

### SAMPLE PAPER

10



The actual test paper has 50 questions. Time allowed: 60 minutes. There are 3 sections: 10 questions in section I, 10 in section II and 30 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.

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**



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**National Science Olympiad** 

**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.

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.



International
Mathematics Olympiad

#### **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.

In addition to the above Syllabus, the NCO paper may include Questions on latest Developments / Upgradation in computers.

# National Cyber Olympiad

# MENTAL ABILITY 1. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of

	(A) 10	nber of blue balls in the l (B) 5	bag is (C) 8	(D) 7
2.	Which of the following	equations have the sam	ne graph?	
	I. $y = x + 3$ (A) I and II only	$II.  y = \frac{x^2 - 9}{x - 3}$	III. (B) I and III only	$(x-3)y=x^2-9$
	(C) II and III only		(D) All of these.	
3.	The value of the real r	number x satisfying log <sub>9</sub>	$x - \log_9 \left( \frac{x}{10} + \frac{1}{9} \right) = 1$ is	
	(A) 3	(B) 4	(C) 9	(D) 10
4.	The sum of first 24 ter	ms of the sequence who	ose <i>n</i> th term is $a_n = 3 +$	$\frac{2}{3}$ <i>n</i> , is
	(A) 275	(B) 272	(C) 280	(D) 270.
		LOGICAL & ANA	LYTICAL REASONING	
5.				est, L, M and N are intelligent and itious person(s) would include (D) N alone
6.		e local terminology for ea y. If someone is thirsty th (B) Water	_	sky are 'sky', 'light', 'air', 'water' k? (D) Light.
7.	Step 4 : Add 7 Step 5 : Divide by 2 Step 6 : Add 2 Step 7 : Multiply by 2	o, jump to step 1 and cor e of 6 then calculate <b>hov</b> (B) 5		
8.	F and G are girls. A and	-	a doctor. E is an engine	and three children, two of whom, er married to one of the brothers
	(A) G's brother	(B) F's father	(C) E's daughter	(D) A's son
		COMPUTERS & INFO	ORMATION TECHNOL	OGY
9.	<script></script> <th>T&gt; tag can be placed wit (B) Body</th> <th>hin (C) Both (A) and (B)</th> <th>(D) None of these</th>	T> tag can be placed wit (B) Body	hin (C) Both (A) and (B)	(D) None of these
10.	The processing speed (A) Mega byte	l of a computer is measu (B) 16 bit	ured in (C) Mega hertz	(D) Milli seconds
11.	While working in MS-E (A) Mixed cell referen (C) Relative cell referen		n a formula means it is a (B) Absolute cell refer (D) Initial cell reference	rence
		(	2 Class 10	

**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) At infinity

(C) Chip

# National Science Olympiad

(D) Semiconductor memory.

#### **MENTAL ABILITY** 1. In an office with 21 staff members, 1/3 are men and 2/3 are women. To obtain a staff in which 1/4 are men, how many women should be hired? (C) 3 A jogger desires to run a certain course in 1/4 less time than she usually takes; by what percent must she increase her average running speed to accomplish this goal? (C) $33\frac{1}{3}\%$ (B) 25% (A) 20% 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% 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? (B) $8\sqrt{2}$ inches (C) $8\sqrt{3}$ inches (A) 10 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. 7. A virtual image is formed by a concave mirror when object is placed (A) Between focus and centre of curvature (B) Beyond C

(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
- 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 SO<sub>2</sub>
- 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 <sub>1</sub>	Beri beri	Water logging of the tissue, paralysis
(C) Vitamin B <sub>4</sub>	Pellagra	Pigeon chest, loss of teeth
(D) Vitamin C	Scurvy	Loosening of teeth, swelling and bleeding of gums



## International Mathematics Olympiad

### **LOGICAL REASONING**

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
- 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



- 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)  $36-6+3\times5\div3=74$ 

### **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°



- (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.

