ADARSH Group of Schools Ch. Dadri

Maths & Science Olympiad–2026

NAME- _____ **FATHER'S NAME-** _____

ROLL NO.- _____ **CLASS-** **10th**

MOBILE NO.- _____ **INVIGILATOR SIGN. -** _____

TIME- 90 Min. **MM- 70**

SUBJECT- MATHEMATICS & REASONING

Q1. If α and β are the zeroes of the polynomial $x^2 + 6x - k$ such that $2\beta + \alpha = 11$ then k is equal to

a) 18 b) -23

c) 391 d) -391

Q2. For a quadratic equation $\alpha x^2 + \beta x + \gamma = 0$, if roots are in the ratio 3:4, then

a) $12\,\beta^2 = 49\alpha\gamma$ b) $6\,\beta^2 = 7\alpha^2\gamma$

c) $15\,\beta^2 = 49\alpha\gamma$ d) $16\,\beta^2 = 7\alpha\gamma$

Q3. If there are (2n-1) terms in an AP then the ratio of the sum of its odd terms to its even terms is _____

a) $\frac{n+1}{n}$ b) $\frac{n-1}{n}$

c) $\frac{n}{n-1}$ d) $\frac{n}{n+1}$

Q4. $\sqrt{-4 + \sqrt{8 + 16\sec^4\theta + \mathrm{Cos}^4\theta}}$ = _____

a) $\mathrm{Cos}\,\theta + \tan\theta$ b) $\mathrm{Sec}\,\theta + \mathrm{Cos}\,\theta$

c) $2\sec\theta - \mathrm{Cos}\,\theta$ d) $2\cos\theta + \tan\theta$

Q5. Find the largest possible positive integer that will divide 125, 162 and 259 leaving remainder 5, 6 and 7 respectively.

a) 6 b) 8

c) 12 d) 13

Q6. Value of $x\left[\left(1+\frac{1}{x}\right)\left(1+\frac{1}{x+1}\right)\left(1+\frac{1}{x+2}\right)-1\right]$ is

a) 3 b) 2x

c) 5x d) 1

Q7. Given $3\sin\beta + 5\cos\beta = 5$, then the value of $(3\cos\beta - 5\sin\beta)^2$ is equal to:

a) 9 b) 9/5

c) 1/3 d) 1/9

Q8. $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta)$ is equal to:

a) 0 b) 1

c) -1 d) 2

Q9. A girl is twice as old as her sister. Four years hence, the product of their ages (in year) will be 160. Find their present age of her sister

a) 12 years b) 6 years

c) 8 years d) 9 years

Q10. If the sum of n terms of a AP is $2n^2 + 5n$, then its n^{th} term will be:

a) 4n-3 b) 3n-4

c) 4n+3 d) 3n+4

Q11. If in an AP the p^{th} term $= 1/q$ and the q^{th} term $= 1/p$, then the pq^{th} term $=$

a) -1 b) 0

c) 1 d) 2

Q12. If the elevation of the sun changed from 30^0 to 60^0 then the difference between the length of shadow of a pole 15m high, made at these two positions is

a) 7.5m

b) 15m

c) $10\sqrt{3}$

d) $\frac{15}{\sqrt{3}}$

Q13. Number of cubes of volume 4 cubic units which can be cut from a cube with a surface area of 96 square units is

a) 4

b) 8

c) 12

d) 16

Q14. If in a $\Delta\, ABC, \angle A = 90^0$ then the value of Cos^2 A + Cos^2 B + Cos^2 C is:

a) 3

b) 2

c) 3/2

d) 1

Q15. If $(3 + \sqrt{3})$ is one of the zeroes of the quadratic polynomial x^2 +mx + 6 then find the second zero.

a) - $\sqrt{3}$

b) 3 - $\sqrt{3}$

c) 3 + $\sqrt{3}$

d) $\sqrt{3}$

Q16. If the points (P, O), (O, Q) and (1, 1) are collinear then $\frac{1}{P} + \frac{1}{Q}$ equals to _____

a) 1 unit

b) 2 unit

c) 3 unit

d) 4 unit

Q17. For what value of m, the equation $-2m^2 + 5m - 12$ has maximum value?

