MATHEMATICS 2022

Time: 3 Hours *(Regular & Private)* *Max. Marks: 100*

Note: (i) This section consists of 40 part questions and all are to be answered. Each question carries 01 marks.

SECTION 'A'

MULTIPLE CHOICE QUESTIONS (40 Marks)

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

(1) $(A')' =$:
☆ B' ☆ U ☆ U' ☆ **A**

(2) $\sqrt{2}$ is:
☆ Rational number ☆ ***Irrational number***
☆ Odd number ☆ Even number

(3) The value of i^9 is equal to:
☆ 1 ☆ $-i$ ☆ **i** ☆ -1

(4) If $z = 3 + 4i$ then $z + \bar{z} =$:
☆ **6** ☆ 8i ☆ 0 ☆ 16

(5) $2x^2 + 3y^2 =$:
☆ $(2x + 3iy)(2x - 3iy)$ ☆ $\left(\sqrt{2x} + \sqrt{3}iy\right)\left(\sqrt{2}x - \sqrt{3}iy\right)$
☆ $(2x - 3y)(2x + 3y)$ ☆ $\left(\sqrt{2}x + \sqrt{3}y\right)\left(\sqrt{2}x - \sqrt{3}y\right)$

(6) The roots of quadratic equation $x^2 - 4x = 0$ are:
☆ Imaginary ☆ ***Rational and Different***
☆ Irrational ☆ Rational and Equal

(7) If $D>0$ and perfect square then roots of $ax^2 + bx + c = 0$ are:
☆ Equal ☆ Imaginary ☆ ***Rational*** ☆ Irrational

(8) The sum of the all cube roots of unity is:
☆ 1 ☆ **0** ☆ w ☆ -1

(9) If 4 and -5 are the roots of an equation then quadratic equation will be:
☆ $x^2 - x - 20 = 0$ ☆ $x^2 - x + 20 = 0$
☆ $\mathbf{x^2 + x + 20 = 0}$ ☆ $x^2 + x + 20 = 0$

(10) The matrix $\begin{bmatrix} 4 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 4 \end{bmatrix}$ is a:
☆ Diagonal matrix ☆ ***Scalar matrix***
☆ Unit matrix ☆ Null matrix

(11) If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then Adj. $A =$:
☆ $\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$ ☆ $\begin{bmatrix} a & -b \\ -c & d \end{bmatrix}$ ☆ $\begin{bmatrix} -a & c \\ b & -d \end{bmatrix}$ ☆ $\begin{bmatrix} a & c \\ b & d \end{bmatrix}$

(12) $[0]$ is:
☆ ***Square matrix*** ☆ Rectangular matrix
☆ Scalar matrix ☆ Unit matrix

(13) If $\begin{bmatrix} 6 & \lambda \\ 3 & 2 \end{bmatrix}$ is singular matrix then $\lambda =$:
☆ **4** ☆ -4 ☆ 12 ☆ 18

(14) For any two non-singular n-square matrices A and B, $(AB)^{-1}$ $=$:
☆ AB ☆ $B^{-1}A^{-1}$ ☆ $A^{-1}B^{-1}$ ☆ $A^{-1}B$

(15) A binary operation * on a set is said to be associative if:
☆ $a*b = b \times a$ ☆ $\mathbf{(a*b)*c = a*(b*c)}$
☆ $a*b = b*a$ ☆ $a*e = e*a = a$

(16) If first term is a and second term is b of H.P then d = :
☆ $\frac{a-b}{ab}$ ☆ $\frac{ab}{a-b}$ ☆ $\frac{a+b}{a-b}$ ☆ $\frac{ab}{a+b}$

(17) If $n \in N$, then number of terms in $(a + b)^n$ is:
☆ n ☆ $(n - 1)$ ☆ $\mathbf{(n + 1)}$ ☆ $(n + 2)$

(18) The G.M between $\sqrt{2}$ and $\frac{1}{\sqrt{2}}$ is:
☆ ± 2 ☆ $\pm\sqrt{2}$ ☆ $\mathbf{\pm 1}$ ☆ $\pm\frac{1}{\sqrt{2}}$

(19) The A.M. between $3\sqrt{5}$ and $5\sqrt{5}$ is:
☆ $\sqrt{5}$ ☆ $2\sqrt{5}$ ☆ $3\sqrt{5}$ ☆ $\mathbf{4\sqrt{5}}$

