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EHF NATIONAL INTERACTIVE SCIENCE OLYMPIAD

N I S O

11 Class **A1 Paper Code**

L E V E L - 1

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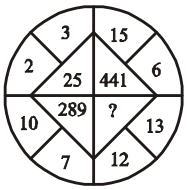
1. You are allowed additional 10 minutes to fill the required details in the **RESPONSE SHEET (OMR). STUDENTS OF CLASS 1 & 2 HAVE TO UNDERLINE** THE CORRECT ANSWER IN THE QUESTION PAPER ITSELF. THEY ARE NOT REQUIRED TO USE THE RESPONSE SHEET (OMR). THEY HAVE TO FILL THEIR NAME, ROLL NUMBER, CLASS, SCHOOL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

GENERAL IQ

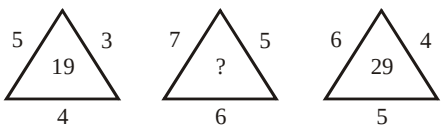
Find the missing character from among the given alternatives.

1.



(1) 625 (2) 25
(3) 125 (4) None of these

2.



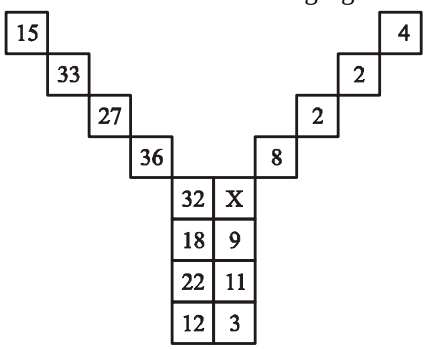
(1) 25 (2) 37
(3) 41 (4) None of these

3.

?	1	2
21	22	40
1	2	5
20	23	43

(1) 5 (2) 4
(3) 2 (4) None of these

4. Find the value of X in the following figure:



(1) 3 (2) 4
(3) 8 (4) None of these

5. In the matrix given below, the values of A, B and C are

9	A	12
B	10	7
8	C	11

(1) A=13, B=9, C=11 (2) A=9, B=11, C=13
(3) A=9, B=13, C=11 (4) None of these

6. A bus starts from city X. The number of women in the bus is half the number of men. In city Y, 10 men leave the bus and five women enter. Now the number of men and women are equal. In the beginning, how many passengers entered the bus?
(1) 15 (2) 36
(3) 45 (4) None of these

7. Between two book-ends in your study are displayed your five favourite puzzle books. If you decide to arrange the five books in every possible combination and moved just one book every minute, how long would it take you?
(1) 1 hour (2) 2 hours
(3) 3 hours (4) None of these

8. In a chess tournament each of six players will play with every other player exactly once. How many matches will be played during the tournament?
(1) 12 (2) 15
(3) 30 (4) None of these

9. A man has a certain number of small boxes to pack into parcels. If he packs 3, 4, 5 or 6 in a parcel, he is left with one over; if he packs 7 in a parcel, none is left over. What is the number of boxes, he may have to pack?
(1) 106 (2) 301
(3) 309 (4) None of these

10. In a group of cows and hens, the number of legs are 14 more than twice the number of heads. The number of cows is?
(1) 5 (2) 7
(3) 10 (4) None of these

SECTION B : PHYSICS & CHEMISTRY

11. Copper (II) nitrate on heating yields a black coloured solid compound, a red coloured gas and a colourless gas. Identify the products.
(1) Black $\rightarrow$ Copper oxide (CuO)
Colourless $\rightarrow$ Oxygen (O_2)
Red $\rightarrow$ Nitrous Oxide (NO_2)
(2) Colourless $\rightarrow NO_2$
Black $\rightarrow O_2$
Red $\rightarrow$ CuO
(3) Black $\rightarrow NO_2$
Colourless $\rightarrow O_2$
Red $\rightarrow$ CuO
(4) None of these

