons reading the newspapers. The diagram is drawn after surveying 50 persons.  
In a population of 10,000 how many can be expected to read at least two newspapers?  
(A) 5000 (B) 6250 (C) 6000 (D) 5400.
- Hari, Pinto, Oliver, Chris, and Tony drew different geometric figures: a circle, a pentagon, a trapezoid, a hexagon, and an octagon. No person's name begins with the same first letter as that person's drawing. Chris, Pinto, and Tony drew figures with more than 4 sides. Chris drawing has the most sides. Oliver's drawing has exactly one pair of parallel lines. What did Chris draw?  
(A) Circle (B) Octagon (C) Hexagon (D) Pentagon



## COMPUTERS & INFORMATION TECHNOLOGY

- In Visual Basic, Hour() function returns \_\_\_\_\_.  
(A) An Integer specifying a whole number  
(B) A whole number between 0 and 23  
(C) The hour of the day (D) All of these
- Which of the statements about HTML is incorrect ?  
(A) Attribute names are not case sensitive (B) LINK defines the color of the unvisited link  
(C) The line break element is a container element  
(D) The default colouring of VLINK attribute is purple

11. What does a disc fragmentor do?  
 (A) It is a utility program that facilitates compression of files so that they occupy less storage space  
 (B) It is a utility program that minimizes the time taken by the hard disk optical reader to read up 'split' files. It does so by rearranging the files and free space on your computer so that files are stored in contiguous memory.  
 (C) It is a utility program that facilitates the backing up of the disk  
 (D) It is a utility program used for creating and editing text file.
- 
12. What does OCR stand for?  
 (A) Optical Character Reader (B) Optical Character Recognition  
 (C) Operational Character Reader (D) Only Character Reader.
- 
13. Match the following
- |                        |                        |
|------------------------|------------------------|
| 1. Scanner             | A. Input Device        |
| 2. OCR                 | B. Output Device       |
| 3. Light pen           |                        |
| 4. Plotter             |                        |
| 5. Printer             |                        |
| (A) 1A, 2B, 3A, 4B, 5A | (B) 1A, 2A, 3A, 4B, 5B |
| (C) 1A, 2A, 3B, 4B, 5B | (D) 1A, 2B, 3A, 4B, 5B |
- 
14. The smallest unit of memory is  
 (A) 16 bytes (B) 8 bits (C) 1 kilobyte (D) 1 GB.
- 
15. Which of the following symbols will be used to end the flowchart?  
 (A)  (B)  (C)  (D) 
- 



## National Science Olympiad

### 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  $\frac{3}{4}$  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.
- 
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 ₹ 180 in her savings account, how much was her income in January?  
 (A) ₹ 1,000 (B) ₹ 1,200 (C) ₹ 1,400 (D) ₹ 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)  $154 \text{ m}^2$  (B)  $160 \text{ m}^2$  (C)  $272 \text{ m}^2$  (D)  $616 \text{ m}^2$ .

### SCIENCE

6. 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.

7. 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.

8. The speed  $c$  of surface waves of wavelength  $\lambda$  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  $\lambda^{-1}$       (B)  $f$  against  $\lambda$       (C)  $f$  against  $\lambda^2$       (D)  $f^2$  against  $\lambda^{-1}$ .

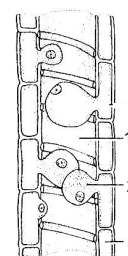
9. For a particle executing simple harmonic motion, the equilibrium position is at  $x = 0$  and the amplitude at  $x = A$ . The kinetic energy of the particle will be equal to the potential energy  
 (A) At  $x = 0$       (B) At  $x = A$       (C) At  $x = A/2$   
 (D) When  $x$  is greater than  $A/2$  but less than  $A$ .

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. 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.

12. Molten sodium chloride conducts electricity due to the presence of  
 (A) Free molecules of NaCl      (B) Free electrons  
 (C) Free  $\text{Na}^+$  and  $\text{Cl}^-$  ions      (D) Free atoms of sodium and chlorine.

13. 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

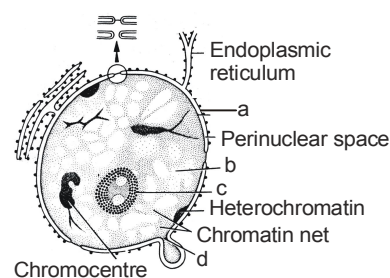


- (A) 1 - Tracheid, 2 - Tyloses, 3 - Parenchyma  
 (B) 1 - Parenchyma, 2 - Tracheid, 3 - Tyloses,  
 (C) 1 - Pit, 2 - Tracheid, 3 - Tyloses,  
 (D) None of these

14. 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.

15. 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



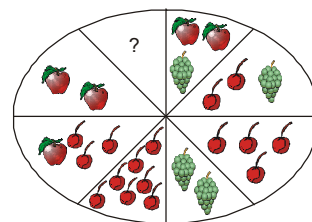
- (A) a      (B) b      (C) c      (D) a and d.