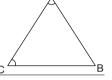
If we assume that  $m\angle A = m\angle C$ , it follows that AB = BC. This contradicts the given statement that AB > BC. What conclusion can be drawn from this contradiction?

(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. 
$$2x+7$$
) $2x^4+21x^3+35x^2-37x+46$  =

- (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.

(B) -4, -1

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

- (A) -6, -3
- . ....
- (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<sup>3</sup>. (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.

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

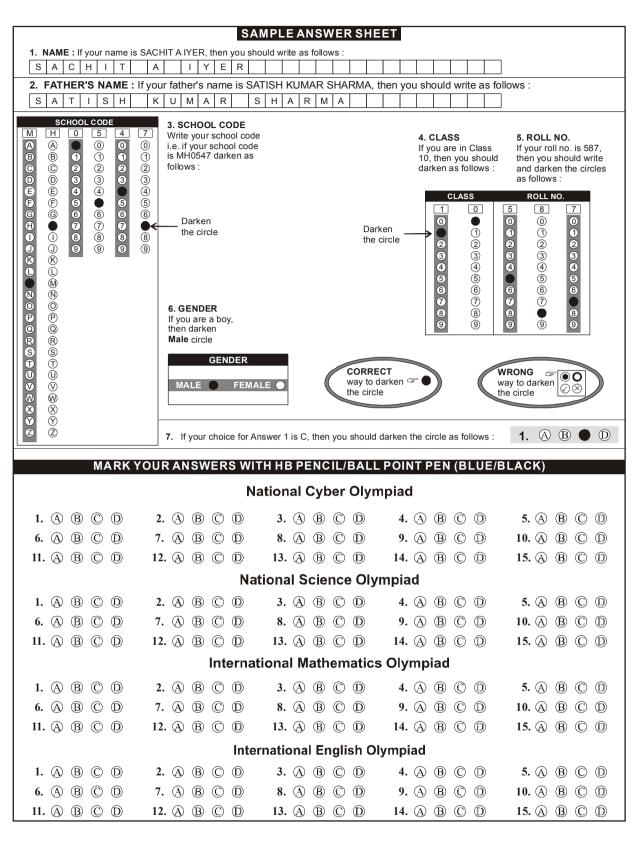


# International English Olympiad

	WORD AND STRU	ICTURE KNOWLED	GE	
Dir 1.	rection (Q. No. 1 and 2): Choose the most  We have to let the law and  (A) Take it course (B) Make its course	d wait for the court ve		se
2.	This colour has gone fas (A) Out from (B) From	shion. (C) Out of	(D) Off	
3.	Choose the correct spelling. (A) Pseudonym (B) Pseudonym	(C) Pseudoname	(D) Seudonum	
4.	Select the correct phrase. (A) Take it and leave it (C) Take it or leave it	(B) Take it or give i		
Dir	rection (Q. No. 5 and 6) : Fill in the blanks i	n the following sen	tences by choosing	one of the
fou 5.	Ir options given below the sentence.  Mr. Prasanna is	BA BA	ell-known computer	firm.
6.	The Director was so his (A) Angry with (B) Angry by	team that he was at (C) Angry about	a loss for words. (D) Angry on	
7.	Read the sentences given below; decide marked as A, B and C. If yes, mark that I He said that he would not be able /to come (A)	etter. If no error, ma with all of us /becaus	ark D. e of his uncle's visit /	
8.	Direction (Q. No. 8 to 10): Read the passage follow.  Once upon a time, everybody "did" science, children, are scientists too—testing substand rocks, seeing patterns in the stars, wondering Partly because the educational system has to partly because of society's demands for practifades quickly for most youngsters. Those who learn to avoid high-school biology. Students who about how people think and feel, find themselver wanted to know.  According to the author, all children are science (A) They are amused and excited by science (B) They are taught science in school.	for their own amusem ces on our tongues, doing what makes the naught science only in a cical applications of tecto love nature but dislips enroll in psychology celves learning more a centists because ce.	nent and excitement. iscovering gravity, peight scary and the slareductionist, left-brachnology, the romand ke dissecting small a courses, hoping to lear	All of us, as sering under ky blue. ain style and se of science nimals soon on something cs than they
	(o) They are taught solence in sollour.	(D) Liljoy peopling i	no mings, asing and	, worldering