a) 5/2

b) -5/2

c) 5/4

d) -5/4

Q18. Diagonal PR of a rectangle PQRS is produced to the point E such that PR : RE = 2:1. If PQ = 8cm and QR = 6cm then the length of SE is _____

a) $2\sqrt{15}$ cm

b) $3\sqrt{17}$ cm

c) $3\sqrt{15}$ cm

d) $4\sqrt{19}$ cm

Q19. The ratio of the areas of the incircle and circumcircle of a square is _____

a) 1:2

b) 1:1

c) 1:3

d) 1:4

Q20. Roots of the equation $3^{1-a} + 3^{a-1} = 2$ is/are

a) 0

b) -1

c) 1

d) 2

Q21. ABC is an equilateral triangle in which AC is produced to R, such that CR = $\frac{1}{2}$ AC, then

a) $BR^2 = 5CR^2$

b) $BR^2 = 3CR^2$

c) $BR^2 = 7CR^2$

d) $BR^2 = 4CR^2$

Q22. Find the other zero of the polynomial $x^3 + 3x^2 - 2x - 6$, if two of its zeros are $-\sqrt{2}$ and $\sqrt{2}$.

a) -3

b) 3

c) 2

d) $\sqrt{3}$

Q23. The sum of digits of a two-digit number is 7 and the tens' place digit is 25% less than the unit's place digit. What is the number?

a) 25

b) 43

c) 16

d) 34

Q24. How many natural numbers between 15 to 500 when divided by 6 leave remainder 5?

a) 80

b) 81

c) 82

d) 83

Q25. If the circumference of a circle increases from 4π *to* 8π then its area is:

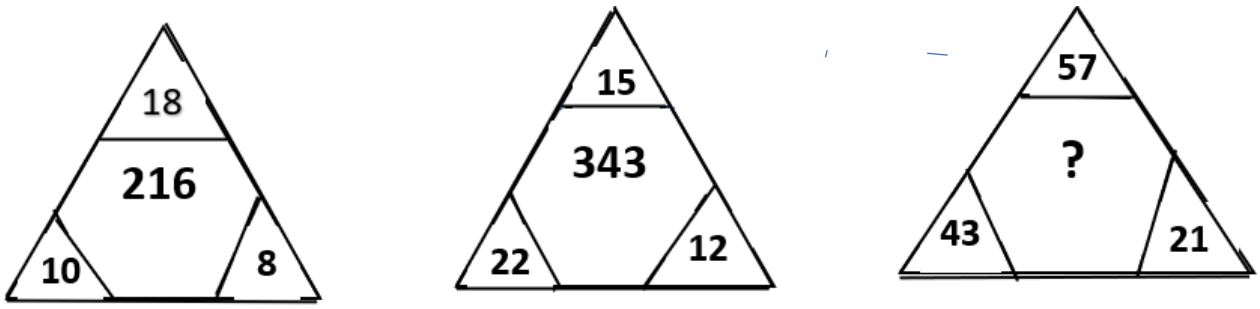
a) Halved

b) Doubled

c) Tripled

d) Quadrupled

Q26. Find the missing number in the following figure.



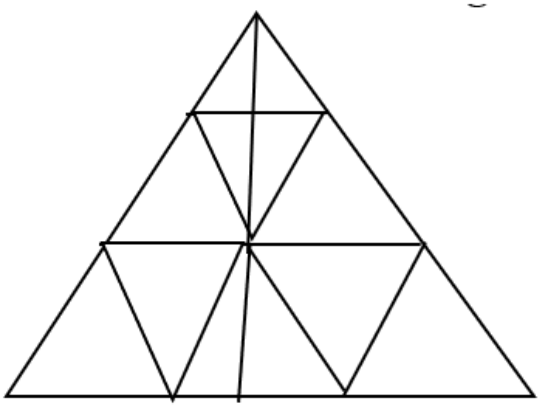
a) 1728

b) 1331

c) 729

d) 512

Q27. Count the number of triangles in the figure shown below.



a) 19

b) 21

c) 22

d) None of these

Q28. Nora correctly remembers that Kate's birthday is before Friday but after Tuesday. Danny correctly remembers that Kate's birthday is after Wednesday but before Saturday. On which day is Kate's birthday?

a) Monday

b) Tuesday

c) Wednesday

d) Thursday

Q29. Garima and Saurabh are Children of Mr. Jindal. Garima marries Amit Goel and Sahil, Sameer and Sanchit are born to them. Sahil is married to the eldest daughter of Mr. and Mrs. Mittal. Kavya is younger to Piya but older than Riya who are daughter of Mr. and Mrs. Mittal. Latika is Sahil's daughter. How is Saurabh related to Sanchit?

