

CLASS

11

SAMPLE PAPER

Science
Olympiad
Foundation

For Excellence in Science, Maths & IT

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) : Linear equations in two variables, Polynomials, Rational expressions, Quadratic equations, Arithmetic progressions (A.P), Installments, Income tax, Similar triangles, Circles, Constructions, Mean, Probability, Pictorial representation of data, Coordinate geometry, Sets, Relations and functions logarithms, Geometrical progressions.

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 (Computer and IT) : IT basics, Internet, Service available on internet, IT tools, MS access, Hyper text markup language, Html fundamentals, IT applications, Database, Website designing.

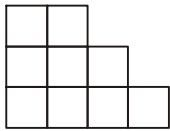
MENTAL ABILITY

1. The points z_1, z_2, z_3 , on the complex plane are the vertices of an equilateral triangle if and only if :
 (A) $\sum (z_1 - z_2)(z_2 - z_3) = 0$ (B) $\sum z_1^2 = 2\sum z_1z_2$ (C) $\sum z_1^2 = 4\sum z_1z_2$
 (D) $(z_1 + z_2 + z_3)^2 = 3\sum z_1z_2$ (E) None of these.

2. $\sum_{r=0}^{n-1} \frac{{}^nC_r}{{}^nC_r + {}^nC_{r+1}} =$
 (A) $\frac{n}{2}$ (B) $\frac{n+1}{2}$ (C) $(n+1)\frac{n}{2}$ (D) $\frac{n(n-1)}{2(n+1)}$ (E) None of these.

3. A student is allowed to select atmost n books from a collection of $(2n + 1)$ books. If the total number of ways in which he can select atleast 1 book is 63, find the value of n .
 (A) 6 (B) 3 (C) 5 (D) 4 (E) None of these.

4. The number of ways in which 5 X's can be placed in the squares of the figure so that no row remains empty is :
 (A) 97 (B) 98 (C) 100 (D) 126
 (E) None of these.



5. c_1 is a fixed circle and c_2 is a variable circle with fixed radius. The common transverse tangents to c_1 and c_2 are perpendicular to each other. The locus of the centre of variable circle is :
 (A) Circle (B) Ellipse (C) Hyperbola (D) Parabola (E) None of these.

6. $\frac{x - x_1}{\cos \theta} = \frac{y - y_1}{\sin \theta} = r$, represents :
 (A) Equation of a straight line, if θ is constant & r is variable
 (B) Equation of a circle, if r is constant & θ is a variable
 (C) A straight line passing through a fixed point & having a known slope
 (D) A circle with a known centre & a given radius
 (E) All of these.

7. The value of $\log_2[\cos^2(\alpha + \beta) + \cos^2(\alpha - \beta) - \cos 2\alpha \cdot \cos 2\beta]$:
 (A) Depends on α & β both (B) Depends on α but not on β
 (C) Depends on β but not on α (D) Is Independent of both α & β
 (E) None of these

LOGICAL & ANALYTICAL REASONING

8. Which alternative is sufficient for answering the following question based on the information given in the two statements?
QUESTION : Does drinking coffee lead to headache?
STATEMENTS :
 I. Overstimulation of pancreas leads to headache?
 II. Coffee contains caffeine which when excessive, stimulates pancreas.
 (A) Statement I alone is sufficient to answer the question
 (B) Statement II alone provides answer to the question
 (C) Both statements I and II provide answer to the question
 (D) Neither statement I nor statement II provide answer to the question
 (E) Information given is incomplete.

9. 'P + Q' means 'P is brother of Q'; 'P - Q' means 'P is mother of Q' and 'P × Q' means 'P is sister of Q'. Which of the following means 'M is maternal uncle of R'?
 (A) $M - R + K$ (B) $M + K - R$ (C) $M + K \times Q$
 (D) There is no such symbol (E) None of these.

10. If 1 is coded as Y, 2 is coded as M, 3 as D, 4 as H, 5 as T, 6 as L, 7 as P, 8 as V and 9 as N, which of the following is the coded form of 3972465?
 (A) DNPMHLP (B) DNPMHNT (C) DNPMHLT (D) DNPMNLT (E) None of these.

11. Which alternative applies to the assumptions of the statement?
STATEMENT : Most people who stop smoking gain weight.
ASSUMPTIONS : I. If one stops smoking one will gain weight
 II. If one does not stop smoking one will not gain weight.
 (A) Only assumption I is implicit (B) Only assumption II is implicit
 (C) Both assumptions I and II are implicit (D) Neither assumption I nor II is implicit
 (E) None of the above.
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12. Which letter will be the sixth to the left of the nineteenth letter from the right end of the following alphabets?
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
 (A) N (B) M (C) Y (D) F (E) None of these.
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13. Bablu ranked sixteenth from the top and twenty-ninth from the bottom among those who passed an examination. Six boys did not participate in the competition and five failed in the examination. How many boys were there in that class?
 (A) 44 (B) 50 (C) 55 (D) 40 (E) None of these.

COMPUTERS & INFORMATION TECHNOLOGY

14. Which of the following is not correct
 (A) E-commerce includes all business activities involved in the development, facilitation and implementation of business communications and transaction through electronic media
 (B) The Intranet is a restricted version of the Internet within a group of users
 (C) The Extranet is a closed online network connecting two or more organisations
 (D) None of the above. (E) All of the above.
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15. A debugging tool is a program which
 (A) Removes bugs from a user program (B) Removes viruses from the computer
 (C) Helps the user find bugs in his/her program (D) Displays errors in a user program
 (E) None of the above.
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16. Computers can be protected from virus by using
 (A) Software (B) Hardware
 (C) Software and hardware (D) Cannot be protected at all (E) None of these.
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17. Y2K problem mainly arose in computer programmes written in
 (A) COBOL (B) BASIC (C) FORTRAN (D) PASCAL (E) None of these.
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18. In the context of information technology, the term security refers to
 (A) Confidentiality only (B) Authentication only
 (C) Integrity only (D) All of these (E) None of these.
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19. Which of the following are super computers developed by Indian Scientists?
 1. PARAM 2. ANURAG 3. GIST 4. CDAC
 Answer choices
 (A) 1 & 2 only (B) 1 only (C) All except 3 (D) 1 and 4 (E) None of these.
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20. Which of the following statements about DOS are true?
 1. DOS is an acronym for Disk Operating System
 2. Loading of DOS into the main memory is known as booting
 3. Storage areas on a disk are known as directories. A directory may contain files and/or subdirectories inside it.
 4. Wildcards are special characters carrying special meaning. Two MS-DOS wild cards are ? and *
 5. A filter is a command that receives its input from the standard input device and sends its output to standard output device. FIND, MORE and SORT are MS-DOS filters.
 (A) 1 and 2 only (B) 1, 2 and 3 (C) All excepts 3 (D) 1 and 4 (E) All of these.

ANSWER KEY

1. (D) 2. (A) 3. (B) 4. (B) 5. (A) 6. (E) 7. (D) 8. (C) 9. (B) 10. (C)
 11. (D) 12. (A) 13. (C) 14. (D) 15. (C) 16. (C) 17. (A) 18. (D) 19. (A) 20. (E)