

TEST # X - 03, Aug 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

Register Today, No admission Required for Test Series. Enquire: 8007267089

Office Work

Registered Office

2nd Floor Axis Vertiga

Mohammad wadi, Near DPS, Pune MH- 411060

Contact: +91- 8484948623 / 8007267089

Invigilator Sign

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

SECTION - A (MATHEMATICS)

PART - I

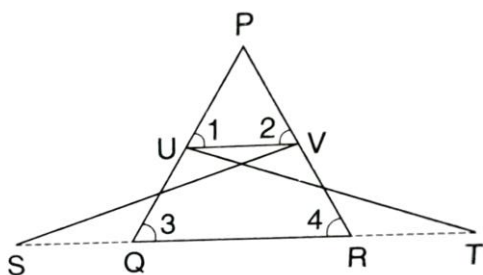
SINGLE OPTION CORRECT (+ 4, - 1, 0)

- If $x - 2$, $4x - 1$ and $5x - 2$ are in A. P. Find the value of x
(A) 2 (B) 0 (C) - 1 (D) - 2
- In ΔPQR , X and Y are points on PQ and PR respectively such that $XY \parallel QR$ and $PX = x - 2$, $PY = x - 1$, $XQ = x + 1$ and $YR = x + 3$, Find x .
(A) 2 (B) - 2 (C) 5 (D) 7
- If $3x = \sec \theta$ and $\frac{3}{x} = \tan \theta$, then value of $\left(x^2 - \frac{1}{x^2}\right)$ is _____
(A) 6 (B) $\frac{1}{6}$ (C) 9 (D) $\frac{1}{9}$
- The coordinate of the point B, if the point P (- 4, 1) divides the line segment joining the points A (2, - 2) and B in the ratio 3 : 5.
(A) (14, 6) (B) (14, - 6) (C) (- 16, - 6) (D) (- 14, 6)
- Evaluate: $\frac{\sec^2(90 - \theta) - \cot^2 \theta}{2(\sin^2 25 + \sin^2 65)} - \frac{2 \cos^2 60 \tan^2 28 \tan^2 62}{3(\sec^2 43 - \cot^2 47)}$
(A) 3 (B) $\frac{1}{2}$ (C) $\frac{1}{3}$ (D) 2

ROUGH SPACE

←~■: ☺ ☺ Best of Luck! ☺ ☺ :■~→

6. In the adjoining figure, $\Delta VSR \cong \Delta TQU$ and $\angle 1 = \angle 2$, then $\Delta PUV \sim$ _____



- (A) ΔSVR (B) ΔPQR (C) ΔTUQ (D) ΔQVR

7. How many terms of an A. P. 18, 16, 14, 12, should be taken so that their sum is zero

- (A) 18 (B) 23 (C) 19 (D) 16

8. If the points A(4, 3) and B(x, 5) are on the circle with center O(2, 3). Find the value of x

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

9. From the top of hill, the angles of depression of two consecutive kilometers stone due east are found to be 30° and 45° . The height of the hill is _____

- (A) $\frac{\sqrt{3}-1}{2}$ (B) $\frac{\sqrt{3}+1}{2}$ (C) $\frac{2\sqrt{3}+1}{2}$ (D) $\sqrt{3}+2$

10. Find the 20th term of the A. P. whose 3rd term is 7 and the seventh term exceeds three times the 3rd term by 2.

- (A) 75 (B) 70 (C) 85 (D) 72

ROUGH SPACE

←~■: ☺ ☺ Best of Luck! ☺ ☺ :■~→

PART - II

MULTI OPTION CORRECT (+ 4, -1, 0).

