

MATHEMATICS 2023

TIME: 3 Hours

(100 Marks)

SECTION 'A' (Multiple Choice Questions)(40)

1. Choose the correct answer for each from the given options:

1) If $z = 4 + 3i$ then $z + \bar{z}$:

- * $6i$ * 10 * $8\sqrt{}$ * $9i$

2) $(1 + i)^2 = ?$ (where $i = \sqrt{-1}$):

- * $-2i$ * $2i\sqrt{}$ * 2 * -2

3) If $A = [-7]$, then $|A|$

- * 7 * $-7\sqrt{}$ * 1 * 0

4) If $|\vec{a} \times \vec{b}| = |\vec{a} \cdot \vec{b}|$ then the angle between \vec{a} and \vec{b} is:

- * 0 * $\frac{\pi}{2}$ * $\frac{\pi}{4}\sqrt{}$ * π

5) $\sum_{n=3}^{20} n^0$:

- * $1\sqrt{}$ * 18 * 19 * 20

6) The factorial form of $12 \cdot 11 \cdot 10$ is:

- * $\frac{12!}{9!}\sqrt{}$ * $12!$ * $\binom{12}{9}$ * $(12!) \cdot (9!)$

7) No term of a G.P. is:

- * $0\sqrt{}$ * 1 * Negative * ∞

8) $\sin \frac{\alpha}{2} = ?$

- * $\sqrt{\frac{(s-b)(s-c)}{bc}}\sqrt{}$ * $\sqrt{\frac{(s-c)(s-a)}{ca}}$
* $\sqrt{\frac{(s-a)(s-b)}{ba}}$ * $\sqrt{\frac{(s-c)(s-a)}{s(s-a)(s-b)(s-c)}}$

9) Solution space of the linear inequality $2x + 3y \leq 6 \forall x, y \in \mathbb{R}$ includes:

- * All points above the line * All points on and below the line \checkmark
* All points below the line * All points on and above the line

10) A circle, which passes through all vertices of a triangle is called the:

- * tri-circle * e-circle * incircle * circum circle \checkmark

11) If K is a scalar and A, B, C are the square matrices of the same order, then $(kABC)^t = ?$

- * $kA^t B^t C^t$ * $kC^t B^t A^t\sqrt{}$ * $k(B \cdot A)^t$ * $k^t(A \cdot B)$

12) If $\frac{a-b}{b-c} = \frac{a}{b}$, then a, b and c are in:

- * A.P * G.P * H.P \checkmark * A.G.P

13) If $a_n = 5 - 3n + 2n^2$, then $a_{2n} = ?$

- * $5 - 6n + 2n^2$ * $5 - 6n + 4n^2$
* $5 + 6n + 4n^2$ * $5 - 6n + 8n^2\sqrt{}$

14) In tossing a coin, the probability of getting the tail is:

- * $\frac{1}{2}\sqrt{}$ * $\frac{1}{3}$ * $\frac{1}{4}$ * $\frac{1}{6}$

15) $1 + x + x^2 + x^3 + \dots = ?$

- * $(1 + x)^{-1}$ * $(1 - x)^{-2}$
* $(1 + x)^{-2}$ * $(1 - x)^{-1}\sqrt{}$

16) The graph of a linear function is:

- * circle * parabola * straight line \checkmark * triangle

17) If f and g are equal, where $f(x) = 7x - 4$ and $g(x) = x$, then $x = ?$

- * $\frac{1}{3}$ * $\frac{2}{3}\sqrt{}$ * 1 * $\frac{4}{3}$

18) $\cos(2\pi + \theta) = ?$

- * $\sin \theta$ * $-\sin \theta$ * $\cos \theta\sqrt{}$ * $-\cos \theta$

19) If $y = \sin x$, then its range is:

- * $-1 \leq y \leq 1\sqrt{}$ * \mathbb{R} * $0 \leq y \leq \pi$ * $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$

20) The solution of $\sqrt{2} \sin \theta - 1 = 0$ in the interval $[\frac{\pi}{2}, \pi]$ is:

- * $\frac{\pi}{4}$ * $\frac{5\pi}{4}$ * $\frac{3\pi}{4}\sqrt{}$ * $\frac{7\pi}{4}$