
TEST # IX - 02, JUNE 2023

NAME: _____

Total. Time: 1:30 Hr

M.M: 150

INSTRUCTIONS

1. The paper consists of two sections A & B. Section A – Mathematics & Section B - Science.
2. The objective paper is designed by considering School Exam, NTSE & IIT Foundation.
3. The marking system is given just before the start of the Part in each section.
4. Blank papers, clipboards, log tables, slide rules, calculators, cameras, cellular phones, pagers and electronic gadgets are NOT allowed during exam.
5. The maximum mark allotted to the paper is 150.
6. Total time allotted for the exam is 1:30 Hours.
7. SECTION – A (MATHEMATICS) Questions No's: 1 – 15.
SECTION – B (SCIENCE) Questions No's 16 – 45.

Mathsarc Test Series

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Invigilator Sign

Test is just a crosscheck of our learning during the month! So, be honest with thyself!

SECTION - A (MATHEMATICS)

PART - I

SINGLE OPTION CORRECT (+ 4, - 1, 0). Only one option is correct.

1. Factorization of $a^6 - 26a^3 - 27$ is _____
- (A) $(a + 3)(a - 1)(a^2 + 3a + 1)(a^2 - a + 9)$ (B) $(a - 3)(a + 1)(a^2 + 3a + 1)(a^2 - a + 9)$
(C) $(a - 3)(a + 1)(a^2 + 3a + 9)(a^2 - a + 1)$ (D) $(a - 1)(a + 3)(a^2 + 3a + 9)(a^2 - a + 1)$
2. If $x^3 + y^3 + z^3 = 3xyz$ and $x + y + z = 0$. The value of $\frac{(x+y)^2}{xy} + \frac{(y+z)^2}{yz} + \frac{(z+x)^2}{zx}$ is _____
- (A) 3 (B) -3 (C) 2 (D) None of these
3. Which of the following is not equal to $\left[\left(\frac{5}{6}\right)^{\frac{1}{5}}\right]^{-\frac{1}{6}}$?
- (A) $\left(\frac{5}{6}\right)^{\frac{1}{5}-\frac{1}{6}}$ (B) $\frac{1}{\left(\left(\frac{5}{6}\right)^{\frac{1}{5}}\right)^{\frac{1}{6}}}$ (C) $\left(\frac{6}{5}\right)^{\frac{1}{30}}$ (D) $\left(\frac{5}{6}\right)^{-\frac{1}{30}}$
4. If $\sqrt{2} = 1.4142$, then $\sqrt{\frac{\sqrt{2}-1}{\sqrt{2}+1}}$ is equal to
- (A) 2.4142 (B) 5.8282 (C) 0.4142 (D) 0.1718

ROUGH SPACE

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5. If $a = 7 + 4\sqrt{3}$ and $b = \frac{1}{a}$, then what will be the value of $a^2 + b^2$?
- (A) 196 (B) 194 (C) 198 (D) None of these
6. If $p(x) = x^2 - 3\sqrt{2}x + 1$, then $p(5\sqrt{2})$ is equal to _____
- (A) $10\sqrt{2} - 1$ (B) $10\sqrt{2} + 1$ (C) 71 (D) 21
7. Select the wrong rational number match
- (A) $0.\bar{3} = \frac{1}{3}$ (B) $0.10\bar{1} = \frac{1}{9}$ (C) $1.2\bar{25} = \frac{1213}{990}$ (D) $0.\bar{9} = 1$
8. Consider $\frac{79}{15} = I + f$, where $0 \leq f < 1, I = \text{Integer}$ then
- (A) $I \times f \neq 1.\bar{3}$ (B) $I + \frac{1}{f} = \frac{35}{4}$ (C) $\frac{1}{I} > f$ (D) I is composite No.
9. The value of $\sqrt{7+2\sqrt{6}} + \sqrt{7-2\sqrt{6}}$ is _____
- (A) $2\sqrt{6}$ (B) 2 (C) - 2 (D) None of these
10. The remainder when we divide $p(x) = 4x^4 - 3x^3 + 2x - 1$ by $x^2 + 1$ is
- (A) $3x - 5$ (B) $3x + 5$ (C) $5x + 3$ (D) None of these

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PART - II

MULTI OPTION CORRECT (+ 4, -1, 0). One or More options are correct

11. Select the correct statement(s)

- (A) If $p(a) = 0$ then $(x - a)$ is a factor of $p(x)$.
- (B) Remainder when polynomial $p(x)$ divided by $(x - a)$ is $p(a)$.
- (C) Remainder, when $x^3 - 2x + 1$ is divided by $2x - 1$ is $1/8$.
- (D) $(x + 2)$ is a factor of $x^3 + x^2 - x + 2$.

