



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-PowerPoint, HTML, Internet, MS-Excel, Hardware, Software, Input & Output Devices, Memory & Storage Devices, Latest Developments in the field of IT.

**Questions are based on Windows 7 and MS-Office 2010.**

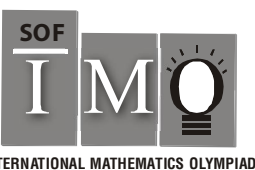


The actual test paper has 50 questions. Time allowed : 60 minutes. There are 2 sections: 15 questions in section I and 35 in section II.

**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.



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.



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 ASSOCIATION WITH





# 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 red ball then the number of blue balls in the bag is \_\_\_\_\_.  
(A) 10 (B) 5 (C) 8 (D) 7
2. Solve for x and y :  $\frac{2}{x} + \frac{2}{3y} = \frac{1}{6}$  and  $\frac{3}{x} + \frac{2}{y} = 0$   
(A)  $x = 4, y = 6$  (B)  $x = 2, y = -2$   
(C)  $x = 6, y = -4$  (D)  $x = 4, y = -6$
3. A copper wire, when bent in the form of a square, encloses an area of  $484 \text{ cm}^2$ . If the same wire is bent in the form of a circle, find the area enclosed by it.  $(\pi = \frac{22}{7})$   
(A)  $416 \text{ cm}^2$  (B)  $516 \text{ cm}^2$  (C)  $216 \text{ cm}^2$  (D)  $616 \text{ cm}^2$
4. The sum of first 24 terms of the sequence whose  $n^{\text{th}}$  term is  $a_n = 3 + \frac{2}{3}n$ , is \_\_\_\_\_.  
(A) 275 (B) 272 (C) 280 (D) 270

## LOGICAL AND ANALYTICAL REASONING

5. 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
6. 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
7. **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
8. 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 AND INFORMATION TECHNOLOGY

9. `<SCRIPT>...</SCRIPT>` tag can be placed within \_\_\_\_\_.  
(A) Header (B) Body (C) Both (A) and (B) (D) None of these
10. The processing speed of a computer is measured in  
(A) Mega byte (B) 16 bit (C) Mega hertz (D) Milli seconds
11. 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 PowerPoint, the default line spacing is \_\_\_\_\_.  
 (A) 1.0 (B) 1.5  
 (C) 2.0 (D) 2.5
- 
14. In MS-Word, endnotes and footnotes are available in \_\_\_\_\_ tab.  
 (A) Home (B) References (C) Insert (D) Margins
- 
15. Which of the following is NOT a hardware component?  
 (A) Mouse (B) MS-Office  
 (C) Chip (D) Semiconductor memory.
- 



# National Science Olympiad

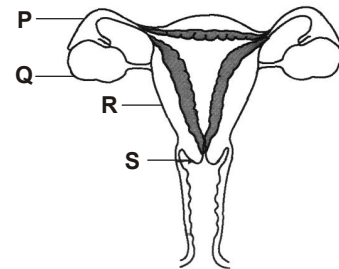
## MENTAL ABILITY

1. If  $\alpha$  and  $\beta$  are the zeros of the quadratic polynomial  $p(y) = 5y^2 - 7y + 1$ , find the value of  $\frac{1}{\alpha} + \frac{1}{\beta}$ .  
 (A) 7/5 (B) 5 (C) 7 (D) 1/5
- 
2. Find the sum of first 30 terms of an A.P. whose second term is 2 and seventh term is 22.  
 (A) 1120 (B) 1480 (C) 1680 (D) 1520
- 
3. If  $\tan \theta = \frac{12}{13}$ , evaluate  $\frac{2 \sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta}$   
 (A)  $\frac{5}{24}$  (B)  $\frac{13}{25}$  (C)  $\frac{24}{25}$  (D)  $\frac{312}{25}$
- 
4. The hypotenuse of right-angled triangle is 6 metres more than twice the shortest side. If the third side is 2 metres less than the hypotenuse, find the length of the longest side.  
 (A) 26 m (B) 24 m (C) 10 m (D) 28 m
- 
5. Samay walks 20 metres North. Then he turns right and walks 30 m. Then he turns right and walks 35 m. Then he turns left and walks 15 m. Then he agains turns left and walks 15 m. How many metres away is he from his original position?  
 (A) 35 m (B) 45 m (C) 55 m (D) 30 m

## SCIENCE

6. Transpiration has been described as a 'necessary evil' because it is inevitable, but potentially harmful. Which of the following are the after-effects of transpiration?  
 (i) Absorption of mineral salts. (ii) Regulation of plant temperature.  
 (iii) Wilting and injury in plants. (iv) Ascent of sap.  
 (A) (i) & (iv) (B) (i), (ii) & (iii) (C) (i), (ii) & (iv) (D) All 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