(20) $0.97777 \ldots\ldots =$
☆ $\mathbf{0.9\dot{7}}$ ☆ $0.\dot{9}\dot{7}$ ☆ $0.\dot{9}7$ ☆ 0.97

(21) The harmonic mean between 2a and 2b is:
☆ $\pm\sqrt{ab}$ ☆ $\frac{a+b}{2}$ ☆ $\frac{4ab}{a+b}$ ☆ $\frac{2ab}{a-b}$

(22) A coin is tossed twice, the probability of getting both tail is:
☆ $\frac{1}{2}$ ☆ $\frac{3}{4}$ ☆ $\frac{1}{4}$ ☆ 1

(23) The value of ${}^nP_o$ is:
☆ 0 ☆ **1** ☆ n! ☆ $\frac{1}{n}$

(24) The number of possible permutations of the letters of word EQUATION is:
☆ 40320 ☆ 40032 ☆ 40023 ☆ 40230

(25) The value of $\frac{(n+1)!}{(n-1)!}$ is:
☆ $\mathbf{n(n + 1)}$ ☆ $(n + 1)!$ ☆ $\frac{(n+1)}{(n-1)}$ ☆ $n(n + 1)!$

(26) The middle term in the expansion $(1 + 2x)^6$ is:
☆ 1st term ☆ **4th term** ☆ 2nd term ☆ 3rd term

(27) If x is so small that its square and higher powers be neglected then $(1 - x)^{-2} =$:
☆ $\mathbf{1 + 2x}$ ☆ $1 - 2x$ ☆ $1 - x$ ☆ $1 + x$

(28) $\cos^2\theta - \sin^2\theta =$:
☆ $\cos\frac{\theta}{2}$ ☆ $\cos\theta$ ☆ $\mathbf{\cos 2\theta}$ ☆ $-\cos 2\theta$

(29) If in ΔABC $a = 2cm$, $b = 3cm$ and $c = 4cm$ then $2s =$:
☆ 6cm ☆ 7cm ☆ **9cm** ☆ 10cm

(30) $\tan\cos\theta =$:
☆ $\cos\theta$ ☆ $\sin\theta$ ☆ $\sec\theta$ ☆ $\operatorname{cosec}\theta$

(31) If $\cos\theta > 0$ and $\sin\theta < 0$, then $\rho(\theta)$ lies in this quadrant:
☆ 1st ☆ 2nd ☆ 3rd ☆ **4th**

(32) $\sin(180^\circ + \theta) =$:
☆ $-\cos\theta$ ☆ $\mathbf{-\sin\theta}$ ☆ $-\tan\theta$ ☆ $\cot\theta$

(33) $1 - \cos\theta$ is:
☆ $2\cos^2\frac{\theta}{2}$ ☆ $2\tan^2\frac{\theta}{2}$ ☆ $2\sec^2\frac{\theta}{2}$ ☆ $\mathbf{2\sin^2\frac{\theta}{2}}$

(34) One degree in radians is equal to:
☆ $\frac{180}{\pi}$ ☆ $\frac{3\pi}{180}$ ☆ $\frac{\pi}{180}$ ☆ one

(35) $\left(\sin^2\frac{\pi}{2} + \cos^2\frac{\pi}{2}\right) - \left(\sin^2\frac{\pi}{3} + \cos^2\frac{\pi}{3}\right) =$:
☆ 1 ☆ **0** ☆ -1 ☆ ∞

(36) $\cos(-\theta) =$:
☆ $\sin\theta$ ☆ $-\sin\theta$ ☆ $\cos\theta$ ☆ $-\cos\theta$

(37) In the 3rd quadrant $\operatorname{cosec}\theta$ is:
☆ positive ☆ ***negative***
☆ both positive & negative ☆ 0

(38) The function $y = \sin^{-1}x$, its domain is:
☆ $-1 \leq x \leq 1$ ☆ $-1 < x < 1$
☆ $\mathbf{-1 \leq x \leq 1}$ ☆ $0 \leq x < 1$

(39) If the radius of the circle is 'r' then its area $=$:
☆ $2\pi r$ ☆ πr ☆ $\mathbf{\pi r^2}$ ☆ $3\pi r$

(40) In ΔABC, $a + b - c =$:
☆ 2s ☆ $2(s - a)$ ☆ $2(s - b)$ ☆ $\mathbf{2(s - c)}$