11. A spherical balloon of radius r subtends an angle θ at the eye of an observer as shown in figure.

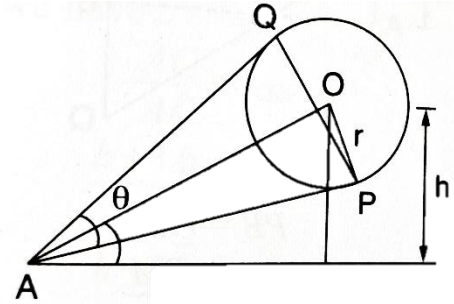
If the angle of elevation of its center is ϕ , then

(A) Height of center of balloon = $r \cdot \sin \phi \cdot \operatorname{cosec} \left(\frac{\theta}{2} \right)$

(B) Height of center of balloon = $r \cdot \sin \phi$

(C) $OA = r \cdot \operatorname{cosec}(\theta)$

(D) $OA = r \cdot \operatorname{cosec} \left(\frac{\theta}{2} \right)$



12. Find the value of "k" if the points $A(k + 1, 2k)$, $B(3k, 2k + 3)$ and $C(5k - 1, 5k)$ are collinear.

(A) 2

(B) $1/2$

(C) 3

(D) $1/3$

13. If $T_1, T_2, T_3, \dots, T_{100}$ are in AP, then

(A) $\frac{T_{15} + T_{27}}{2} = T_{21}$

(B) $T_{15} + T_{28} = T_{18} + T_{25}$

(C) $T_1 + T_2 + \dots + T_{2k} = k(T_3 + T_{2k-2}), k < 50$

(D) 63th term from last = T_{38}

14. Consider the triangle ΔABC , where $A(1, 2)$, $B(4, 3)$ & $C(5, 6)$, then triangle ΔABC is?

(A) Obtuse

(B) Acute

(C) Isosceles

(D) Right angled

15. Consider an AP a_1, a_2, a_3, \dots such that $a_3 + a_5 + a_8 = 11$ and $a_4 + a_2 = -2$, then the value of

(A) $a_1 + a_6 + a_7 = 7$

(B) $a_1 = -5$

(C) Common difference $d = 2$

(D) $a_3 = -3$

ROUGH SPACE

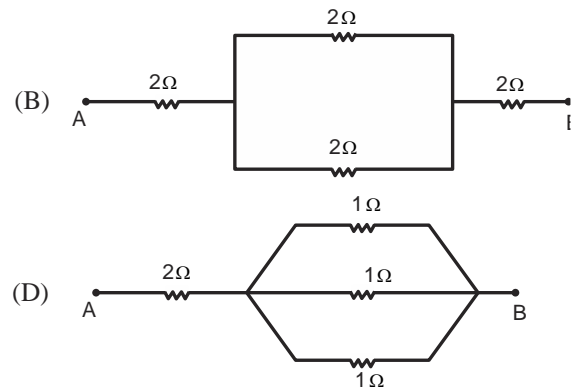
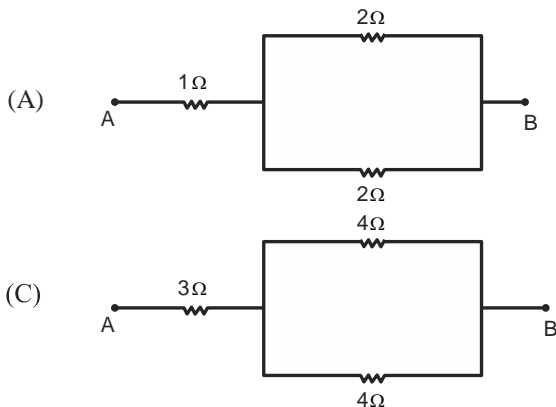
←~■: ☺ ☺ Best of Luck! ☺ ☺ :■~→

SECTION - B (SCIENCE)

PART - I (PHYSICS)

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

16. Electrical resistivity of given metallic wire depends upon
 (A) its length (B) its thickness (C) its shape (D) nature of the material
17. For the object placed between the optical center and focus of a convex lens, the Image is:
 (A) Real and Enlarge (B) Real and Diminished
 (C) Virtual and enlarged (D) Virtual and Diminished
18. The resistivity does not change if
 (A) the material is changed (B) the temperature is changed
 (C) the shape of the resistor is changed (D) both material and temperature are changed
19. Find the combination(s) which give an equivalent resistance of $\frac{7}{3}\Omega$ between A and B.



