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INTERNATIONAL CYBER OLYMPIAD	NATIONAL INTERACTIVE SCIENCE OLYMPIAD	NATIONAL INTERACTIVE MATH OLYMPIAD	NATIONAL BIOTECHNOLOGY OLYMPIAD	INTERNATIONAL ENGLISH OLYMPIAD	INTERNATIONAL G.K. OLYMPIAD	BSE INTERNATIONAL FINANCE OLYMPIAD	NATIONAL IIT-PMT OLYMPIAD

Level - 1 : All Level-1 successful* participants will get certificate, apititude report and online subscription, and school toppers will be eligible for school hero medals.

Level - 2 : School toppers* will be selected for level-2-National level - online computer based interactive test held at exam centres all over India. Besides selection for level-3, winner will get merit certificate, medals, educational CDs, laptop, scholarship and other prizes. There is no level 2 in Art, Cricket, Cyber, NIPO and Biotech.

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* # See prospectus/website for details

EHF

NATIONAL INTERACTIVE SCIENCE OLYMPIAD

NISO

12 Class

B1 Paper Code

LEVEL-1

1. **You are allowed additional 10 minutes to fill the required details in the RESPONSE SHEET (OMR).**
2. **The question paper is made as per syllabus guidelines & pattern given in the information Booklet. The Question Paper for Classes 1 to 6 contains 25 Questions each to be answered in 40 minutes. The Question paper for classes 7 to 12 contains 50 Questions each to be answered in 60 minutes. All questions are compulsory. Further instructions are given in the instruction letter to the teacher.**
3. **Use the response sheet to mark your responses by darkening the required circle. The response sheet has to be returned to the foundation, duly filled in. THE STUDENT CAN RETAIN THE QUESTION PAPER.**

SECTION-A : GENERAL IQ

1. It is given that M is either greater than or equal to P. P is smaller than Q and Q is not greater than R. Which of the following is definitely true ?

(1) M is either greater than or equal to R

(2) M is either greater than or equal to Q

(3) R is greater than P.

(4) None of these

2. How many pairs of letters are there in the word EXPRESSION which have as many letters between them in the word as in the alphabet?

(1) Four (2) Five

(3) Three (4) None of these

3. If 'MSN' means 'M is the father of N', 'M ≠ N' means 'M is the sister of N' and 'M ∗ N' means 'M is the brother of N', then what is the relation of C with A in A ≠ BSC ∗ D?

(1) Niece (2) Nephew

(3) Aunt (4) None of these

4. In a class of 39 students the ratio of boys and girls is 2:1. Radhika ranks 15th among all the students from top and 8th among girls from bottom. How many boys are there below Radhika?

(1) 16 (2) 17

(3) 15 (4) None of these

5. If 'P' means 'X', 'Q' means '÷ ', 'T' means 'of' and 'V' means '+', then what will be the value of 85Q17P3V1T4?

(1) 62 (2) 31

(3) 17 (4) None of these.

6. In a certain code language AUTHORITY is written as YTUROHTIA. How will DESIGNATE be written in that language?

(1) ESENGATDI (2) ESEGNITAD

(3) ESENGITAD (4) None of these

7. Four of the following five are alike in a certain way and hence form a group. Which is the one that does not belong to that group?

(1) A F 9

(2) 7 N 6

(3) B 5 C

(4) None of these

8. If *x* stands for add, *y* stands for substract, Z stands for 'divide' and P stands for multiply', then what is the value of (7 P 3) *y* 6 *x* 5?

(1) 5

(2) 10

(3) 15

(4) None of these

9. Raju is much older than Ravi as he is younger than Praveen. Rohit is as old as Ravi. Which of the following statements is wrong?

(1) Ravi is younger than Praveen.

(2) Rohit is younger than Praveen

(3) Praveen is the oldest

(4) None of these

10. Mohan placed 3 sheets with two carbons to get two extra copies of the original. Then he decided to get more carbon copies and folded the paper in such a way that the upper half of the sheets were on top of the lower half. Then he typed.

How many carbon copies did he get?