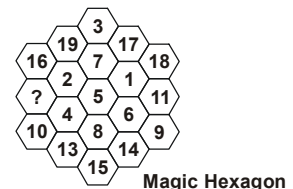
9. How do we know that fission isn't responsible for the sun's energy ?  
 (A) Fission doesn't produce enough energy per gram of fuel  
 (B) If fission were going on in the sun, the sun would explode  
 (C) If fission were going on in the sun, the sun's mass would increase  
 (D) There isn't very much 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  $\text{SO}_2$
- 
11. Which of the following statements is true with respect to diamond ?  
 (A) The carbon atoms are connected to each other by metallic bonds.  
 (B) In the diamond crystal, the carbon atoms are very loosely packed.  
 (C) Each carbon atom in the crystal is surrounded by four others forming a rigid 3-D.  
 (D) Diamond can be synthesised by subjecting pure carbon to very low pressure and temperature.
- 
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. Which of the following statements regarding natural selection is true?  
 (A) It is a process in which members of a population inherit traits that enable them to better survive and produce offspring  
 (B) It is based on the isolation of natural populations and selective breeding of organisms  
 (C) It provides diversity without any adaptation (D) All of the above.
- 
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. In which labelled part of the given figure does the fertilization of an ovum by a sperm take place?  
 (A) P  
 (B) Q  
 (C) R  
 (D) S



# International Mathematics Olympiad

## LOGICAL REASONING

1. Arrange the given word in the sequence in which they occur in the dictionary and then choose the correct sequence.  
 1. Page                      2. Pagan                      3. Palisade                      4. Pageant  
 5. Palate  
 (A) 1, 4, 2, 3, 5              (B) 2, 4, 1, 3, 5              (C) 2, 1, 4, 5, 3              (D) 1, 4, 2, 5, 3
- 
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

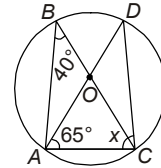


3. Mohit was looking for his father. He went 90 metres in the East before turning to his right. He went 20 metres before turning to his right again to look for his father at his uncle's place 30 metres from this point. His father was not there. From here he went 100 metres to the North before meeting 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 given figure.

- (A)  $75^\circ$  (B)  $40^\circ$   
 (C)  $65^\circ$  (D)  $90^\circ$



6. In the following systems of equations determine the value of  $k$  for which the given system of equations has a unique solution:

$$\begin{aligned} 2x - 3y &= 1 \\ kx + 5y &= 7 \end{aligned}$$

- (A)  $-\frac{5}{3}$  (B)  $-\frac{10}{3}$  (C)  $-\frac{3}{5}$  (D)  $\frac{2}{3}$

7. Given that  $\angle CAB = 90^\circ$  and  $AD \perp BC$ . If  $AC = 75$  cm,  $AB = 1$  m and  $BD = 1.25$  m, find  $AD$ .

- (A) 81.83 cm (B) 125 cm  
 (C) 75 cm (D) 93.75 cm

8. If the mean of the following distribution is 54, find the value of  $p$  :

Class	0-20	20-40	40-60	60-80	80-100
Frequency	7	$p$	10	9	13

- (A) 9 (B) 11  
 (C) 8 (D) 10

9. If the HCF of 210 and 55 is expressible in the form  $210 \times 5 + 55y$ , find  $y$ .

- (A) 5 (B)  $-15$   
 (C) 14 (D)  $-19$

10. If sum of the squares of zeros of the quadratic polynomial  $f(x) = x^2 - 8x + k$  is 40, find the value of  $k$ .

- (A) 11 (B) 12 (C) 10 (D) 9

11. The sum of three numbers in A.P. is  $-3$ , and their product is 8. Find the numbers.

- (A) 2,  $-1$ ,  $-4$  (B)  $-4$ ,  $-1$ , 2 (C) 4,  $-1$ ,  $-2$  (D) Both (A) and (B)

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. What is the probability that a number selected from the numbers 1, 2, 3, ..., 25 is a prime number, when each of the given numbers is equally likely to be selected?

- (A)  $\frac{2}{7}$  (B)  $\frac{9}{25}$  (C)  $\frac{11}{25}$  (D)  $\frac{2}{5}$

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.**

1. 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
2. This colour has gone \_\_\_\_\_ fashion.  
(A) Out from (B) From (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 (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.**

5. 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
6. 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
7. **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)
- 

### READING

**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.

8. 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) They 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 meant beneficial 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
-

