PAPER CODE – 6195

11^{th} CLASS – 1^{st} Annual 2023

MATHEMATICS **OBJECTIVE** **TIME: 30 MINUTES**

GROUP : FIRST DGK-11-1-23 **MARKS: 20**

NOTE : You have four choices for each objective type question as A , B , C and D . The choice which you think is correct , fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

QUESTION NO. 1

1	A.M between $\frac{1}{2}$ and $\frac{1}{4}$ is (A) $-\frac{1}{8}$ (B) $\frac{1}{8}$ (C) $\frac{3}{4}$ (D) $\frac{3}{8}$
2	If $r = n$ then ${}^{n}C_{r}$ is equal to (A) 0 (B) 1 (C) $n!$ (D) $(n-1)!$
3	For mutually exclusive events A and B (A) $A \cup B = \emptyset$ (B) $A - B = \emptyset$ (C) $A \cap B = \emptyset$ (D) $A \cup B = A \cap B$
4	The in – equality $n^2 > n + 3$ is valid if (A) $n \geq 2$ (B) $n \geq 0$ (C) $n \geq 1$ (D) $n \geq 3$
5	Sum of even coefficient in expansion of $(a+b)^4$ is (A) 18 (B) 10 (C) 12 (D) 16
6	The angle $\frac{\pi}{12}$ in degree measure is (A) 30^o (B) 20^o (C) 45^o (D) 15^o
7	$\sin 390^o$ is equal to (A) $\cos 30^o$ (B) Zero (C) $\sin 30^o$ (D) $\sin 60^o$
8	Smallest positive number 'p' for which $f(x+p) = f(x)$ is called (A) Domain (B) Range (C) Co – domain (D) Period
9	Radius of e – circle opposite to vertex B of triangle ABC is (A) $\frac{\Delta}{s-a}$ (B) $\frac{\Delta}{s-b}$ (C) $\frac{\Delta}{s-c}$ (D) $\frac{\Delta}{s}$
10	In an equilateral Triangle ABC $r_1 : r_2 : r_3$ is equal to (A) 1 : 2 : 3 (B) 1 : 3 : 3 (C) 3 : 3 : 3 (D) 2 : 3 : 3
11	$\cos^{-1}(-x) = ?$ (A) $\pi - \cos^{-1}x$ (B) $\cos^{-1}x$ (C) $\pi + \cos^{-1}x$ (D) $\sin^{-1}x$
12	Solution of $\tan 2x = 1$, $x \in [0, 2\pi]$ is (A) $\left\{\frac{\pi}{8}, \frac{5\pi}{8}\right\}$ (B) $\left\{\frac{\pi}{4}, \frac{3\pi}{4}\right\}$ (C) $\left\{\frac{\pi}{4}, \frac{5\pi}{4}\right\}$ (D) $\left\{\frac{\pi}{6}, \frac{5\pi}{6}\right\}$
13	$(-i)^{19}$ is equal to (A) $-i$ (B) 1 (C) -1 (D) i
14	A function $f : A \to B$ is surjective if (A) Range of $f = A$ (B) Range of $f = B$ (C) Range of $f \neq B$ (D) Both A and B
15	A matrix $m \times 1$ is called (A) Scalar Matrix (B) Row Matrix (C) Column Matrix (D) Null Matrix
16	If 'A' is a square Matrix of order 2 x 2 then $\|KA\|$ is equal to (A) $2K\|A\|$ (B) $K^3\|A\|$ (C) $K\|A\|$ (D) $K^2\|A\|$
17	If one solution if equation $x^2 - ax + 2 = 0$ is $x = 1$ the 'a' is equal to (A) 0 (B) -7 (C) 7 (D) 3
18	A quadratic equation $ax^2 + bx + c = 0$ becomes linear if (A) $a = 0, b \neq 0$ (B) $a \neq 0$ (C) $b = 0$ (D) $b \neq 0$
19	$\frac{A}{x-1} + \frac{B}{x+1}$ are partial fractions of (A) $\frac{1}{x^3-1}$ (B) $\frac{1}{x^2-1}$ (C) $\frac{1}{x^2+1}$ (D) $\frac{1}{x^3+1}$
20	$\sum_{k=1}^{n} k$ is equal to (A) $\frac{n^2(n+1)^2}{4}$ (B) $\frac{n(n+1)(2n+1)}{6}$ (C) $\frac{n(n+1)}{2}$ (D) $\frac{n^2(n+1)}{4}$

