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**Level - 1** : All Level-1 successful\* participants will get certificate, aptitude 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 G.K. and Biotech.

**Level - 3** : Toppers will qualify# for level 3-International level-where you will compete with students globally. Get selected for EHF's International Olympiad training camp. Only Indian organization giving students exposure to global competitions. Represent India & win laurels. Guidance by top scientists. Prizes ranges from cash (millions of \$), gadgets, foreign trips, publicity, fame, scholarships, Internships, conference participation and more. Level 3 is in Maths, Science & Cyber only.

\*# See prospectus/website for details

- You are allowed additional 10 minutes to fill the required details in the **RESPONSE SHEET (OMR)**. **STUDENTS OF CLASS 1 & 2 HAVE TO UNDERLINE** THE CORRECT ANSWER IN THE QUESTION PAPER ITSELF. THEY ARE NOT REQUIRED TO USE THE RESPONSE SHEET (OMR). THEY HAVE TO FILL THEIR NAME, ROLL NUMBER, CLASS, SCHOOL NAME IN THE SPACE PROVIDED IN THE QUESTION PAPER.
- 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.
- 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 except for classes 1 and 2.

**NATIONAL  
INTERACTIVE  
SCIENCE  
OLYMPIAD**

**N I S O**

**11  
Class**

**A1  
Paper  
Code**

**L E V E L - 1**

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## GENERAL IQ

- If CAT and BOAT are written as XZG and YLZG respectively in a code language, how is EGG written in that language?  
(1) UTT (2) VSS  
(3) VTT (4) None of these
- Book is to Read as Piano is to  
(1) Music (2) Play  
(3) Sing (4) None of these
- If South becomes North-East, North-East becomes West and so on, what will East become?  
(1) North-West (2) South-West  
(3) South (4) None of these
- Two poles of heights 10m and 15 m stand on a plane ground. If the distance between their feet is 12m, the distance between their top is  
(1) 12 m (2) 12.5 m  
(3) 13 m (4) None of these
- Flight to Delhi leaves every 5 hours. At the information

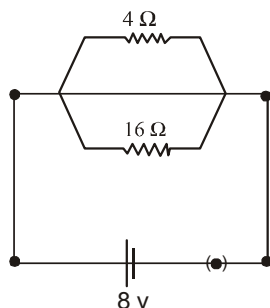
counter a person learnt that the flight took off 25 minutes before. If the time now is 10:45am, what is the time for the next flight?

- (1) 2:20 a.m (2) 3:20 p.m  
(3) 3:30 a.m (4) None of these
- If BAT is coded as 283, CAT is coded as 383 and ARE is coded as 801, then the code for BETTER is  
(1) 213310 (2) 213301  
(3) 123301 (4) None of these
- In a group of six person F is richer than E but not as rich as A. B is richer than C and D but not as rich as A. E is richer than D, E and C are equally rich. Who is the poorest among them?  
(1) C (2) E  
(3) D (4) None of these
- If 1 is coded as ?, 5 is coded as %, 6 is coded as ?, 3 is coded as +, 7 is coded as # and 4 is coded as ? What will be the correct form of the number 435671?  
(1) ? + % ? # ? (2) ? + ? % # ?  
(3) ? + % ? # + (4) None of these

9. Stammering is to Speech as Deafness is to  
 (1) Noise (2) Hearing  
 (3) Ear (4) None of these
10. Mini tore out several successive pages from a book. The number of the first page she tore out was 385. It is known that the number of the last page which she tore out is with the same digits in some other order. How many pages did she remove from the book ?  
 (1) 469 (2) 450  
 (3) 157 (4) None of these

### SECTION-B : PHYSICS & CHEMISTRY

11. Which of the following salts is basic in nature ?  
 (1)  $\text{NH}_4\text{NO}_3$  (2)  $\text{Na}_2\text{CO}_3$   
 (3)  $\text{Na}_2\text{SO}_4$  (4) None of these
12. Butanoic acid is a carbon compound whose functional group is represented as  
 (1)  $\begin{array}{c} \text{--- C --- OH} \\ || \\ \text{--- C ---} \end{array}$  (2)  $\text{H --- C} \equiv \text{O}$   
 (3)  $\begin{array}{c} \text{--- C ---} \\ || \\ \text{O} \end{array}$  (4) None of these
13. The least active of the following non-metals is :  
 (1) Carbon (2) Helium  
 (3) Chlorine (4) None of these
14. What is the ratio of the current flowing in the  $4-\Omega$  branch to that in the  $16-\Omega$  branch in the given circuit?