6 Class 10

9.	, , , ,	e ) They are forced to ) It is not taught in	
10.	· ·	nould focus on ) Problems in statis ) Understanding hu	
	SPOKEN AND WRIT	TEN EXPRESSION	
11.	Direction (Q. No. 11 and 12): Find one senter.  Namrata: Hey, come on, let's go and have som Sujana: Sorry, I can't. I have a bad cold.  Namrata:  (A) Have a biscuit.	e ice-cream before	
	(C) What's wrong with you? (D	) Come on, you can	n study later.
12.	<ul> <li>Kartik: We're going trekking to the Narmada va Nisha: I wish I could come.</li> <li>(A) The trip sounds fantastic and I am sure wil</li> <li>(B) The Narmada is a river that must be seen.</li> <li>(C) But my grandparents will be visiting us and</li> <li>(D) It will be lovely to be with all of you for so</li> </ul>	I be great fun. I have to be home.	
13.	Direction (Q. No. 13 to 15): You need to see paragraph. Look at the choices given below.  Sentence 1: What is meat for the body at one Sentence 2: Sentence 3: Sentence 4: After 50, the toxicity of these metato diseases.  P. For example, iron and copper are nutrional Q. Iron deficiency can lead to anaemia and cohormones.  R. But larger amounts of their intake are good (A) QR  (B) PR	and select the best age is poison at an age is poison at age is poison at age is possible.	other.  and can damage cells, leading  s.  colour and is a part of several
14.	Sentence 1: If there is a neem or jamun tree in y when they flower and fruit.  Sentence 2:  Sentence 3:  Sentence 4: The data base is important as Inc.  P. The National Centre for Biological Sciences pon the life cycle of plant species across the Q. You may soon realize that you are not just when R. There is no information, however, that show location.	our backyard, check lia has several climates to rope in people e country. liling time, but collect	it regularly and just note down atic zones and biodiversity. for creating an online database ting data for scientific research.
15.	Sentence 1 : Satnam Singh detests wheat chap Sentence 2 : Sentence 3 : Sentence 4 : He actually suffers from a disease P. The four year old hails from a small village Q. If force fed, he shouts and cries loudly. R. The boy is not throwing a temper tantrum, (A) PR (B) QP (C)	e known as celiac c in Punjab, from Am	bala.



#### ANSWERS

National Cyber Olympiad National Science Olympiad							International Mathematics						International English											
l <sub>1</sub> .	(A)	2.	(C)	3.	(D)	1	(C)	2	(C)	3.	(D)	Olympiad							Olympiad					
4.	(B)	5.	(D)	6.	(D)	4.	(A)	5.	(B)	6.	(C)	1.	(A)	2.	(B)	3.	(B)	1.	(D)	2.	(C)	3.	(A)	
7.	(D)	8.	(D)	9.	(C)	7.	(D)	8.	(C)	9.	(D)	4.	(D)	5.	(A)	6.	(B)	4.	(C)	5.	(B)	6.	(A)	
10.	(C)	11.	(B)	12.	(D)	10.	(C)	11.	(B)	12.	(C)	7.	(D)	8.	(B)	9.	(D)	7.	(C)	8.	(D)	9.	(C)	
13.	(A)	14.	(B)	15.	(B)	13.	(A)		(B)	15.	(C)	10. 13.	(B) (A)	11. 14.	(C) (B)	12. 15.	(C) (C)	10. 13.	(D) (B)	11. 14.	` '	12. 15.	( - )	