Interactive Practice & Step-by-Step Solutions: Practice chapter-wise PYQs with timer & full explanation on The Crucible.

Open on The Crucible ↗

Trigonometric Equations — Basic · BITSAT 2023 Memory-Based Practice on Crucible ↗

1. If $\sec^2\theta = \frac{4}{3}$, then the general value of θ is

(A) $2n\pi \pm \frac{\pi}{6}$ **(B)** $n\pi \pm \frac{\pi}{6}$

(C) $2n\pi \pm \frac{\pi}{3}$ **(D)** $n\pi \pm \frac{\pi}{3}$

Permutation Combination — Arrangement under Constraint · BITSAT 2023 Memory-Based Practice on Crucible ↗

2. Number of words from the letters of the words BHARAT in which B and H will never come together is

(A) 210 **(B)** 240

(C) 422 **(D)** 400

Sets and Relations — Questions on Venn Diagram · BITSAT 2023 Memory-Based Practice on Crucible ↗

3. A set A has 3 elements and another set B has 6 elements. Then

(A) $3 \leq n(A \cup B) \leq 6$ **(B)** $3 \leq n(A \cup B) \leq 9$

(C) $6 \leq n(A \cup B) \leq 9$ **(D)** $0 \leq n(A \cup B) \leq 9$

Straight Lines — Angle between Lines · BITSAT 2023 Memory-Based Practice on Crucible ↗

4. What is the angle between the two straight lines $y = (2-\sqrt{3})x + 5$ and $y = (2+\sqrt{3})x - 7$?

(A) 60° **(B)** 45°

(C) 30° **(D)** 15°

Functions — Composite Function · BITSAT 2023 Memory-Based Practice on Crucible ↗

5. If $f(x) = \frac{x}{\sqrt{1+x^2}}$, then (fof of) (x) is

(A) $\frac{3x}{\sqrt{1+x^2}}$ **(B)** $\frac{x}{\sqrt{1+3x^2}}$

(C) $\frac{3x}{\sqrt{1-x^2}}$ **(D)** None of these

Differential Equations — Variable Separable Form · BITSAT 2023 Memory-Based

Practice on Crucible ↗

6. The number of solutions of $\frac{dy}{dx} = \frac{y+1}{x-1}$, when $y(1) = 2$ is

(A) none

(B) one

(C) two

(D) infinite

Probability · BITSAT 2023 Memory-Based

Practice on Crucible ↗

7. The probability of getting sum more than 7 when a pair of dice are thrown is:

(A) $\frac{7}{36}$

(B) $\frac{5}{12}$

(C) $\frac{7}{12}$

(D) None of these

Application of Derivatives — Monotonicity · BITSAT 2023 Memory-Based

Practice on Crucible ↗

8. The interval in which the function $f(x) = \frac{4x^2+1}{x}$ is decreasing is :

(A) $\left(-\frac{1}{2}, \frac{1}{2}\right)$

(B) $\left[-\frac{1}{2}, \frac{1}{2}\right]$

(C) $(-1, 1)$

(D) $[-1, 1]$

Indefinite Integration — Integration by Parts · BITSAT 2023 Memory-Based

Practice on Crucible ↗

9. If $\int \frac{e^x(1+\sin x)dx}{1+\cos x} = e^x f(x) + C$, then $f(x)$ is equal to

(A) $\sin \frac{x}{2}$

(B) $\cos \frac{x}{2}$

(C) $\tan \frac{x}{2}$

(D) $\log \frac{x}{2}$

Limits — Existance of Limit · BITSAT 2023 Memory-Based

Practice on Crucible ↗

10. $\lim_{x\to 0} \frac{|\sin x|}{x}$ is equal to

(A) 1

(B) -1

(C) Does not exist

(D) None of these

Statistics — Measures of Dispersion · BITSAT 2023 Memory-Based

Practice on Crucible ↗

11. Find the mean deviation about the mean for the data $4, 7, 8, 9, 10, 12, 13, 17$

(A) 3

(B) 24

(C) 10

(D) 8

Inverse Trigonometric Functions — Sum and difference of angles · BITSAT 2023 Memory-Based