12. Which is a balanced chemical equation?
(1) $Cu(NO_3)_2 \xrightarrow{(heat)} CuO + NO_2 + O_2$
(2) $2Cu(NO_3)_2 \xrightarrow{(heat)} 2CuO + 4NO_2 + O_2$
(3) $3Cu(NO_4)_2 \xrightarrow{(heat)} 3CuO + 4NO_2 + O_2$
(4) none of these

13. Choose the correct balanced chemical reaction:
(1) $2Mg + CO_2 \rightarrow 2MgO + C$
(2) $3Mg + 2CO_2 \rightarrow 3MgO + C$
(3) $2Mg + CO_4 \rightarrow 4MgO + C$
(4) None of these

14. Name the hardest substance present in the human body.
(1) Calcium chloride
(2) Calcium sulphate
(3) Calcium phosphate
(4) None of these

15. In which of the following solutions, the bulb will not glow when electric current is passed through it?
(1) Tap water
(2) Hydrochloric acid
(3) Glucose solution
(4) None of these

16. Guard tube containing anhydrous calcium chloride is used to
(1) Absorb water from air
(2) Absorb coloured component
(3) Absorb N_2 from air
(4) None of these

17. What is not true about calcinations?
(1) To remove all organic matter
(2) To convert ore into metal
(3) To remove moisture from the ore
(4) None of these

18. What is not true about roasting?
(1) To convert sulphides into oxides
(2) To remove volatile impurities
(3) To convert the the ore into fine powder
(4) None of these

19. What is anodising ?
(1) Process of forming a thick oxide layer of aluminium.
(2) Process of forming a thick oxide layer of iron.
(3) Process of forming a thick oxide layer of silver.
(4) None of these

20. Which of the following is true about the properties of Ionic Compounds ?

(1) Ionic compounds are solids and are somewhat hard.
(2) Electrovalent compounds are generally soluble in water and insoluble in solvents such as kerosene etc.
(3) Solution of an ionic compound in water contains ions which move to the opposite electrodes when electricity is passed through the solution
(4) All of these

21. _____ & _____ are the examples of thermoplastics.
(1) Polyvinyl chloride, polystyrene
(2) Isoprene, polystyrene
(3) Thiokol, polystyrene
(4) None of these

22. _____ & _____ are the examples of thermosetting polymers.
(1) Bakelite, melamine
(2) Thiokol, polystyrene
(3) Bakelite, polystyrene
(4) None of these

23. Four elements along a period have atomic number (11, 13, 16 and 17). The most metallic among these has an atomic number of_____.
(1) 11 (2) 12
(3) 16 (4) None of these

24. Six elements A, B, C, D, E and F have the following atomic numbers (A = 12, B = 17, C = 18, D = 7, E = 9 and F = 11). Among these elements, the element, which belongs to the 3rd period and has the highest ionisation potential, is _____.
(1) A (2) B
(3) C (4) None of these

25. A factor that affects the ionisation potential of an element is _____.
(1) Atomic size (2) Electron affinity
(3) Electro-negativity (4) None of these

26. In order to determine focal length of a concave mirror by obtaining the image of distant object on screen you need to measure the distance between
(1) Mirror and the screen (2) Object & screen
(3) Mirror & object (4) None of these

27. For a plane mirror, the value of focal length is
(1) Anything between zero & infinity
(2) Infinity
(3) Zero
(4) None of these

28. Red colour of the sun at the time of sunrise and sunset is because-
(1) Red colour is least scattered
(2) Blue colour is least scattered
(3) Red colour is scattered the most
(4) All colours are equally scattered

29. A human eye can focus objects at different distances by adjusting the focal length of the eye lens. This is due to –
(1) Persistence of vision
(2) Near sightedness
(3) Accommodation
(4) None of these

30. For which of the following substance, _____ resistance decreases with temperature?
(1) Copper (2) Carbon
(3) Mercury (4) None of these

SECTION C : BIOLOGY

31. Which of the following types of meals would stay in the stomach for the longest period of time?
(1) Meals high in lipids
(2) Meals high in carbohydrates
(3) Meals high in proteins
(4) All would stay in the stomach about the same amount of time