12. Select the correct statement(s)

- (A) $73^3 - 80^3 + 7^3 = -3 \times 73 \times 80 \times 7$
- (B) $x^3 - 1 = (x + 1)(x^2 - x + 1)$
- (C) $a^2 + b^2 + c^2 - ab - bc - ca = 0 \rightarrow a = b = c$
- (D) $(x - a)(x - b)(x - c) = x^3 - (a + b + c)x^2 + (ab + bc + ca)x - abc$

13. If $2^{2x+3} - 9 \times 2^x + 1 = 0$, then $x =$ _____

- (A) 0
- (B) 1
- (C) - 2
- (D) - 3

14. Select the correct option(s)

- (A) $9^{5/2} - 3 \times 8^0 - \left(\frac{1}{81}\right)^{-1/2} = 231$
- (B) $\frac{3}{0} = \infty$ (Infinite)
- (C) $3^{x-1} \times 5^{2y-3} = 225 \rightarrow x = 3, y = \frac{5}{2}$
- (D) $0^x = \begin{cases} 1 & \text{if } x = 0 \\ 0 & \text{if } x > 0 \\ \text{N.D.} & \text{if } x < 0 \end{cases}$

15. If $2^x = 4^y = 8^z$ and $\frac{1}{2x} + \frac{1}{4y} + \frac{1}{9z} = \frac{4}{3}$, then

- (A) $x = 2z$
- (B) $2y = 3z$
- (C) $x = 1$
- (D) $z = 3$

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SECTION - B (SCIENCE)**PART - I (PHYSICS)****SINGLE OPTION CORRECT (+ 3, - 1, 0)**

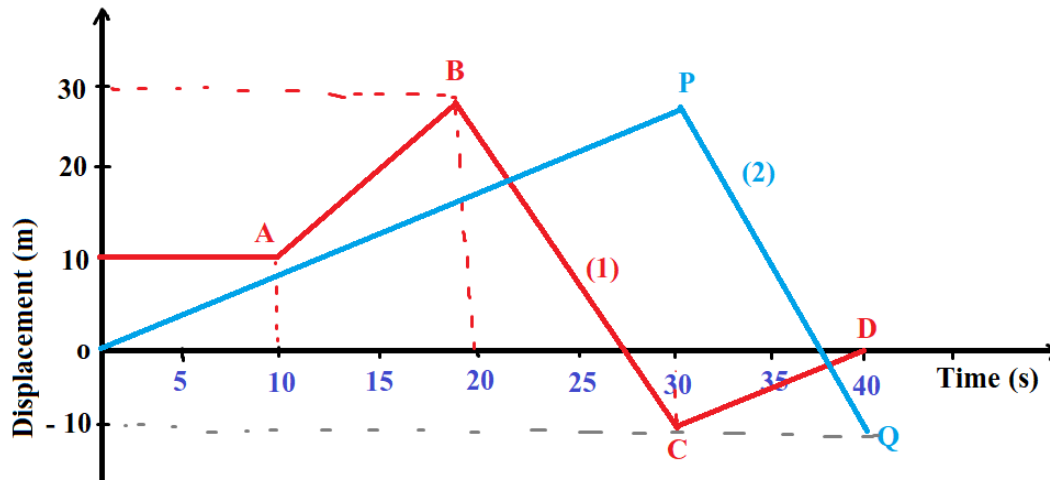
16. A pebble thrown vertically upwards with an initial velocity 50 ms^{-1} comes to a stop in 5 s. The retardation is _____
- (A) 9.8 ms^{-2} (B) 10 ms^{-2} (C) 5 ms^{-2} (D) -10 ms^{-2}
17. A body initially at rest, start moving with a constant acceleration of 0.5 ms^{-2} and travels a distance 25 m, then its final velocity is:
- (A) 5 ms^{-1} (B) 20 ms^{-1} (C) 15 ms^{-1} (D) -15 ms^{-1}
18. Wrong equation of motion is/are
- (A) $v = u + at$ (B) $S = ut + \frac{1}{2}at^2$ (C) $v^2 = u^2 + 2aS$ (D) $v = ut + at^2$
19. Select the correct option
- (A) Average speed = Magnitude of average velocity
- (B) |Displacement| \geq Distance of an object for a given Interval.
- (C) $\vec{a}_{\text{avg}} = \frac{\vec{v}_{\text{final}} + \vec{v}_{\text{initial}}}{t}$ is applicable for uniform accelerated motion.
- (D) $\vec{a}_{\text{avg}} = \frac{\Delta \vec{v}}{\Delta t} \rightarrow \frac{d\vec{v}}{dt} = \vec{a}$, as $\Delta t \rightarrow 0$
20. A particle moving with an initial velocity of 5.0 m/s is subjected to a uniform acceleration of -2.5 ms^{-2} . The displacement in the next 4.0 s is _____
- (A) 0 m (B) 4 m (C) 5 m (D) 20 m