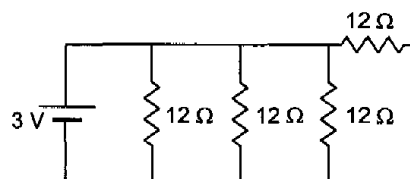
ROUGH SPACE

←~■: ☺ ☺ Best of Luck! ☺ ☺ :■~→

20. A Convex lens form an image 16.0 cm long of an object 4 cm long kept at a distance 6 cm from the lens. The object and the image are on the same side of the lens. Find the focal length of the lens.
 (A) 4 cm (B) 24/5 cm (C) 8 cm (D) None of these
21. The frequency of violet light is 7.5×10^{14} Hz. Find its wavelength in Nano-meter (nm). Speed of light is $c = 3 \times 10^8$ m s⁻¹.
 (A) 200 (B) 400 (C) 4000 (D) None of these
22. A 2.0 cm Long pin is placed perpendicular to the principal axis of a convex lens of focal length 12 cm. The distance of the pin from the lens is 15 cm, Find the size of the image.
 (A) 8.0 cm, Inverted (B) 8.0 cm, Erect (C) 4.0 cm, Inverted (D) 4.0 cm, Erect
23. A current of 1 A is drawn by a filament of an electric bulb. Number of electrons passing through a cross section of the filament in 16 seconds would be roughly.
 (A) 10^{20} (B) 10^{16} (C) 10^{18} (D) 10^{23}
24. Select the Wrong statement(s)
 (A) Conductivity (σ) = $\frac{1}{\rho}$, Resistivity = ρ
 (B) Resistance $R = \frac{\rho l}{A}$, for conductor of length l & Area of cross section A
 (C) $V = I \times R$, for non-ohmic resistor
 (D) Internal resistance inside battery caused by ions and hence voltage drop arises across terminals.

25. Find the current supplied by the battery in the circuit shown in figure.

- (A) 1 A (B) 2 A
 (C) 0.5 A (D) 4 A

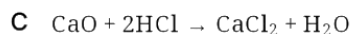
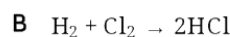
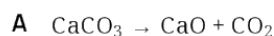


ROUGH SPACE

PART – II (CHEMISTRY)

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

26. Which of the following is a redox reaction?



27. One of the following processes does not involve a chemical reaction, that is:

- (A) Melting of candle wax when heated (B) Burning of candle wax when heated
(C) Digestion of food in your stomach (D) Ripening of banana

28. Which of the following is a strong acid?

- (A) HCl, pH = 1 (B) CH_3COOH , pH = 5
(C) Lemon juice, pH = 2.2 (D) Pure Milk, pH = 6

29. What is the chemical formula of POP (Plaster of Paris)?

- (A) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (B) $\text{CaSO}_4 \cdot 3\text{H}_2\text{O}$ (C) $\text{CaSO}_4 \cdot 1/2\text{H}_2\text{O}$ (D) $\text{CaCO}_3 \cdot 1/2\text{H}_2\text{O}$

30. Sodium carbonate reacts with hydrochloric acid and produces -

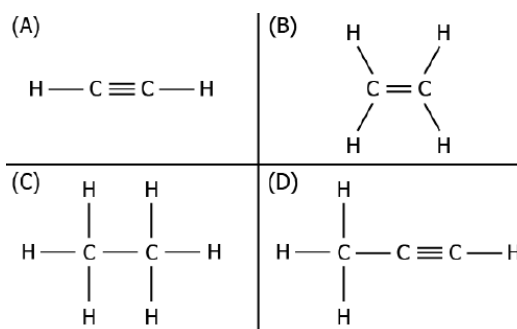
- (A) NaCl (B) CO_2 (C) H_2O (D) All of the above

31. The electronic configuration of an element is found to be 2, 4. How many bonds can one carbon atom form in a compound?

