Mathematics	(C)	L.K.No.1014	Paper Code No. 6195
Paper I	(Objective Type)	Ist – A – Exam – 2023	Session (2020 – 22) to (2022 – 24)
Time :	30 Minutes	Inter (Part - I)	Marks : 20

Note : Four possible choices A , B , C ,D to each question are given. Which choice is correct fill that circle in front of that Question No. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

Bwp-11-23

Q.No.1 (1)	If $A = \begin{bmatrix} -2 & 1 \\ 3 & 5 \end{bmatrix}$ then $A - A^t$ is : (A) $\begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 0 & 4 \\ 4 & 10 \end{bmatrix}$ (C) $\begin{bmatrix} 0 & -2 \\ 2 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} -2 & 0 \\ 0 & 2 \end{bmatrix}$
(2)	Venn Diagrams are useful only in case of : (A) Concrete Sets (B) Abstract Sets (C) Subsets (D) Universal Sets
(3)	If $Z = 2 - 3i$, then $\lvert Z \rvert^2 =$ (A) $\sqrt{5}$ (B) 5 (C) $\sqrt{13}$ (D) 13
(4)	If A is a Square Matrix of Order 3 , then $\lvert KA \rvert$ = : (A) $3\lvert A \rvert$ (B) $9\lvert A \rvert$ (C) $K\lvert A \rvert$ (D) $K^3\lvert A \rvert$
(5)	An equation in which two Algebraic Expressions are equal for particular values of the variable is called : (A) An Equation (B) Conditional Equation (C) Identity (D) Both A and B
(6)	If for a Quadratic Equation $ax^2 + bx + c = 0$, $b^2 - 4ac = 0$, then roots of the equation will be : (A) Rational (B) Irrational (C) Equal (D) Unequal
(7)	The Sum of the Roots of the Equation $5x^2 - x - 2 = 0$ is : (A) $\frac{-2}{5}$ (B) $\frac{2}{5}$ (C) $\frac{-1}{5}$ (D) $\frac{1}{5}$
(8)	If $a_n = (-1)^n(2n-3)$, then 5^{th} term of the sequence is : (A) – 7 (B) 7 (C) 49 (D) – 49
(9)	A Coin is tossed four times, then the Probability of getting no head is : (A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D) $\frac{1}{2}$
(10)	The Number of 4 Digit Numbers that can be formed out of digits 1 , 2 , 3 , 4 , 5 , 6 when no digit is repeated is : (A) 15 (B) 36 (C) 360 (D) 720
(11)	H.M. between $\frac{1}{a}$ and $\frac{1}{b}$ is : (A) $\frac{2ab}{a+b}$ (B) $\frac{a+b}{2ab}$ (C) $\frac{2}{a+b}$ (D) $\frac{a+b}{2}$
(12)	$1 + 3 + 5 + \text{------} + (2n + 5) = (n + 3)^2$ is true for : (A) $n \geq -1$ (B) $n \geq -2$ (C) $n \geq 1$ (D) $n \geq 2$
(13)	$\text{Cos}(2x + 30^\circ) \cdot \text{Cos}(2x - 30^\circ)$ = : (A) $\frac{-1}{2}[\text{Sin}4x - \text{Sin}60^\circ]$ (B) $\frac{-1}{2}[\text{Sin}4x + \text{Sin}60^\circ]$ (C) $\frac{1}{2}[\text{Cos}4x + \text{Cos}60^\circ]$ (D) $\frac{1}{2}[\text{Cos}4x - \text{Cos}60^\circ]$
(14)	Which of the following is a pair of Coterminal Angles : (A) $30^\circ, -330^\circ$ (B) $50^\circ, -330^\circ$ (C) $30^\circ, 760^\circ$ (D) $60^\circ, 1480^\circ$
(15)	The Coefficients of the terms equidistant from beginning and end of the expansion of $(a+x)^n$; $n \in N$ are equal as : (A) $\binom{n}{r} = \binom{n}{n-r}$ (B) $\binom{n}{r} = \binom{n}{n+r}$ (C) $\binom{n}{r+1} = \binom{n}{r}$ (D) $\binom{n}{r} = \binom{n-1}{r-1}$
(16)	Range of y = 3Sin2x is : (A) $[-1, 1]$ (B) $[-3, 3]$ (C) $[-5, 5]$ (D) $[-6, 6]$
(17)	$\text{Sin}^{-1}\left(\frac{1}{\sqrt{2}}\right)$ = ------- : (A) 0 (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{3}$
(18)	$\frac{abc}{R} =$: (A) 4 rs (B) 4 Δ (C) $\frac{4}{\Delta r}$ (D) $\frac{\Delta r}{4}$
(19)	Area of a Triangle ABC is equal to : (A) $\frac{1}{2}$ bc Sinα (B) $\frac{1}{2}$ ab Sinα (C) $\frac{1}{2}$ bc Cosα (D) $\frac{1}{2}$ ac Sinγ
(20)	Reference Angle of Cosx = $\frac{-1}{2}$ is : (A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{2}$ (D) $\frac{\pi}{3}$