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PARAGRAPH - I (Q No. 21 - 22)

Consider the figure as shown in the graph and answer the question No 21 - 22.



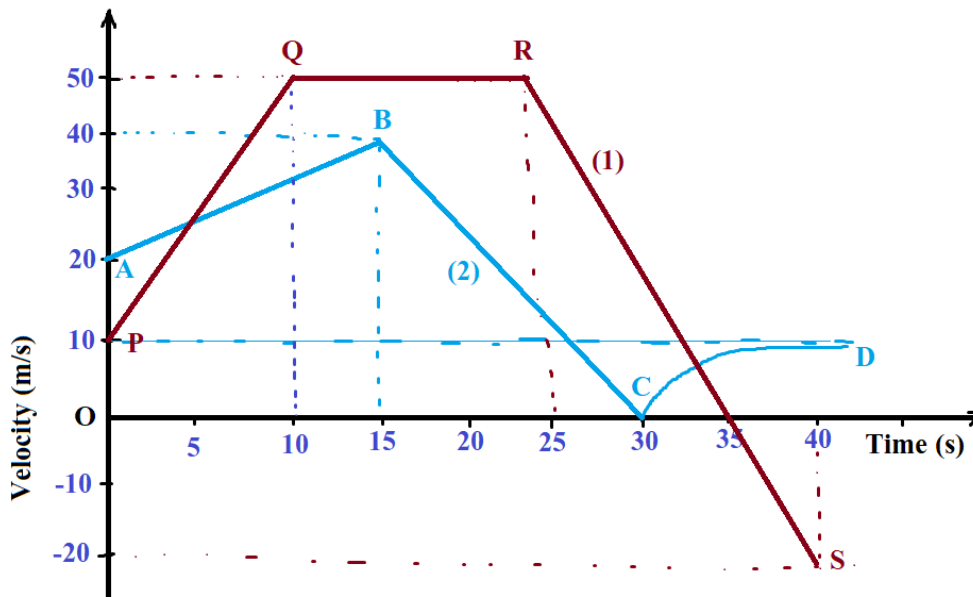
21. Highest Magnitude of velocity in both graphs (1) & (2) is
 (A) 2 m/s (B) 4 m/s (C) 3 m/s (D) 1 m/s
22. Select the correct answer
 (A) \vec{v}_{avg} is different for both segment BC and PQ.
 (B) $\vec{v}_{avg}|_{BC} = \frac{d\vec{s}}{dt}|_{t=25s}$ or Instantaneous velocity at $t = 25$ s.
 (C) $|\vec{v}_{avg}|_{OP} > |\vec{v}_{avg}|_{AB}$
 (D) Net Magnitude of displacement in both graph is zero for time period $t = 0$ s to $t = 40$ s

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PARAGRAPH - I (Q No. 23 - 25)

Consider the figure of 1-D Motion of two objects as shown in the graph. Answer the question No 23 - 25.