11th CLASS - 1st Annual 2023

MATHEMATICS
GROUP : FIRST

TIME : 2.30 HOURS
MARKS : 80

SUBJECTIVE
SECTION-I

DGK-11-1-23

QUESTION NO. 2 Write short answers of any Eight (8) parts of the following 16

i	State commutative law of addition and associative law of multiplication of real numbers.
ii	Separate into real and imaginary parts $\frac{i}{1+i}$
iii	Write the set $\{x/x \in \mathcal{R} \wedge x \neq x\}$ in the descriptive and tabular form
iv	Write converse and inverse of the conditional $\sim p \rightarrow q$
v	Show that the statement $(p \wedge q) \rightarrow p$ is tautology.
vi	If $A = \begin{bmatrix} 1 & -1 \\ a & b \end{bmatrix}$ and $A^2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find the values of " a " and " b "
vii	If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 1 \end{bmatrix}$, then find A_{32}
viii	If the matrices A and B are symmetric and AB = BA , show that AB is symmetric
ix	Define reciprocal equation.
x	Evaluate $(1+\omega-\omega^2)^8$
xi	Prove that sum of four 4th roots of unity is zero.
xii	Use remainder theorem to find the remainder when x^2+3x+7 is divided by $x+1$

QUESTION NO. 3 Write short answers of any Eight (8) parts of the following 16

i	What are partial fractions ?
ii	Find the 13th term of the sequence $x, 1, 2-x, 3-2x, \ldots\ldots\ldots$
iii	Find three A.Ms between 3 and 11.
iv	The sum of S_9 and S_7 is 203 and $S_9 - S_7 = 49$, S_7 and S_9 being the sums of the first 7 and 9 terms of an A.P respectively. Determine the series.
v	If $\frac{1}{a}, \frac{1}{b}$ and $\frac{1}{c}$ are in G.P show that the common ratio is $\pm\sqrt{\frac{a}{c}}$
vi	Find the Geometric means between 4 and 16.
vii	Find the value of n when ${}^{n}p_4 : {}^{n-1}p_3 = 9:1$
viii	In how many ways can 4 keys be arranged on a circular key ring?
ix	A natural number is chosen out of first fifty natural numbers. What is the probability that the chosen number is a multiple of 3 or of 5 ?
x	Prove the formula for n = -1 ,0 $3+5+7+\ldots\ldots\ldots+(2n+5) = (n+2)(n+4)$
xi	Expand $(a-\sqrt{2}x)^4$
xii	Expand the following up to 4 terms $(2-3x)^{-2}$

QUESTION NO. 4 Write short answers of any Nine (9) parts of the following 18

i	Show that the area of a sector of a circular region of radius r is $\frac{1}{2}r^2\theta$, where θ is the circular measure of central angle of the sector.
ii	If $\tan\theta = \frac{1}{\sqrt{7}}$ and the terminal arm of the angle is not in III quad, find the value of $\frac{\operatorname{Cosec}^2\theta - \sec^2\theta}{\operatorname{Cosec}^2\theta + \sec^2\theta}$
iii	Prove the identity $(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$
iv	Prove that $\cos 330^\circ \sin 600^\circ + \cos 120^\circ \sin 150^\circ = -1$
v	Prove $\frac{\sin(\alpha+\beta)+\sin(\alpha-\beta)}{\cos(\alpha+\beta)+\cos(\alpha-\beta)} = \tan\alpha$
vi	Prove the identity $\cot\alpha - \tan\alpha = 2\cot 2\alpha$
vii	Find the period of sec 9x
viii	Find the area of Δ ABC , given three sides a = 18 , b = 24 , c = 30
ix	Show that the $r_3 = s \tan\frac{\gamma}{2}$
x	Prove that $\tan\frac{\alpha}{2} = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$
xi	Without using Calculator show that $\operatorname{Cos}^{-1}\frac{4}{5} = \operatorname{Cot}^{-1}\frac{4}{3}$
xii	Solve $\sec^2\theta = \frac{4}{3}$, $\theta \in [0, 2\pi]$
xiii	Find the value of θ $2\sin^2\theta - \sin\theta = 0$, $\theta \in [0, 2\pi]$