a) Brother-in-law

b) Uncle

c) Maternal Uncle

d) Brother

Q30. Mr. Das left for his office in his car. He drove 12 km towards North and then 10 km towards west. He then turned to the South and covered 4 km. Further he turned to the East and covered 8 km. Finally, he turned right and drive 8 km. How far in which direction is he from his point?

a) 2 km, West

b) 2 km, East

c) 4 km, North

d) 2 km, South

Q31. Choose the number group which is different from others:

a) [64, 14, 54]

b) [99, 25, 74]

c) [26, 4, 22]

d) [45, 9, 36]

Q32. In a row of boys, Nitish is 8^{th} from the right end and Prem is 17^{th} from the left end. If they interchange their positions, then Nitish becomes 10^{th} from the right end. How many boys are there in the row?

a) 25

b) 26

c) 27

d) 24

Q33. A large cube is dipped into a tub filled with colour. When the cube is taken out, it is observed that all its sides are painted. This large cube is now cut into 125 small identical cubes. How many of the smaller cubes have exactly three faces painted?

a) 4

b) 8

c) 9

d) None of these

Q34. If '-' means '+', '+' means '-', '×' means '÷' and '÷' means '×', then which one of the following will be the correct equation?

a) 100 + 5 – 12 ÷ 10 × 15 = 157

b) 130 + 5 ÷ 14 – 10 × 16 = 123

c) 150 × 5 – 4 ÷ 10 + 15 = 55

d) 30 × 5 – 4 ÷ 10 + 15 = 35

Q35. How many meaningful, English words not ending with 'D' can be made with third, fifth, seventh and ninth letters of the word 'STEADFAST' using each letter only once in each word? (All letters are counted from left to right)

a) One

b) Two

c) Three

d) More than three

SUBJECT- SCIENCE

Q36. In a respiratory system 'X' is delivered to the cells of the body's tissues and 'Y' is removed as a cell waste product. Identify 'X' and 'Y'.

a) X-Water; Y - Carbon dioxide

b) X-Oxygen; Y - Carbon dioxide

c) X - Carbon dioxide; Y – Oxygen

d) X - Carbon dioxide; Y – Glucose

Q37. Study the features of phenomenon given below.

(I) The water is uptaken from roots to all parts.

(II) During this process there is expenditure of energy by the cell.

(III) This process usually happens against the concentration gradient.

Identify the phenomenon based on given information.

a) Active absorption

b) Passive absorption

c) Osmosis

d) Diffusion

Q38. Which of the following statements is correct about the human reproductive system?

Statement 1: The prostate gland secretes a fluid that helps to nourish and transport sperm.

Statement 2: The prostate gland is located just below the bladder in males.

a) Only Statement 1 is correct

b) Only Statement 2 is correct

c) Both Statement 1 and Statement 2 are correct

d) Neither Statement 1 nor Statement 2 is correct

Q39. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in

a) Cytoplasm

b) Mitochondria

c) Chloroplast

d) Nucleus

Q40. Which of the following blood vessels carry blood away from the heart?

1. Pulmonary artery

2. Pulmonary vein

3. Aorta

4. Vena cava

a) Only 1 and 3

b) Only 2 and 4

c) Only 1, 3 and 4

d) All 1, 2, 3 and 4

Q41. A person is excreting about 10 litres of urine per day. Which of the following endocrine gland is responsible for this?

a) Pituitary

b) Thyroid

c) Parathyroid

d) Adrenal

Q42. Assertion: Contribution of CO_2, CH_4 CFCs and N_2O towards greenhouse effect is respectively 60%, 6%, 14% and 20%.

Reason: Greenhouse gases are radiatively active gases which prevent the long wavelength radiations emitted by earth to escape into space

Mark the correct choice.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false.

d) If assertion is false but reason is true.

Q43. Identify the correct order of steps of respiration in leaves.

(p) Stomata is the one through which the exchange of respiratory gases takes place by diffusion.

(q) The oxygen gas is used for respiration and the carbon dioxide produced diffuses out from the leaf into the air through stomata.

(r) The leaves of a plant have tiny pores called stomata.