(1) 1

(2) 2

(3) 3

(4) None of these

11. Two points A and B are situated at the same distance from a source of light, but in opposite direction from it. The phase difference between the light waves passing through A and B will be

(1) Zero

(2) $\pi/2$

(3) π

(4) None of these

12. The intensity ratio of the two interfering beams of light is β. What is the value of $\frac{I_{max} - I_{min}}{I_{max} + I_{min}}$

(1) $2\sqrt{\beta}$

(2) $\frac{2\sqrt{\beta}}{1+\beta}$

(3) $\frac{2}{1+\beta}$

(4) None of these

13. All the following substances react with water. The pair that gives the same gaseous product is

(1) K and KO_2

(2) Na and Na_2O_2

(3) Ca and CaH_2

(4) None of these

14. A mineral having the formula AB2 crystallises in the cubic closepacked lattice, with the A atoms occupying the lattice points. The co-ordination number of the A atoms, B atoms and the fraction of the tetrahedral sites occupied by B atoms are

(1) 8, 4, 100%

(2) 2, 6, 75%

(3) 3, 1, 25%

(4) None of these

15. Beryllium is placed above magnesium in the electro-chemical series. When beryllium dust is added to $MgCl_2$ solution it will

(1) Have no effect

(2) Precipitate Mg metal

(3) Liberate Cl_2

(4) None of these

16. Two resistances are joined in parallel whose resultant is 6/5 ohm. One of the resistance wire is broken and the effective resistance becomes 2 ohms. Then the resistance in ohm of the wire that got broken was

(1) 2

(2) 6/5

(3) 3

(4) None of these

17. The activity of a radioactive sample goes down to about 6% in a time of 2 hours. The half-life of the sample in minutes is about

(1) 30

(2) 15

(3) 60

(4) None of these

18. The *p*H of a 10^{-10} M NaOH solution is nearest to
(1) 10
(2) 7
(3) 4
(4) None of these

19. The electrode $Pt/Fe^{2+}(C_1), Fe^{2+}(C_2)$ belongs to the type
(1) Gas electrodes
(2) Inert metal electrodes
(3) Amalgam electrodes
(4) None of these

20. The stability of the following alkali metal chlorides follows the order
(1) LiCl > KCl >NaCl > CsCl
(2) CsCl > KCl > NaCl > LiCl
(3) KCl > CsCl > NaCl > LiCl
(4) None of these

21. Glass fibres are usually made by coating fibres of glass with a thin layer of glass of
(1) Lesser refractive index
(2) Same refractive index
(3) Greater refractive index
(4) None of these

22. An electron and a positron are formed from a photon having an energy of 1.82 MeV. The kinetic energy of the electron and the positron at the time of formation will be
(1) 1.5×10^{-10} J
(2) 1.28×10^{-12} J
(3) 1.28×10^{-13} J
(4) None of these

23. A certain weak acid has a dissociation constant of 1×10^{-4}. The equilibrium constant for reaction with a strong base is
(1) 1×10^{-4}
(2) 1×10^{-10}
(3) 1×10^{10}
(4) None of these

24. When propene is treated with HBr in the dark and in absence of peroxide, the main product is
(1) 1-bromopropane
(2) 2-bromopropane
(3) 1, 2-dibromopropane
(4) None of these

25. The equation of two sound waves are given by $y_1 = 3 \sin 100\pi t$ and $y_2 = 4 \sin 150\pi t$. Find the ratio of intensities of sound produced in the medium.
(1) 9 : 16
(2) 4 : 1
(3) 1 : 2
(4) None of these

26. A small air bubble is situated in a glass slab of 24 cm thickness. When viewed from one face, its apparent depth is 10 cm and when viewed from opposite face it is 6 cm. Calculate the refractive index of the glass slab.
(1) 1.2
(2) 1.4
(3) 1.5
(4) None of these

27. Which one of the following compounds does not dissolve in conc. H_2SO_4 even on warming?
(1) Ethylene
(2) Benzene
(3) Hexane
(4) None of these

28. The acceleration due to gravity on the surface of the moon is 1/6 that one the surface of earth and the diameter of the moon is one-fourth that of earth. The ratio of escape velocities on earth and moon will be
(1) $2\sqrt{6}$
(2) $4\sqrt{2}$
(3) 3
(4) None of these

29. Which of the following has a greater electrical resistivity?
(1) Metals
(2) Insulators
(3) Semi conductors
(4) None of these

30. What will be the boiling point of bromine when 174.5 mg of S_8 is added to 78 g of bromine?
(K_b for Br_2 = 5.2 $Kmol^{-1}$ kg and boiling point of Br_2 = 332.15k)
(1) 335.198 K
(2) 332.195 K
(3) 330.194 K
(4) None of these