23. Uniform speed region as per the graph is
 (A) PQ (B) CD (C) QR (D) BC
24. Maximum average retardation region is
 (A) BC (B) AB (C) RS (D) PQ
25. Select the wrong option
 (A) Displacement by object (1) in PQ region = 300 m.
 (B) Initial velocity of Object (2) is 20 m/s.
 (C) $|\vec{a}_{avg}|_{AB} > |\vec{a}_{avg}|_{PQ}$
 (D) CD is representing Non-Uniform accelerated motion.

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PART – II (CHEMISTRY)

SINGLE OPTION CORRECT (+ 3, - 1, 0)

26. Seema visited a Natural Gas Compressing unit and found that the gas can be liquefied under specific conditions of temperature and pressure. While sharing her experience with friends she got confused. Help her to identify the correct set of conditions.
- (A) Low temperature, low pressure (B) High temperature, low pressure
(C) Low temperature, high pressure (D) High temperature, high pressure
27. A few substances are arranged in the increasing order of 'forces of attraction' between their particles. Which one of the following represents a correct arrangement?
- (A) Water, air, wind (B) Air, sugar, oil (C) Oxygen, water, sugar (D) Salt, juice, air
28. Which of the following are physical changes?
- (i) Melting of iron metal (ii) Rusting of iron
(iii) Bending of an iron rod (iv) Drawing a wire of iron metal
- (A) (i), (ii) and (iii) (B) (i), (ii) and (iv) (C) (i), (iii) and (iv) (D) (ii), (iii) and (iv)
29. Two chemical species X and Y combine together to form a product P which contains both X and Y
 $X+Y \rightarrow P$
X and Y cannot be broken down into simpler substances by simple chemical reactions. Which of the following concerning the species X, Y and P are correct?
- (i) P is a compound
(ii) X and Y are compounds
(iii) X and Y are elements
(iv) P has a fixed composition
- (A) (i), (ii) and (iii) (B) (i), (ii) and (iv) (C) (ii), (iii) and (iv) (D) (i), (iii) and (iv)
30. Cooking of food and digestion of food:
- (A) are both physical processes
(B) are both chemical processes
(C) cooking is physical whereas digestion is chemical
(D) cooking is chemical whereas digestion is physical
31. Which of the following has maximum number of atoms?
- (a) 18 g of H₂O (b) 18 g of O₂ (c) 18 g of CO₂ (d) 18 g of CO₄
32. A change in the physical state can be brought about
- (A) only when energy is given to the system

- (B) only when energy is taken out from the system
(C) when energy is either given to, or taken out from the system
(D) without any energy change

33. Percentage of calcium in calcium carbonate is

- (A) 40 (B) 30 (C) 48 (D) 36

34. The number of oxygen atoms in 4.4 g of CO₂ is approx.

- (A) 6×10^{22} (B) 6 (C) 12×10^{23} (D) 1.2×10^{23}

35. State the number of atoms present in each of the following chemical species CO₃²⁻

- (A) 4 (B) 5 (C) 3 (D) 2

PART – III (BIOLOGY)

SINGLE OPTION CORRECT (+ 3, - 1, 0)

36. Amoeba acquires its food through a process of:

- (A) Plasmolysis (B) exocytosis
(C) Endocytosis (D) Exocytosis and Endocytosis both

37. The cell wall of which of the following is not made up of cellulose:

- (A) Mango Tree (B) Bacteria (C) Cactus (D) Hydrilla

38. Name the cell organelle in which Cristae are present

- (A) RER (B) SER (C) Mitochondria (D) Ribosomes

39. Name the cell organelle in which Stroma are present

- (A) Leucoplast (B) Chromoplast (C) Chlorophyll (D) Chloroplast

40. A naked cell organelle present in cell is:

- (A) Centrosome (B) Centriole (C) Aster (D) Spindle

41. The cell organelles that are present only in Plant Cells:

- (A) Cell Membrane (B) Plastids (C) Vacuoles (D) Cytoplasm

42. Name the cell organelle in which Cisternae are present

- (A) Mitochondria (B) ER (C) Lysosomes (D) Ribosomes

43. Dictyosomes are units that make:

- (A) Golgi Bodies (B) ER (C) Plastids (D) Mitochondria

44. "Protein Factory of cell" is:

- (A) Mitochondria (B) Ribosomes (C) Chloroplast (D) Lysosomes

45. Which of the following is covered by a single membrane

- (A) Mitochondria (B) Vacuole (C) Plastid (D) None of these



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