(s) Oxygen from air diffuses into a leaf through stomata and reaches all the cells.

a) (q)→(r)→(s)→(p)

b) (q)→(s)→(r)→(p)

c) (r)→(p)→(s)→(q)

d) (r)→(s)→(q)→(p)

Q44. In a monohybrid cross between two heterozygous individuals, percentage of heterozygous individuals obtained in F_1 generation is

a) 25%.

b) 50%

c) 75%

d) 100%

Q45. Heart is covered by

a) Peritoneum

b) Pleural membrane

c) Pericardium

d) Visceral membrane

Q46. Read the given statements and mark the correct option.

Statement 1: A normal human eye can clearly see all the objects at a distance less than or greater than 25 m.

Statement 2: The human eye has the capacity to suitably adjust the focal length of its lens to a certain extent.

a) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.

b) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.

c) Statement 1 is true but statement 2 is false.

d) Statement 1 is false but statement 2 is true.

Q47. A passenger in an aeroplane

a) Shall never see a rainbow

b) May see a primary and a secondary rainbow as concentric circles

c) May see a primary and a secondary rainbow as concentric arcs

d) Shall never see a secondary rainbow.

Q48. An object, 5 cm tall, is placed at the distance of 15 cm in front of a concave mirror with a focal length of 10 cm. Where should a screen be placed to obtain a sharp image?

a) The screen should be placed at 7.5 cm in front of the mirror.

b) The screen should be placed at 12 cm in front of the mirror.

c) The screen should be placed at 30 cm in front of the mirror.

d) The screen should be placed at 30 cm behind the mirror.

Q49. In a metal, the path of motion of a free electron is

a) straight line

b) Oscillatory

c) circular

d) parabolic

Q50. If two identical heaters, each rated as 1000 W- 220 V; are connected in parallel to 220 V, then the total power consumed is

a) 200 W

b) 2500 W

c) 250 W

d) 2000 W

Q51. An object is placed at a distance of 10 cm from the pole of a concave mirror. Its image is formed at 6 cm from its pole. Calculate the focal length of the concave mirror.

a) -6.83 cm

b) -5.94 cm

c) -3.75 cm

d) -1.26 cm

Q52. Which of the following statements is/are correct regarding scattering of light?

(i) Scattering is responsible for the bluish appearance of the sky.

(ii) Clouds having droplets of water scatter all wavelengths almost equal and so are generally white.

(iii) Advanced sunrise and delayed sunset are due to atmospheric reflection.

a) Only (i) and (ii)

b) Only (ii) and (iii)

c) Only (iii)

d) (i), (ii) and (iii)

Q53. A cell, a resistor, a key and ammeter are arranged as shown in the circuit diagrams of Figure12.1. The current recorded in the ammeter will be

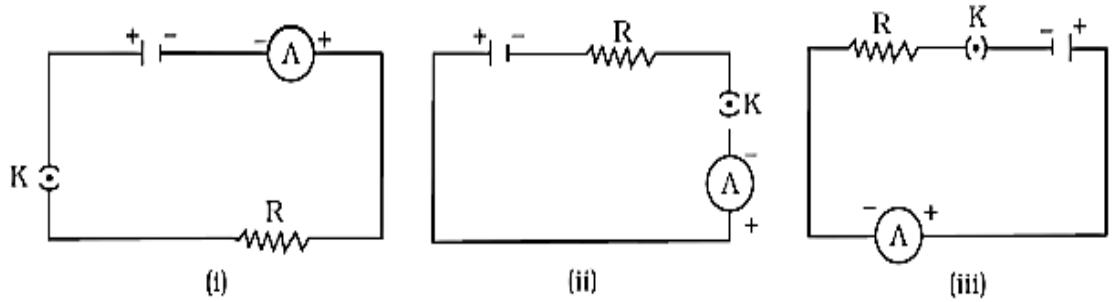


Fig. 12.1

a) maximum in (i)

b) maximum in (ii)

c) maximum in (iii)

d) the same in all the cases

Q54. If the resistance of your body is 100000 Ω, what would be the current that flows in your body when you touch the terminals of a 12V battery?

a) 10×10^{-5} A

b) 14×10^{-5} A

c) 12×10^{-5} A

d) None of these

Q55. Which of the following statements is true?

a) A convex lens has 4 dioptre power having a focal length 0.25 m

b) A convex lens has -4 dioptre power having a focal length 0.25 m

c) A concave lens has 4 dioptre power having a focal length 0.25 m

d) A concave lens has -4 dioptre power having a focal length 0.25 m

Q56. Which of the following properties Mg and Zn do not resemble in?

a) Nature of oxides

b) Forms Carbonates on heating with metal oxides

c) Widely used as electrodes

d) Used to prevent corrosion

Q57. Which one of the following is the oxidising agent in given chemical reaction?