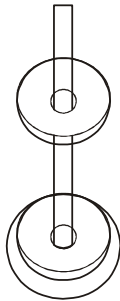
- (1) 1:4 (2) 2:1  
 (3) 4:1 (4) None of these
15. The spreading of white light into its component colours is known as  
 (1) Dispersion (2) Refraction  
 (3) Reflection (4) None of these
16. A convex mirror is used in  
 (1) A shaving mirror  
 (2) The rear-view mirror of a vehicle  
 (3) The headlights of a vehicle  
 (4) None of these

17. When two or more than two rays starting from a point on the object after refraction through a lens, do not actually meet but appear to diverge from a point to form  
 (1) Virtual image (2) Real image  
 (3) Inverted image (4) None of these
18. While sitting on the first bench, Mohan finds it difficult to read what is written on the blackboard. However, he can clearly see the same when he sits on the last bench. It can be concluded that Mohan is suffering from  
 (1) Myopia (2) Cataract  
 (3) Hypermetropia (4) None of these
19. An electric heater has an operating voltage of 220 V and a power rating of 1000 W. It is connected to a supply of 110 V for 30 minutes. What is the amount of heat generated by the heater ?  
 (1)  $4.49 \times 10^4 \text{ J}$  (2)  $4.49 \times 10^5 \text{ J}$   
 (3)  $4.49 \times 10^6 \text{ J}$  (4) None of these
20. What is the direction given by the forefinger as per Fleming's right hand rule ?  
 (1) Applied force (2) Magnetic field  
 (3) Induced current (4) None of these
21. The magnetic field that exists outside the body of a bar magnet is stronger at the poles and weaker near the centre of the magnet. This is because at the poles, the magnetic field lines are  
 (1) Discontinuous (2) Openly spaced  
 (3) Highly crowded (4) None of these
22. In which of the following solar devices the ultimate energy that is produced is not heat energy ?  
 (1) Solar cell (2) Solar heater  
 (3) Solar cooker (4) None of these
23. Which chemical is responsible for the depletion of the ozone layer ?  
 (1)  $\text{CaF}_2$  (2) CFC  
 (3) CO (4) None of these
24. The diagram below shows a worker using a rope to pull a cart.



- The worker's pull on the handle of the cart can best be described as a force having  
 (1) Magnitude, only  
 (2) Direction, only  
 (3) Both magnitude and direction  
 (4) None of these

25. The force acting on an object perpendicular to the surface is called
- (1) Buoyancy (2) Thrust  
(3) Surface Tension (4) None of these
26. A ring magnet is floating above another ring magnet as shown in the diagram. Which of the following inferences can be drawn from the observation ?



- (1) A pushing force is keeping the magnet floating  
(2) Magnetic forces can act at a distance  
(3) The earth's gravitational force is not acting on the ring magnet when it is floating  
(4) None of these
27. The hardness of water can be attributed to the presence of
- (1) Calcium and sodium ions  
(2) Magnesium and calcium ions  
(3) Potassium and ammonium ions  
(4) None of these
28. Which of the following statements is correct ?
- (1) Ionic compounds are bad conductors of electricity  
(2) Ionic compounds have low melting point in crystalized state  
(3) Ionic compounds are generally insoluble in water  
(4) None of these
29. To relieve pain caused due to acidity, we can take
- (1) Lemon Juice (2) Milk of magnesia  
(3) Orange juice (4) None of these
30. Which of the following oxides is not amphoteric in nature?
- (1) Sodium oxide (2) ZnO  
(3) SnO<sub>2</sub> (4) None of these