# International Mathematics Olympiad

## LOGICAL REASONING

1. Apples, cherries and grapes are arranged on a platter in the following fashion: opposite sectors contain fruit which is of equal value. To equal the value of two bunches of grapes, how much fruit must be placed in the empty sector?

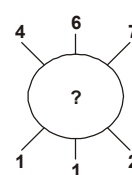
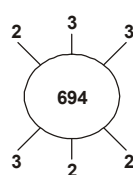
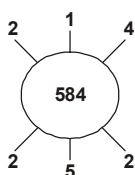


- (A) (B)   
 (C) (D)

2. If L denotes  $\div$ , M denotes  $\times$ , P denotes  $+$  and Q denotes  $-$ , then which of the following statements is true?

- (A)  $32 P 8 L 16 Q 4 = -\frac{3}{2}$  (B)  $6 M 18 Q 26 L 13 P 7 = \frac{173}{13}$   
 (C)  $11 M 34 L 17 Q 8 L 3 = \frac{38}{3}$  (D)  $9 P 9 L 9 Q 9 M 9 = -71$

3. Find the missing number :



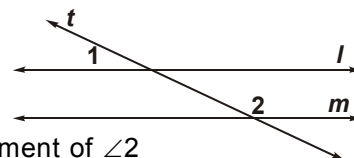
- (A) 937 (B) 824 (C) 769 (D) 678

4. Complete the pattern. 6, 11, 21, 36, 56, (.....)

- (A) 42 (B) 51 (C) 81 (D) 91

## MATHEMATICAL REASONING

5. In the accompanying diagram, parallel lines  $l$  and  $m$  are cut by transversal  $t$ .

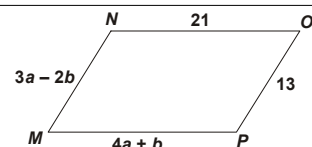


Which statement about angles 1 and 2 must be true?

- (A)  $\angle 1 \cong \angle 2$  (B)  $\angle 1$  is the complement of  $\angle 2$   
 (C)  $\angle 1$  is the supplement of  $\angle 2$  (D)  $\angle 1$  and  $\angle 2$  are right angles

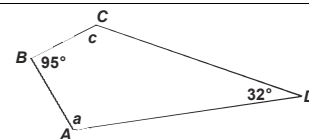
6. What values of  $a$  and  $b$  make quadrilateral  $MNOP$  a parallelogram?

- (A)  $a = 1, b = 5$  (B)  $a = 5, b = 1$   
 (C)  $a = \frac{11}{7}, b = \frac{34}{7}$  (D)  $a = \frac{34}{7}, b = \frac{11}{7}$



7. For the quadrilateral shown below, what is  $m\angle a + m\angle c$ ?

- (A)  $53^\circ$  (B)  $137^\circ$   
 (C)  $180^\circ$  (D)  $233^\circ$

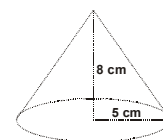


8. If a cylindrical barrel measures 22 cm in diameter, how many cm will it roll in 8 revolutions along a smooth surface?

- (A)  $121\pi$  cm (B)  $168\pi$  cm (C)  $176\pi$  cm (D)  $228\pi$  cm

9. A right circular cone has radius 5 cm and height 8 cm. What is the lateral surface area of the cone?

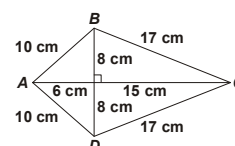
- (A)  $40\pi$  sq cm (B)  $445\pi$  sq cm  
 (C)  $5\pi\sqrt{39}$  sq cm (D)  $5\pi\sqrt{89}$  sq cm



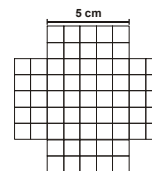
10. Figure  $ABCD$  is a kite.

What is the area of figure  $ABCD$ , in square centimetres?

- (A) 120 (B) 154  
 (C) 168 (D) 336

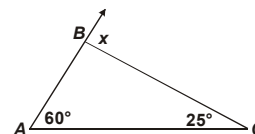


11. The four sides of this figure will be folded up and taped to make an open box.  
What will be the volume of the box?  
(A)  $50 \text{ cm}^3$  (B)  $75 \text{ cm}^3$   
(C)  $100 \text{ cm}^3$  (D)  $125 \text{ cm}^3$



12. What is value of  $x$ ?

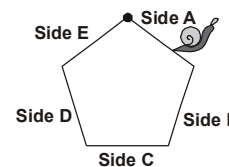
- (A)  $35^\circ$  (B)  $60^\circ$   
(C)  $85^\circ$  (D)  $95^\circ$



### EVERYDAY MATHEMATICS

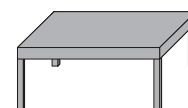
13. One snail started from the dot. What side will it be on when it has crawled  $\frac{13}{20}$  of the distance around the regular pentagon of equal sides?

- (A) A (B) C  
(C) D (D) E



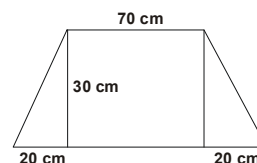
14. A rectangular kitchen table is three times as long as it is wide. If it was 3 m shorter and 3 m wider it would be a square. What are the dimensions of the rectangular table?