$3MnO_2 + 4Al \longrightarrow 3Mn + 2Al_2O_3$

a) Mn

b) O_2

c) MnO_2

d) Al

Q58. Which of the following molecules contain covalent bonds?

1) H_2

2) $CHCl_3$

3) CH_4

4) CH_3CH_2OH

a) Only 1 and 2

b) Only 2 and 3

c) Only 1, 2 and 3

d) All 1, 2, 3 and 4

Q59. A white precipitate can be obtained by adding dilute sulphuric acid to:

a) $CuSO_4$ solution

b) NaCl solution

c) $BaCl_2$ solution

d) Na_2SO_4 solution

Q60. The number of isomers formed by the hydrocarbon with molecular formula C_5H_{12} is

a) 2

b) 5

c) 3

d) 4

Q61. Which of the following statements about the following reactions is correct?

$ZnO + CO \longrightarrow Zn + CO_2$

a) ZnO is being oxidised

b) CO is being reduced

c) CO_2 is being oxidised

d) ZnO is being reduced

Q62. Which of the following is a salt with pH < 7

a) HCOONa

b) CH_3COONH_4

c) NH_4Cl

d) CH_3COONa

Q63. Electricity is passed through an aqueous solution of sodium chloride (called brine) as per the given chemical equation.

$NaCl\ (aq) \xrightarrow{\text{Electricity}} NaOH + X + Y$

What are the products formed at X and Y and where are they produced?

a) X = O_2 at cathode, Y = Cl_2 at anode

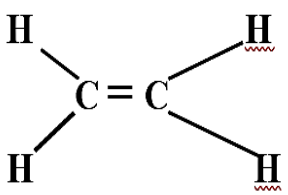
b) X = O_2 at anode, Y = Cl_2 at cathode

c) X = H_2 at cathode, Y = Cl_2 at anode

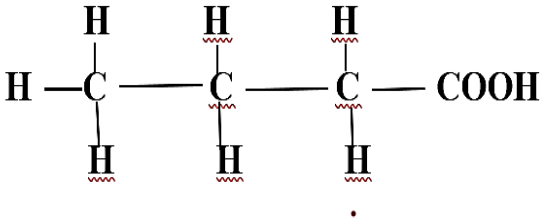
d) X = H_2 at anode, Y = Cl_2 at cathode

Q64. Which of the structure shown below of a compound reacts with ethanol to form a sweet-smelling liquid?

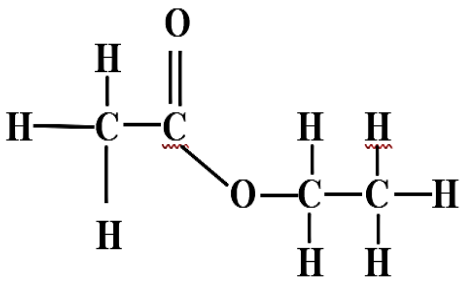
a)



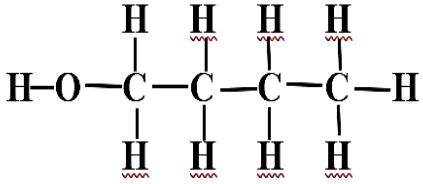
b)



c)



d)



Q65. A covalent molecule having a double bond between its atoms is

a) Hydrogen

b) Oxygen

c) Water

d) Ammonia

Q66. The two kidneys lie in man

a) At the level of ovaries

b) At the same level

c) Left kidney at a higher level than the right one

d) Right kidney at a higher level than the left one

Q67. What happens to the current through a resistor if the resistance is doubled while the voltage remains constant?

a) The current remains the same

b) The current is doubled

c) The current is halved

d) The current is quadrupled

Q68. Electrical resistivity of a given metallic wire depends upon

a) its length

b) its thickness

c) its shape

d) nature of the material

Q69. The atomic number of four elements P, Q, R and S are 6, 10, 12 and 17 respectively. Which two elements can combine to form a covalent compound?

a) P and R

b) Q and S

c) P and S

d) R and S

Q70. The molecular formula of an organic compound is $C_{48}H_{94}$. This compound belongs to the homologous series of

a) Alkenes

b) Aldehydes

c) Alkynes

d) Alkanes