32. Which events occur during the process of photosynthesis?
(1) Absorption of light energy by chlorophyll
(2) Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.
(3) Reduction of carbon-dioxide to carbohydrates
(4) All of these

33. Who coined the term hormones ?
(1) Ernest Starling & William Bayliss
(2) Carl Linneaus & William Bayliss
(3) Ernest Starling & Carl Linneaus
(4) None of these

34. What is geotropism?
(1) Growth movement by a plant, fungus, or animal in response to gravity.
(2) Growth of organisms (or parts of an organism, including individual cells) such as bacteria and plants, navigated by chemical stimulus from outside of the organism or organisms part.
(3) Growth of organisms (or parts of an organism, including individual cells) such as bacteria and plants, navigated by physical stimulus from inside of the organism or organisms part.
(4) None of these

35. The hemoglobin of a human foetus:
(1) Has a higher affinity for oxygen than that of an adult
(2) Has a lower affinity for oxygen than that of the adult
(3) Its affinity for oxygen is the same as that of an adult
(4) None of these

36. Which one of the following statements is incorrect about menstruation?
(1) The beginning of the cycle of menstruation is called menarche

(2) During normal menstruation about 40 ml blood is lost
(3) The menstrual fluid can easily clot
(4) None of these

37. Human seminal plasma, the fluid part of semen, is produced by contributions from the: (i). Urethra (ii). Prostate (iii). Seminal vesicle (iv). Bulbourethral gland, choose the most suitable option.
(1) i and iii (2) i and iv
(3) ii, iii and iv (4) none of these

38. Test cross of dihybrid ratio 1:1:1:1:, then it proves that :
(1) F_1 hybrid produces four different progenies
(2) F_2 hybrid is homozygous
(3) F_2 hybrid is heterozygous
(4) None of these

39. Sickle cell anaemia is
(1) Characterized by elongated sickle like RBC's with a nucleus
(2) Cause the substitution of valine by glutamic acid in the β globin chain of haemoglobin
(3) An autosomal linked dominant trait
(4) None of these

40. If two pea plants having red (dominant) coloured flowers with unknown genotypes are crossed, 75% of the flower are red and 25% are white. The genotype constitution of the parents having red coloured flowers will be:
(1) Both heterozygous
(2) Both homozygous
(3) Both (1) and (2)
(4) None of these

SECTION-C : MATHEMATICS

31. Let A be a 2×2 matrix with real entries. Let I be the 2×2 identity matrix. Denote by tr(A), the sum of diagonal entries of A. Assume that $A^2 = I$.
Statement-1: If $A \neq I$ and $A \neq -I$, then det A = –1.
Statement-2: If $A \neq I$ and $A \neq -I$, then tr(A) $\neq 0$.
(1) statement-1 is true, statement-2 is true; statement -2 is not a correct explanation for statement-1.
(2) statement-1 is true, statement-2 is true; statement-2 is a correct explanation for statement-1.
(3) statement-1 is false, statement-2 is true.
(4) statement-1 is true, statement-2 is false.

32. If $|z + 4| \leq 3$, then the maximum value of $|z + 1|$ is
(1) 10 (2) 0
(3) 4 (4) 6

33. The string of a kite is 100 m long and it makes an angle of 60° with the horizontal. What is the height of the kite assuming that there is no slack in the string ?
(1) $50\sqrt{3}$ m (2) 80 m
(3) $40\sqrt{3}$ m (4) 60 m

34. The coefficient of the term independent of x in the expansion of $\left[\sqrt{\frac{x}{3}} - \frac{3}{2x^2}\right]^{10}$ is :
(1) $\frac{5}{4}$ (2) $\frac{7}{4}$
(3) $\frac{9}{4}$ (4) none of these