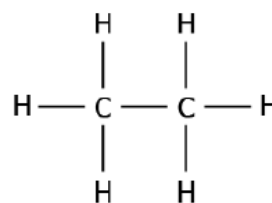
- (A) 1 (B) 2 (C) 4 (D) 6

32. The image represents the structure of a few hydrocarbon compounds. Which of these compounds can be classified as alkynes?

- (A) Only A
(B) Only B
(C) Both A and D
(D) Both B and C



33. The given image represents the structure of a carbon compound known as ethane. Which of the following option explains the naming of ethane?
- (A) The presence of a functional group connected with a single bond
(B) As it contains two carbon atoms, and a single bond connects the carbon atoms
(C) Carbon compound with a total number of eight atoms is named ethane
(D) As it contains six hydrogen atoms, and a single bond connects the carbon and hydrogen atom
34. A carbon compound contains two atoms of carbon. Which name should the carbon compound bear?
- (A) Butane (B) Ethane (C) Methane (D) Propane
35. A student studies that a soap molecule has two ends, one of which is an ionic end, and the other is the carbonic chain. Which option explains the interaction of a soap molecule with oil?
- (A) Ionic end of the soap interacts with the oil
(B) The closest end of the soap interacts with the oil
(C) Carbonic chain end of the soap interacts with the oil
(D) Ends of the soap randomly interact with the oil



PART - III (BIOLOGY)

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

36. The bending of the root of a plant away from source of light is caused by a plant hormone called:
- (A) Cytokinin (B) Gibberellin (C) Abscisic acid (D) Auxin
37. The plant hormone which triggers the fall of mature leaves and fruits from the plant body is:
- (A) Cytokinin (B) Gibberellin (C) Abscisic acid (D) Auxin
38. The gap between two neurons is called a:
- (A) Dendrite (B) Synapse (C) Axon (D) Impulse
39. The brain is responsible for:
- (A) Thinking (B) regulating heart beat (C) balancing the body (D) All of the above
40. The bending of the stem of a plant towards the source of light is caused by a plant hormone called:
- (A) Cytokinin (B) Gibberellin (C) Abscisic acid (D) Auxin
41. Which of the following hormones prepares our body for action in emergency situations?
- (A) Growth hormone (B) Adrenaline (C) Insulin (D) Testosterone

42. Which of the following is not an involuntary action?

- (A) Vomiting (B) Chewing (C) Heart Beat (D) Salivation

43. Which of the following helps in maintaining posture and balance of the human body?

- (A) Cerebellum (B) Cerebrum (C) Medulla (D) Pons

44. The number of pairs of nerves which arises from the spinal cord is :

- (A) 21 (B) 31 (C) 41 (D) 51

45. Which of the following can not be considered as receptors?

- (A) Eye (B) Ear (C) Muscle (D) nose

ROUGH SPACE

←~■: ☺ ☺ Best of Luck! ☺ ☺ :■~→



Keep smiling!

Visit Us: <https://www.mathsarc.com>

ANSWER KEY

- | | | | |
|----------------|----------|-------------|----------|
| 1. C | 2. C | 3. D | 4. D |
| 5. C | 6. B | 7. C | 8. C |
| 9. B | 10. A | 11. A, D | 12. A, B |
| 13. A, B, C, D | 14. A, C | 15. A, B, C | 16. D |
| 17. C | 18. C | 19. D | 20. C |
| 21. B | 22. A | 23. A | 24. C |
| 25. A | 26. B | 27. A | 28. A |
| 29. C | 30. D | 31. C | 32. C |
| 33. B | 34. B | 35. C | 36. D |
| 37. C | 38. B | 39. D | 40. D |
| 41. B | 42. B | 43. A | 44. B |
| 45. C | | | |