- (A)  $9 \times 3$  (B)  $4 \times 2$   
(C)  $12 \times 6$  (D)  $16 \times 4$



15. Two carpenters decided to design desks for students at the Junior High School. The dimensions of the desk are as shown. How much wood (in  $\text{cm}^2$ ) would they need for 30 desks?

- (A)  $2700 \text{ cm}^2$  (B)  $80000 \text{ cm}^2$   
(C)  $21000 \text{ cm}^2$  (D)  $81000 \text{ cm}^2$



## International English Olympiad

### WORD AND STRUCTURE KNOWLEDGE

Direction (Q. No. 1 and 2) : Choose one suitable word/phrase for each blank. Make sure that you choose the correct form of the word/phrase.

- I am happy you are helping me with the assignment. This kind of work is not really my \_\_\_\_\_.  
(A) Cup and sauce (B) Cup of tea (C) Cup of coffee (D) Tea cup
- The discussion was by no means \_\_\_\_\_. It went on for more than four hours!  
(A) Cut and dried (B) Chopped and dried  
(C) Cut and shredded (D) Dried and cut
- Choose the correct spelling of the word.  
(A) Believe (B) Beleive (C) Believ (D) Beleev
- Choose the correct phrase.  
(A) Down and up (B) Down and out (C) Down and town (D) Out and down

Direction (Q. No. 5 and 6) : Fill in the blanks using the correct word/phrase.

- A class full of very good students means \_\_\_\_\_ failures for the teachers to worry about.  
(A) Lesser (B) Less (C) Fewer (D) Less than
- He seems to know a lot about you! How long have you \_\_\_\_\_ him?  
(A) Known (B) Knew (C) Been knowing (D) Know

**7. Spot the error in the sentence.**

Becoming a monitor / often means / to lose friends. No error

- (A) (B) (C) (D)

**8. Complete the conversation with the correct word.**

Ravi: I think it's really exciting to go to new places.

Teacher: What \_\_\_\_\_ keep in mind if you are going to a new place.

- (A) Do you have to (B) Can you (C) Have you to (D) Must you have to

**9. Change the given direct sentence to indirect.**

"Drive carefully!" Ram said to me.

- (A) Ram said to me drive carefully. (B) Ram ordered me drive carefully.  
(C) Ram told me to drive carefully. (D) None of the above.

**READING**

**Direction (Q. No. 10 and 11) : Read the passage and answer the following questions.**

The fly was finally hers. It had taken Mini hours to trap it, but now, exhausted, it buzzed and crashed hopelessly around inside a pickle jar. Kneeling on a chair, she took a chapatti and spread it with a thick layer of butter, wiping the knife clean against the edge of the dish, the way her mother used to and savored her victory. She was again in control.

**10. The event of trapping the fly is compared with \_\_\_\_\_.**

- (A) The taste of chapatti and butter (B) A war followed by celebrations  
(C) A celebration by the victor (D) The defeat of the oppressed

**11. Which of the following expressions would you use to describe Mini's emotions after trapping the fly?**

- (A) On cloud ten (B) Under a cloud  
(C) On cloud nine (D) Every dark cloud has a silver lining

**SPOKEN AND WRITTEN EXPRESSION**

**Direction (Q. No. 12 and 13) : Find one sentence to complete the dialogue.**

**12. Teacher to student : I thought you had been doing your homework regularly? Why are you still so irregular with your work?**

- (A) I will let your parents know that you have failed this year.  
(B) I'm afraid, at this rate, I'll have to give you a 'D' grade.  
(C) I'm expecting you to earn a 'D' grade. (D) I think you will do well this year.

**13. Manasa : Vinu, it's the Maths class now! I forgot my book.**

- (A) Could you share your book with me today.  
(B) Look here! Give me that book of yours!  
(C) Can I buy a Maths book?  
(D) Could I borrow your Maths notebook, please!

**Direction (Q. No. 14 and 15) : You need to select the two sentences that will complete the paragraph. Look at the choices given below and select the best option.**

**14. Sentence 1 : The blackbucks are mainly grazers and prefer to eat green fodder.**

Sentence 2 : \_\_\_\_\_

Sentence 3 : \_\_\_\_\_

Sentence 4 : Unfortunately most of their habitats are being converted to agricultural fields and this is forcing them to feed on crops.

P. This has restricted their distribution to areas that are close to cultivation.

Q. They also need to drink water twice a day so they do not live far from the source of water.

R. This gives rise to man-animal conflict and hundreds of them are being killed.

- (A) PQ (B) QP (C) PR (D) RP

**15. Sentence 1 : The Pageant's Handbook of First Aid is a must for every home.**

Sentence 2 : \_\_\_\_\_

Sentence 3 : \_\_\_\_\_

Sentence 4 : Then seal and send this post-paid cover back to us.

P. All you have to do is write the names of 14 friends who enjoy reading.

Q. And you can get it free, with no contest or prize to be won.

R. And we will rush you the booklet free of cost.

- (A) PQ (B) QP (C) PR (D) QR