35. A bag contains n balls. It is given that the probability among these n balls exactly r balls are white is proportional to $r^2 (0 \leq r \leq n)$. A ball is drawn at random and is found to be white. Then, the probability that all the balls in the bag are white, will be :
(1) $\frac{4n}{(n+1)^2}$ (2) $\frac{2n}{(n+1)^2}$
(3) $\frac{2n}{(n+3)^2}$ (4) $\frac{4n}{(n+3)^2}$

36. The number of n terms of an A.P. is $3n^2 + 5$. The number of the term which equals 159 is
(1) 28 (2) 13
(3) 27 (4) 21

37. If p, q, r are any real numbers, then
(1) max (p, q) < max (p, q, r)
(2) max (p, q) < min (p, q, r)
(3) min (p, q) = $\frac{1}{2}(p + q - |p - q|)$
(4) none of these

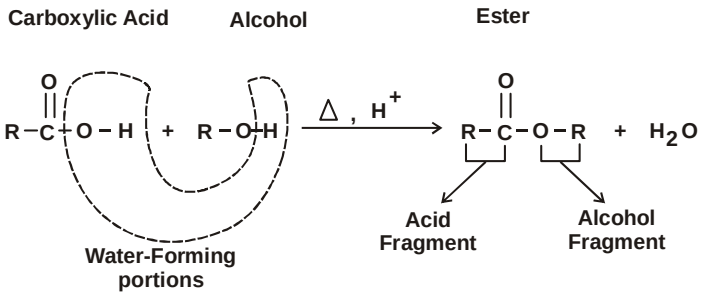
38. At an election, a voter may vote for any number of candidates, not greater than the number to be elected. There are 10 candidates and 4 are to be elected. If a voter votes for at least one candidate, then the number of ways in which he can vote is
(1) 385 (2) 6210
(3) 5040 (4) 1110

39. $\int \frac{x\,dx}{1 - x^4}$ is equal to :
(1) $\tan^{-1} x^2 + c$
(2) $\frac{1}{2}\tan^{-1} x^2 + c$
(3) $\log (1 + x^4) + c$
(4) none of these

40. If $\angle$A is acute and tan A = 2/3, then
(1) cot (90°–A) = 2/3
(2) cot (90°–A) = 1/3
(3) cot A = 2/3
(4) none of these

INTERACTIVE SECTION

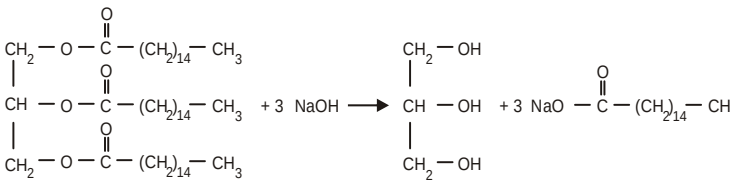
Look at the given figure and answer the following question nos. 41 and 42.



41 What is the name of the process shown ?
(1) Esterification (2) Saponification
(3) Froath floation (4) None of these

42. What are the properties & uses of the product(ester) formed?
(1) They have a fruity smell
(2) They are used in cold drinks ,ice-creams ,sweets & perfumes.
(3) Benzyl acetate has the smell of strawberry.
(4) All of these

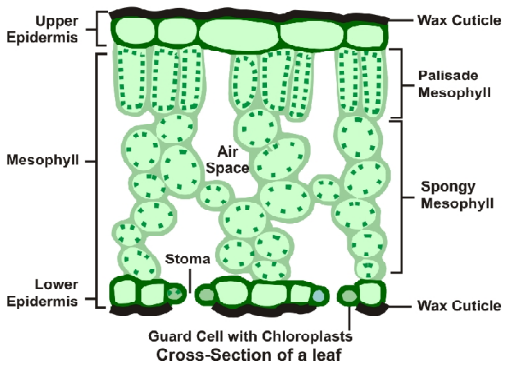
Direction: Look at the reaction and answer the given question