SECTION-C : MATHEMATICS

31. If the ortho centre and centroid of a triangle are (–3, 5) and (3, 3) respectivly, then its circumcentre is
(1) (6, 2)
(2) (6, –2)
(3) (0, 4)
(4) None of these

32. The equation $x^2 + y^2 + 2x + 3y + 11$ represents a
(1) Pair of straight lines
(2) Circle
(3) Hyperbola
(4) None of these

33. If $|\vec{a}\cdot\vec{b}| = |\vec{a}\times\vec{b}| = 1$, then the angle between $\vec{a}$ and $\vec{b}$ is
(1) 0°
(2) 180°
(3) 135°
(4) None of these

34. If A and B are two sets then $(A \cup B)' \cup (A' \cup B')$ is
(1) Null set
(2) Universal set
(3) A′
(4) None of these

35. If 12 cot θ = 16, then $\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta}$ is equal to
(1) 1/7
(2) –7
(3) –1
(4) None of these

36. If $\int xe^{2x}\,dx$ is equal to $e^{2x} f(x) + c$ where c is constant of integration, then $f(x)$ is
(1) $\frac{3x-1}{4}$ (2) $\frac{2x+1}{2}$
(3) $\frac{2x-1}{4}$ (4) None of these

37. $f(x) = a\cos(bx + x) + d$, then range of $f(x)$ is
(1) $(d - a)(d + a)$
(2) $(d + a)(d + 2a)$
(3) $(a - d)(a + d)$
(4) None of these

38. If α and β are roots of $x^2 - 3x + 2 = 0$, then the value of
$\begin{vmatrix} 0 & \alpha & \beta \\ 1 & -\alpha & \alpha \\ \beta & 0 & 0 \end{vmatrix}$ is
(1) 6
(2) 3/2
(3) – 6
(4) None of these

39. Four boys and three girls stand in queue for an interview, probability that they will be in alternate position is
(1) 1/34
(2) 1/35
(3) 1/17
(4) None of these

40. If $x + (1 + x) = \sqrt{2}$, then x is equal to
(1) $(1 + i)/\sqrt{2}$
(2) $1/\sqrt{2}$
(3) $2(1 - i)/\sqrt{2}$
(4) None of these

SECTION-C : BIOLOGY

31. In which manner are genes located on the chromosomes?
(1) Linear
(2) Spiral
(3) Scattered
(4) None of these

32. DNA polymerase enzyme is required for the synthesis of
(1) DNA from RNA
(2) DNA from DNA
(3) RNA from DNA
(4) None of these

33. The main embryo develops from the structure formed as a result of fusion of
(1) Two polar nuclei of embryo sac
(2) Definitive nuclei and male gamete
(3) Egg cell and male gamete
(4) None of these

34. A botanist is having difficulty getting seeds to germinate. Which hormone should be applied to the seeds to help induce germination?
(1) Gibberellin

(2) Auxin
(3) Abscisic acid
(4) None of these

35. Two major functional component of ecosystem are
(1) Energy flow and food chain
(2) Energy flow and decomposers
(3) Food chain and decomposers
(4) None of these

36. Lethal genes are defined as those
(1) Which are present but not expressed
(2) That express suddenly an ancestral character
(3) That cause early death in homozygous condition
(4) None of these

37. The greatest source of variations are due to the process of
(1) Meiosis
(2) Mutations
(3) Polyploidy
(4) None of these

38. Which statement is wrong about DNA?
(1) The number of nucleotides of DNA is less than in RNA
(2) Thymine is present in DNA
(3) Deoxyribose is pentose sugar
(4) None of these

39. Which statement is false?
(1) The golgi complex forms vesicles that fuse to form the endoplasmic reticulum.
(2) Secreted proteins are initially formed by ribosomes attached to the endoplasmic reticulum.
(3) Cell walls generally contain high levels of carbohydrate.
(4) None of these

40. In humans, the sex ratio is very close to 50:50. The best genetic explanation for this is
(1) Segregation
(2) Crossing over
(3) Independent assortment
(4) None of these