### SECTION-C : MATHEMATICS

31. If  $\lim_{x \rightarrow k} \frac{x^k - 5^k}{x - 5}$
- (1) 3 (2) 4  
(3) 5 (4) None of these
32.  $X = \{8^n - 7n - 1 : n \in \mathbb{N}\}$  and  $Y = \{49(n-1) : n \in \mathbb{N}\}$  then
- (1)  $X \subset Y$  (2)  $Y \subset X$   
(3)  $X = Y$  (4) None of these
33. The domain of the function  $f(x) = \sqrt{4x-3} + \sqrt{2x-6}$  is
- (1)  $(0, \infty)$  (2)  $(3/4, \infty)$   
(3)  $(4/3, \infty)$  (4)  $(3, \infty)$

34. If the base and height of a right angled triangle is 3 times and 1/5th times of another right angled triangle then what is the ratio of areas of first triangle to second triangle
- (1) 1:3 (2) 5:2  
(3) 2:3 (4) 5:3
35. If the  $m^{\text{th}}$  term of an AP is  $2n$  and  $n^{\text{th}}$  term is  $2m$ , then the sum of first  $mn$  terms is
- (1)  $mn(a+1-mn)$  (2)  $\frac{mn+a+2}{2}$   
(3)  $\frac{mn(-1+a+n+m)}{3}$  (4) None of these
36. The value of the expression  $\sqrt{3} \operatorname{cosec} 20^\circ - \sec 20^\circ$  is equal to
- (1) 2 (2)  $2 \sin 20^\circ / \sin 40^\circ$   
(3) 4 (4)  $4 \sin 20^\circ / \sin 40^\circ$ .
37. Let  $0 < x < \frac{\pi}{4}$  then  $(\sec 2x - \tan 2x)$  equals?
- (1)  $\tan\left(x - \frac{\pi}{4}\right)$  (2)  $\tan\left(\frac{\pi}{4} - x\right)$   
(3)  $\tan\left(x + \frac{\pi}{4}\right)$  (4)  $\tan^2\left(x + \frac{\pi}{4}\right)$ .
38. If  $w$  is an imaginary cube root of unity then the value of  $\sin\left\{(\omega^{10} + \omega^{23})\pi - \frac{\pi}{4}\right\}$  is
- (1)  $-\frac{\sqrt{3}}{2}$  (2)  $-\frac{1}{\sqrt{2}}$  (3)  $\frac{1}{\sqrt{2}}$  (4)  $\frac{\sqrt{3}}{2}$ .
39.  $3(\sin x - \cos x)^4 + 6(\sin x + \cos x)^2 + 4(\sin^6 x + \cos^6 x) =$
- (1) 11 (2) 12 (3) 13 (4) 14.
40. The number of all possible triplets  $(a_1, a_2, a_3)$  such that  $a_1 + a_2(\cos 2x) + a_3 \sin^2 x = 0$  for all  $x$  is
- (1) infinite (2) one  
(3) three (4) zero

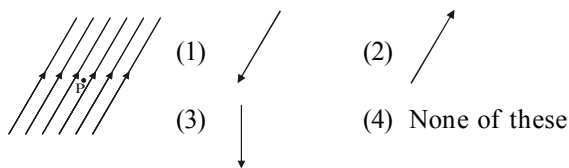
### SECTION C : BIOLOGY

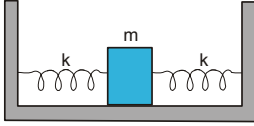
31. Which of the following correctly explains how favourable genetic traits can increase frequency in a population ?
- (1) Lamarck's principle (2) Natural selection  
(3) Genetic recombination (4) None of these
32. In human female, the fertilized eggs get implanted in Uterine wall
- (1) After 3 weeks of fertilization  
(2) After about 7 days of fertilization  
(3) After one month of fertilization  
(4) None of these
33. The autonomic nervous system has control over
- (1) Thought (2) Internal organs  
(3) Sense organs (4) Reflex action