P.T.O

SECTION-II

DGK-11-1-23

Note: Attempt any Three questions from this section **10 x 3 = 30**

Q. 5-(A)	Show that $\begin{vmatrix} x & 1 & 1 & 1 \\ 1 & x & 1 & 1 \\ 1 & 1 & x & 1 \\ 1 & 1 & 1 & x \end{vmatrix} = (x+3)(x-1)^3$
(B)	Solve the equation $\left(x+\frac{1}{x}\right)^2 - 3\left(x+\frac{1}{x}\right) - 4=0$
Q. 6 -(A)	Resolve $\frac{1}{(x-1)^2(x+1)}$ into partial fraction
(B)	Prove that ${}^{n-1}C_r + {}^{n-1}C_{r-1} = {}^nC_r$
Q. 7-(A)	If $y=\frac{x}{2}+\frac{x^2}{4}+\frac{x^3}{8}+$............ and if $0<x<2$ then prove that $x=\frac{2y}{1+y}$
(B)	Identify the series : $1+\frac{1}{3}+\frac{1.3}{3.6}+\frac{1.3.5}{3.6.9}+$............ as a binomial expansion and find its sum.
Q. 8 -(A)	If $\cot\theta=\frac{5}{2}$ and the terminal arm of the angle is in 1st quadrant. Find the values of $\frac{3\sin\theta+4\cos\theta}{\cos\theta-\sin\theta}$
(B)	Prove that $\frac{2\sin\theta\sin2\theta}{\cos\theta+\cos3\theta}=\tan2\theta\tan\theta$
Q. 9 -(A)	Prove that $r_1+r_2+r_3-r=4R$
(B)	Prove that $\cos^{-1}\frac{63}{65}+2\tan^{-1}\frac{1}{5}=\sin^{-1}\frac{3}{5}$

[redacted] **PAPER CODE – 6194**

11^{th} CLASS – 1^{st} Annual 2023

MATHEMATICS DGK-11-2-23 **<u>OBJECTIVE</u>** **TIME: 30 MINUTES**

GROUP : SECOND **MARKS: 20**

NOTE : You have four choices for each objective type question as A , B , C and D . The choice which you think is correct , fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

QUESTION NO. 1

1	If $x^{1/4} = -2$ then $x =$ ________ (A) 8 (B) -8 (C) 16 (D) -16
2	If w is the cube root of unity. Then $(1 + w - w^2)^8 =$ ________ (A) 256 (B) -256 (C) $-256\,w$ (D) $256\ w$
3	Degree of a constant polynomial is (A) 1 (B) 0 (C) 2 (D) 3
4	A.M between $1-x+x^2$ and $1+x+x^2$ is (A) x^2+1 (B) $x+1$ (C) $\frac{x+1}{2}$ (D) $\frac{x^2+1}{2}$
5	If $a_n = (-1)^n(2n-3)$ Then $a_5 =$ ________ (A) 7 (B) -7 (C) 13 (D) -13
6	If n is a negative integer. Then $n!$ is (A) 1 (B) Not defined (C) Zero (D) n
7	Number of ways of writing the letters of the " WORD " taken all at a time. (A) 24 (B) 4 (C) 6 (D) 25
8	Francesco Maurolico devised the method of (A) Partial fraction (B) Logarithm (C) Induction (D) Binomial expansion
9	The middle term in the expansion of $(x-y)^{12}$ is (A) 5th (B) 6th (C) 8th (D) 7th
10	One radian is equal to (A) 57.296° (B) 57° (C) 56° (D) 0.01875°
11	$\sin 8\theta - \sin 4\theta =$ ______ (A) $2\sin 6\theta \sin 4\theta$ (B) $2\cos 2\theta \sin 6\theta$ (C) $2\cos 6\theta \sin 2\theta$ (D) $-2\sin 6\theta \cos 2\theta$
12	Period of $\tan \frac{x}{3}$ is (A) π (B) 2π (C) 3π (D) $\frac{\pi}{2}$
13	Radius of Escribed circle apposite to the vertex B is equal to (A) $\frac{\Delta}{s}$ (B) $\frac{\Delta}{s-c}$ (C) $\frac{\Delta}{s-a}$ (D) $\frac{\Delta}{s-b}$
14	With usual notation $\frac{abc}{4\Delta}$ is equal to (A) r (B) 2 r (C) $\mathcal{R}$ (D) r_1
15	The domain of $y = \sin^{-1} x$ is (A) $-1 \le x < 1$ (B) $-1 < x < 1$ (C) $-\pi/2 \le x \le \pi/2$ (D) $-\pi/2 < x < \pi/2$
16	If $\sin x = \cos x$ then $x =$ _____ (A) 30° (B) 45° (C) 0° (D) 60°
17	$\lvert a + ib \rvert$ is equal to (A) a^2+b^2 (B) $\sqrt{a^2+b^2}$ (C) a^2-b^2 (D) $\sqrt{a^2-b^2}$
18	If A^c is complement of set A. Then $A \cap A^c =$ ________ (A) A (B) A^c (C) $\cup$ (D) $\emptyset$
19	If a system of linear equation has a unique solution or infinitely many solutions. Then it can be known as (A) Consistent System (B) Inconsistent System (C) Non linear System (D) Unique System
20	Transpose of Matrix $A = [a_{ij}]_{m\times n}$ is equal to (A) $[a_{ij}]_{n\times m}$ (B) $[a_{ij}]_{m\times n}$ (C) $[a_{ij}]_{n\times m}$ (D) $[a_{ij}]_{n\times n}$