INTERACTIVE SECTION

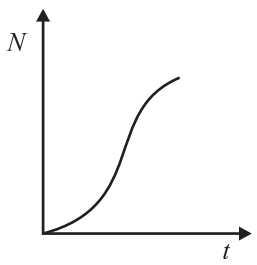
41. A parallel plate capacitor made of circular plates each of radius $R = 6.0$ cm has a capacitance $C = 100$ pF. The capacitor is connected to a 230 V ac supply with a (angular) frequency of 300 rad S^{-1}. Find the amplitude at a point 3 cm from the axis between the plates.
(1) $1.73 \times 10^{-11}\ T$
(2) $1.63 \times 10^{-11}\ T$
(3) $1.83 \times 10^{-11}\ T$
(4) None of these

42. The ionization constant of benzoic acid is 6.46×10^{-5} and Ksp for silver benzoate is 2.5×10^{-13}. How many times is silver benzoate more soluble in a buffer of pH 3.19 compared to its solubility in pure water ?
(1) 4.54 times
(2) 5.82 times
(3) 3.31 times
(4) None of these

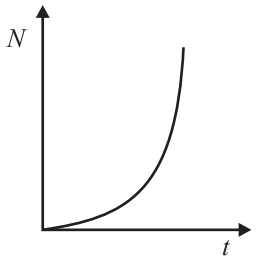
43. Dominant gene for tallness is T and for yellow colour is Y. A plant heterozygous for both the traits is crossed? then the ratio of pure homozygous dwarf and green offspring would be
(1) 1/16
(2) 3/16
(3) 4/16
(4) None of these

44. What happens each day when the leaf of a plant is first exposed to light?
(1) The epidermal cells on the upper surface of the leaf begin to photosynthesize.
(2) The guard cells become more turgid and the stomatal apertures open
(3) The cells of the spongy mesophyll begin to take up carbon dioxide, and are the only cells that are able to do so.
(4) None of these

45. The voltage applied across the X-plates of a cathode ray tube is of the shape
(1)



(2)



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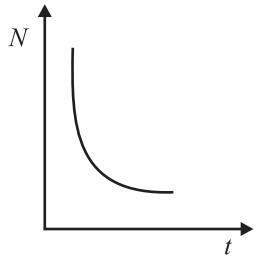


(4) None of these.

46. Aluminothermy used for on the spot welding of large iron structures is based upon the fact that

(1) As compared to iron, aluminium has greater affinity for oxygen

(2) As compared to aluminium, iron has greater affinity for oxygen

(3) Reaction between aluminium and oxygen is endothermic

(4) None of these

47. A person wants to obtain precise information regarding the exact time and location of synthesis of new DNA. Which of the following methods would be most effective for such study?

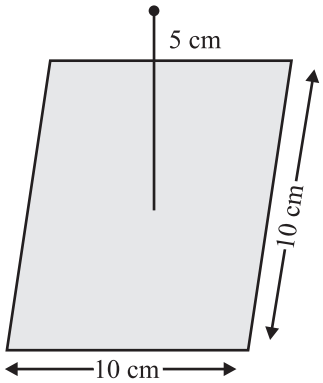
(1) Isolating and extracting DNA after regular intervals and estimating DNA amount.

(2) Using radioactive precursors of nucleic acids

(3) Carbon dating

(4) None of these

48. A point charge + 10 μC is a distance 5 cm directly above the centre of a square of side 10 cm, as shown in the given figure. What is the magnitude of the electric flux through the square?



(1) 4.4×10^5 Nm^2/C (2) 3.3×10^5 Nm^2/C

(3) 2.2×10^5 Nm^2/C (4) None of these.

49. The susceptibility to many cancers is inherited, despite the fact that those who contract the disease usually die quickly. The evidence shows that the usual explanation for this is that people who are at a genetic risk for cancer inherit

(1) A deficient RNA editing mechanism

(2) A predisposition (tendency) to avoid foods that prevent cancer.

(3) One of two or more mutations necessary to cause the disease.

(4) None of these

50. Consider the following statements:

If these were no phenomenon of capillarity.

(a) it would be difficult to use a Kerosene lamp.

(b) one would not be able to use a straw to consume a soft drink.

(c) the blotting paper would fail to function.

(d) the big trees that we see around would not have grown on the Earth.

Which of the statements given above are correct?

(1) *a*, *b* and *c* only (2) *a*, *c* and *d* only

(3) *b* and *d* only (4) none of these

END OF THE EXAM