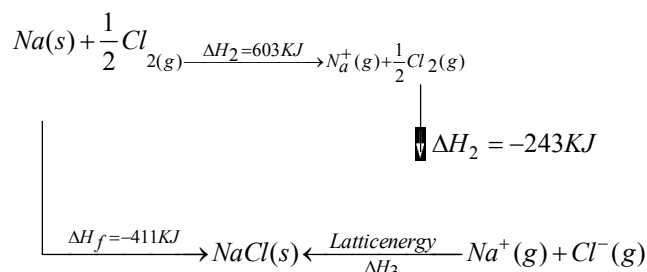
34. The shape of prokaryotic DNA is  
 (1) Linear (2) Spiral  
 (3) Circular (4) Zig Zag
35. Which are the amphibians of the plant kingdom ?  
 (1) Gymnosperms (2) Bryophytes  
 (3) Thallophytic (4) None of these
36. Total coliform count indicates the presence of  
 (1) Algae (2) Bacteria  
 (3) Fungi (4) None of these
37. The three basic body parts of insects are  
 (1) Head, wings, legs  
 (2) Head, abdomen and wings  
 (3) Head, thorax, abdomen  
 (4) None of these
38. Spore formation is an asexual mode of reproduction. Which of the following organisms reproduces asexually through spores ?  
 (1) Rhizopus (2) Planaria  
 (3) Yeast (4) None of these
39. Dwarfism occurs due to the deficiency of  
 (1) Insulin (2) Adrenaline  
 (3) Growth hormone (4) None of these
40. Red pigment present in RBCs is :  
 (1) Carotene (2) Anthocyanin  
 (3) Haemoglobin (4) None of these

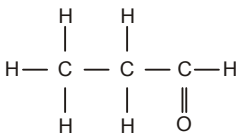
### ETG INTERACTIVE SECTION

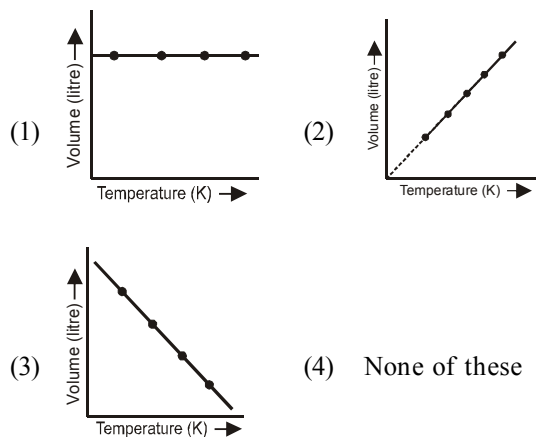
41. The diagram below represents the magnetic field near point P. If a compass is placed at point P in the same plane as the magnetic field, which arrow represents the direction of the north end of the compass needle will point ?



42. Which type of motion is exhibited when the mass is displaced from its equilibrium position on either side ?  
 (1) Simple harmonic motion (2) Circular motion  
 (3) Both 1 & 2 (4) None of these
- 
43. On plugging the key, the voltmeter/ammeter is likely to be damaged in the circuit shown in which figure  
 (1) 1 (2) 2  
 (3) 3 (4) None of these
44. An organism that has simple nutritional requirements has ..... biosynthetic ability than that has complex nutritional requirements. The blank is filled by  
 (1) Greater (2) Equal  
 (3) Lesser (4) None of these.
45. The Hess cycle for the formation of sodium chloride is shown in the diagram



- (1)  $-771 kJ/mol$  (2)  $-435 kJ/mol$   
 (3)  $+435 kJ/mol$  (4) None of these
46. Which of the following is a primary alkyl halide ?  
 (1)  $C_6H_5CHClCH_3$  (2)  $CH_3CHClCH_2CH_3$   
 (3)  $(CH_3)_2CHCH_2Cl$  (4) None of these.
47. The structural formula of a particular compound is shown in the given figure.
- 
- What is the IUPAC name of the given compound ?  
 (1) Propanoic acid  
 (2) Butanoic acid  
 (3) Propanol  
 (4) None of these.
48. Which of the following is a graphical representation of Charles's Law ?



49. A certain amount of gas at  $27^{\circ}C$  and 1 atm. pressure occupies a volume of  $25m^3$ . If the pressure is kept constant and the temperature is raised to  $77^{\circ}C$ , What will be the volume of the gas ?  
 (1)  $20.17m^3$  (2)  $29.17m^3$   
 (3)  $39.17m^3$  (4) None of these
50. If you arrange the units of life listed in the table below into a hierarchy, from smallest (least inclusive) to largest (most inclusive), which unit would be found three levels below a fish ?

Organism	Community	Molecule
Atom	Population	Organ
Tissue	Cell	Biosphere

- (1) Organ (2) Molecule  
 (3) Cell (4) None of these