Practice on Crucible ↗

12. $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{2}{9}\right)$ is equal to

(A) $\frac{1}{2}\cos^{-1}\left(\frac{3}{5}\right)$

(B) $\frac{1}{2}\sin^{-1}\left(\frac{3}{5}\right)$

(C) $\frac{1}{2}\tan^{-1}\left(\frac{3}{5}\right)$

(D) $\tan^{-1}\left(\frac{1}{2}\right)$

Binomial Theorem — Terms of Binomial Expansion · BITSAT 2023 Memory-Based

Practice on Crucible ↗

13. The middle term in the expansion of $\left(\frac{10}{x} + \frac{x}{10}\right)^{10}$ is

(A) ${}^{10}C_5$

(B) ${}^{10}C_6$

(C) ${}^{10}C_5 \frac{1}{x^{10}}$

(D) ${}^{10}C_5 x^{10}$

Parabola — Common Tangent · BITSAT 2023 Memory-Based

Practice on Crucible ↗

14. The equation of a common tangent to the parabolas $y = x^2$ and $y = -(x-2)^2$ is

(A) $y = 4(x-2)$

(B) $y = 4(x-1)$

(C) $y = 4(x+1)$

(D) $y = 4(x+2)$

Complex Number — Power of iota · BITSAT 2023 Memory-Based

Practice on Crucible ↗

15. $i^{57} + \frac{1}{i^{25}}$, when simplified has the value

(A) 0

(B) $2i$

(C) $-2i$

(D) 2

Quadratic Equation · BITSAT 2023 Memory-Based

Practice on Crucible ↗

16. If one root of the equation $x^2+px+12=0$ is 4, while the equation $x^2+px+q=0$. has equal roots, then the value of ' q ' is

(A) 4

(B) 12

(C) 3

(D) $\frac{49}{4}$

Linear Programming · BITSAT 2023 Memory-Based

Practice on Crucible ↗

17. Minimum value of $Z=3x+5y$ subject to constraints $x+y\geq 2, x+3y\geq 3, x, y\geq 0$

(A) 6

(B) 7

(C) 8

(D) 9

Mathematical Reasoning · BITSAT 2023 Memory-Based

Practice on Crucible ↗

18. The negation of the Boolean expression $((\sim q)\wedge p)\Rightarrow((\sim p)\vee q)$ is logically equivalent to

(A) $p\Rightarrow q$

(B) $q\Rightarrow p$

(C) $\sim(p\Rightarrow q)$

(D) $\sim(q\Rightarrow p)$

Three Dimensional Geometry — Basics of point in 3 dimension · BITSAT 2023 Memory-Based

Practice on Crucible ↗

19. If the co-ordinates of the point in which the line joining the points $(3,5,-7)$ and $(-2,1,8)$ is intersected by the plane yz is $\left[\mathrm{a}, \frac{13}{\mathrm{b}}, \mathrm{c}\right]$, then $(a+b-c)=$

(A) 2

(B) 3

(C) 4

(D) 5

Definite Integration · BITSAT 2023 Memory-Based

Practice on Crucible ↗

20. $\int_0^{\pi/4}\cos x e^{\sin x}dx$ is equal to

(A) $e+1$

(B) $e-1$

(C) e

(D) $-e$

Circle · BITSAT 2023 Memory-Based

Practice on Crucible ↗

21. The equation of the circle with centre $(0, 2)$ and radius 2 is $x^2 + y^2 - my = 0$. The value of m is

(A) 1

(B) 2

(C) 4

(D) 3

Determinants — System of Linear Equations · BITSAT 2022 PYQ

Practice on Crucible ↗

22. Given $2x - y + 2z = 2, x - 2y + z = -4, x + y + \lambda z = 4$, then the value of λ such that the given system of equation has no solution is