Roll No.	1014 - 27000	Inter (Part – I)	Session (2020 – 22) to (2022 – 24)
Mathematics (Subjective)	Ist – A – Exam – 2023		Time 2 : 30 Hours Marks : 80

Note: It is compulsory to attempt any (8 - 8) Parts each from Q.No. 2 and Q.No.3 while attempt any (9) Parts from Q.No.4. Attempt any (3) Questions from Part - II .Write same Question No. and its Part No. as given in the Question Paper.

Part - I RwP-11-23 **25 x 2 = 50**

Q.No.2	(i)	Prove that : $\frac{a}{b} = \frac{c}{d} \Leftrightarrow ad = bc$		
	(ii)	Show that $\forall\ Z \in C$ $Z^2 + \bar{Z}^2$ is a real number.		
	(iii)	Show A – B and B – A by Venn Diagram , when A and B are Overlapping Sets.		
	(iv)	Verify the Commutative Property of Union and Intersection for the sets $A = \{1, 2, 3, 4, 5\}$, $B = \{4, 6, 8, 10\}$		
	(v)	Construct Truth Table for the Statement $(p \rightarrow \sim p) \vee (p \rightarrow q)$		
	(vi)	If $A = \begin{bmatrix} 2 & -1 \\ 3 & 1 \end{bmatrix}$ verify that $(A^{-1})^t = (A^t)^{-1}$		
	(vii)	Find value of 'x' if : $\begin{vmatrix} 1 & 2 & 1 \\ 2 & x & 2 \\ 3 & 6 & x \end{vmatrix} = 0$	(viii)	Solve the Matrix Equation $2X - 3A = B$ if $A = \begin{bmatrix} 1 & -1 & 2 \\ -2 & 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 & 0 \\ 4 & 2 & 1 \end{bmatrix}$
	(ix)	Reduce to Quadratic Form $(x+1)(x+2)(x+3)(x+4) = 24$	(x)	Show that : $x^3 - y^3 = (x-y)(x-wy)(x-w^2y)$
	(xi)	Show that the roots of the equation $(b-c)x^2 + (c-a)x + (a-b) = 0$; a , b , c ∈ Q will be real.	(xii)	If the roots of the equation $x^2 - px + q = 0$ differ by unity , prove that $P^2 = 4q + 1$
Q.No.3	(i)	Define Proper Rational Fraction.		
	(ii)	Write the first four terms of the sequence if $a_n - a_{n-1} = n + 2$, $a_1 = 2$		
	(iii)	If 5 , 8 are two A.Ms between 'a' and 'b' , find 'a' and 'b'		
	(iv)	Sum the Series $-8 - 3\frac{1}{2} + 1 +$ -------- $+ a_{11}$		
	(v)	Find the 11^{th} term of the Sequence $1 + i$, 2 , $2(1 - i)$, --------		
	(vi)	Insert three G.Ms. between 2 and 32		
	(vii)	Find the number of the Diagonals of a 6 – sided figure.	(viii)	Show that : ${}^{16}C_{11} + {}^{16}C_{10} = {}^{17}C_{11}$
	(ix)	Two Dice are thrown. What is the Probability that the sum of the number of dots appearing on them is 4 or 6 ?	(x)	If $S_n = n(2n-1)$, then find the Series.
	(xi)	Expand upto four terms $(1+x)^{\frac{-1}{3}}$	(xii)	If 'x' is so small that its square and higher powers can be neglected then show that $\frac{1-x}{\sqrt{1+x}} \approx 1 - \frac{3}{2}x$
Q.No.4	(i)	A Railway Train is running on a Circular Track of Radius 500 meters at the rate of 30 Km per hour. Through what angle will it turn in 10 Sec ?		
	(ii)	Verify $\cos 2\theta = Cos^2\theta - Sin^2\theta$ when $\theta = 30^\circ, 45^\circ$		
	(iii)	Find the period of Sec 9x.		