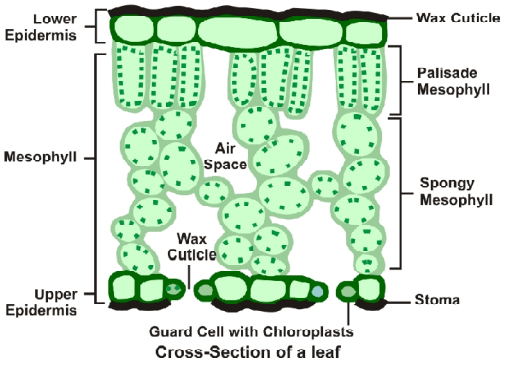
43. What is the name of the process shown ?
(1) Esterification (2) Saponification
(3) Froath floation (4) None of these

44. Which diagram represents the correctly labelled cross-section of a leaf?

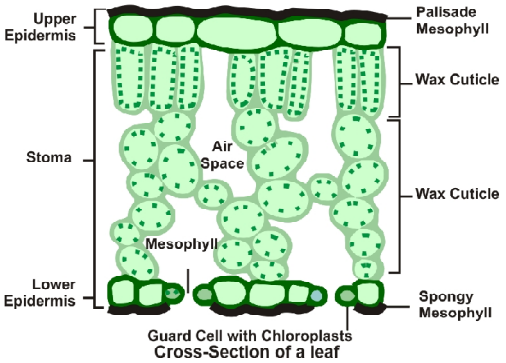
(1)



(2)

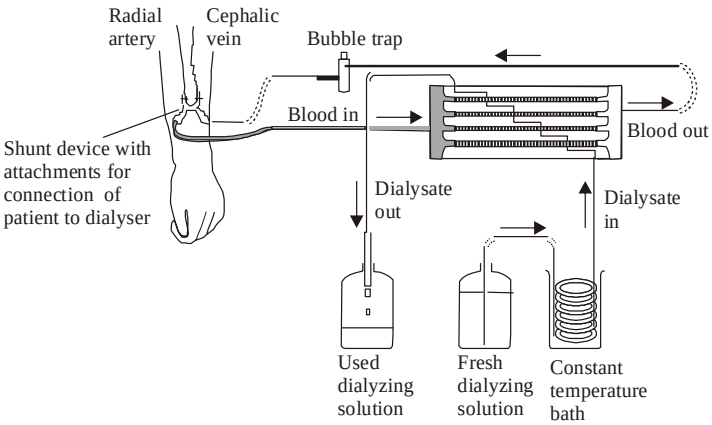


(3)



(4) None of these

45. Name the process

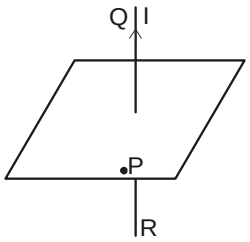


(1) Dialysis (2) Nutrition
(3) Transportation (4) None of these

46. Four cells each of e.m.f 'E' are joined in parallel to form a battery. The equivalent e.m.f. of the battery will be_____.
(1) 4 E (2) E
(3) E/4 (4) None of these

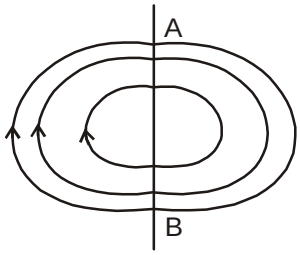
47. Two electric bulbs have resistances in the ratio 1:2. If they are joined in series, the energy consumed in them are in the ratio _____.
(1) 1:2 (2) 2:1
(3) 4:1 (4) None of these

48. In the figure QR is a vertical conductor and the current I flows from R to Q. P is a point on the horizontal plane and is to the south of the wire. The direction of the magnetic field at P due to the current will be towards



(1) upward
(2) north
(3) east
(4) none of these

49. Concentric circles with arrows centered at the wire AB are shown in the given figure. Which is the correct statement?



(1) no current in AB
(2) current flows from B to A
(3) current flows from A to B
(4) none of these

50. Biodiversity hot spots are areas where
(1) large number of different species are found
(2) hot areas where large number of different species are found
(3) areas where large spot has been created due to the death of a number of species
(4) none of these

END OF THE EXAM