(A) -3

(B) 1

(C) 0

(D) 3

Properties of Triangles — Sine Rule and its application · BITSAT 2022 PYQ

Practice on Crucible ↗

23. If in a $\triangle ABC, 2b^2 = a^2 + c^2$, then $\frac{\sin 3B}{\sin B}$ is equal to

(A) $\frac{c^2-a^2}{2ca}$

(B) $\frac{c^2-a^2}{ca}$

(C) $\frac{\left(c^2-a^2\right)^2}{(ca)^2}$

(D) $\left[\frac{c^2-a^2}{2ca}\right]^2$

Ellipse — Equation of Ellipse · BITSAT 2021 PYQ

Practice on Crucible ↗

24. The eccentricity of the ellipse whose major axis is three times the minor axis is:

(A) $\frac{\sqrt{2}}{3}$

(B) $\frac{\sqrt{3}}{2}$

(C) $\frac{2\sqrt{2}}{3}$

(D) $\frac{2}{\sqrt{3}}$

Sequences and Series — Geometric Progression · BITSAT 2021 PYQ

Practice on Crucible ↗

25. Consider an infinite geometric series with first term a and common ratio r. If its sum is 4 and the second term is $\frac{3}{4}$, then:

(A) $a = \frac{4}{7}, r = \frac{3}{7}$

(B) $a = 2, r = \frac{3}{8}$

(C) $a = \frac{3}{2}, r = \frac{1}{2}$

(D) $a = 3, r = \frac{1}{4}$

Differentiation · BITSAT 2021 PYQ

Practice on Crucible ↗

26. If $y = \tan^{-1}\left(\frac{\log ex^{-2}}{\log ex^2}\right) + \tan^{-1}\left(\frac{3+2\log x}{1-6\log x}\right)$ then $\frac{d^2y}{dx^2}$ is

(A) 2

(B) 1

(C) 0

(D) x

Trigonometric Ratios & Identities — Maximum and Minimum Values · BITSAT 2020 PYQ

Practice on Crucible ↗

27. The equation $\sin^4 x - (k+2)\sin^2 x - (k+3) = 0$ possesses a solution if

(A) $k > -3$

(B) $k < -2$

(C) $-3 \leq \mathrm{k} \leq -2$

(D) k is any positive integer

Vector Algebra — Algebra of Vectors · BITSAT 2020 PYQ

Practice on Crucible ↗

28. If $\vec{r}$ and $\vec{s}$ arenon-zero constant vectors and the scalar b is chosen such that $|\vec{r} + b\vec{s}|$ is minimum, then the value of $|b\vec{s}|^2 + |\vec{r} + b\vec{s}|^2$ is equal to

(A) $2|\vec{r}|^2$

(B) $|\vec{r}|^2/2$

(C) $3|\vec{r}|^2$

(D) $|\vec{r}|^2$

Basic of Mathematics — Inequalities · BITSAT 2020 PYQ

Practice on Crucible ↗

29. If x, y and z are real numbers, the $x^2 + 4y^2 + 9z^2 - 6yz - 3zx - 2xy$ is always

(A) positive

(B) non-positive

(C) zero

(D) non-negative

Continuity and Differentiability — Differentiability · BITSAT 2020 PYQ

Practice on Crucible ↗

30. Let $f(x) = ||x-1| - 1|$, then all the points where $f(x)$ is not differentiable is (are)

(A) 1

(B) 1,2

(C) ± 1

(D) $0, 1, 2$

Answer Key (Q1 to Q30)

Click any question number below to practice chapter-wise PYQs on The Crucible ↗

1: (B)	2: (B)	3: (C)	4: (A)	5: (B)	6: (B)	7: (B)	8: (A)	9: (C)	10: (C)
11: (A)	12: (D)	13: (A)	14: (B)	15: (A)	16: (D)	17: (B)	18: (C)	19: (B)	20: (B)
21: (C)	22: (D)	23: (D)	24: (C)	25: (D)	26: (C)	27: (C)	28: (D)	29: (D)	30: (D)

Sample Solution — Question 1 (BITSAT 2023 Memory-Based · Correct Option: B)

Open on The Crucible ↗

Q1. If $\sec^2\theta = \frac{4}{3}$, then the general value of θ is

We have $\sec^2\theta = \frac{4}{3} \Rightarrow \cos^2\theta = \frac{3}{4} \Rightarrow \cos^2\theta = \cos^2\left(\frac{\pi}{6}\right) \Rightarrow \theta = n\pi \pm \frac{\pi}{6} \ldots\ldots\ldots$

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