11^{th} CLASS - 1^{st} Annual 2023

MATHEMATICS | **SUBJECTIVE** | **TIME : 2.30 HOURS**

GROUP : SECOND | **SECTION-I** | **MARKS : 80**

DGK-11-2-23

QUESTION NO. 2 Write short answers of any Eight (8) parts of the following **16**

i	Whether closed or not with respect to addition and multiplication is $\{1\}$
ii	Simplify $(-1)^{-21}$
iii	Write down power set of $\{\emptyset\}$
iv	Verify De – Morgan's laws for sets $U = \{1,2,3,\ldots,20\}$ $A = \{2,4,6,\ldots\ldots,20\}$, $B = \{1,3,5,\ldots,19\}$
v	Construct truth table for statement $(p \wedge \sim p) \rightarrow q$
vi	If $A = \begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}$ show that $A^4 = I_2$
vii	Without expansion show that $\begin{vmatrix} 2 & 3 & -1 \\ 1 & 1 & 0 \\ 2 & -3 & 5 \end{vmatrix} = 0$
viii	Define Hermitian Matrix
ix	Evaluate $\left(-1+\sqrt{-3}\right)^5 + \left(-1-\sqrt{3}\right)^5$
x	When the polynomial $x^3 + 2x^2 + kx + 4$ is divided by $x - 2$, remainder is 14. Find the value of 'x'
xi	Solve the system of equations $x + y = 5$, $\frac{2}{x} + \frac{3}{y} = 2$, $x \neq 0$, $y \neq 0$
xii	Sum of positive number and its square is 380. Find the number.

QUESTION NO. 3 Write short answers of any Eight (8) parts of the following **16**

i	Define improper rational fraction and give one example.
ii	Determine whether 2 is a term of the A.P 17,13,9,………
iii	If 5, 8 are two A.Ms between " a " and " b ", find a and b
iv	Sum the series $(x-a) + (x+a) + (x+3a) + \ldots\ldots\ldots$ to n terms
v	Find the 5th term of the G.P : 3 , 6 , 12 ,…….
vi	If the numbers $\frac{1}{k}$, $\frac{1}{2k+1}$ amd $\frac{1}{4k-1}$ are in harmonic sequence, find k.
vii	Find the value of n when ${}^{n}p_2 = 30$
viii	How many arrangements of the letters of word PAKISTAN , taken all together, can be made.
ix	What is the probability that a slip of numbers divisible by 4 is picked from the slips bearing numbers 1,2,3,……..,10 ?
x	Prove that $n! > n^2$ for $n = 4,5$
xi	Find the term independent of x in the expansion of $\left(x - \frac{2}{x}\right)^{10}$
xii	Expand upto 3 terms $(4-3x)^{1/2}$

QUESTION NO. 4 Write short answers of any Nine (9) parts of the following **18**

i	What is the circular measure of the angle between the hands of a watch at 4 O' Clock ?
ii	Find the value of $\sin\theta$ and $\cos\theta$ if $\tan\theta = -\frac{1}{3}$ and the terminal arm of the angle is in quadrant II
iii	Prove that $\text{Sec}^2 A + \text{Cosec}^2 A = \text{Sec}^2 A \ \text{Cosec}^2 A$ (Where $A \neq \frac{n\pi}{2}, n \in Z$)
iv	Prove that $\sin(180^\circ + \alpha)\sin(90^\circ - \alpha) = -\sin\alpha\cos\alpha$
v	Find the value of $\tan 105^\circ$
vi	Express $\cos(2x+30^\circ)\cos(2x-30^\circ)$ as sum or differences.
vii	Find the period of $3\cos\frac{x}{5}$
viii	Solve the triangle ABC if $\beta = 60^\circ$, $\gamma = 15^\circ$, $b = \sqrt{6}$
ix	Find the area of the triangle ABC $b = 37$, $c = 45$, $\alpha = 30^\circ 50'$
x	Prove that $\mathcal{R} = \frac{abc}{4\Delta}$
xi	Find the value of $\sec\left[\sin^{-1}\left(-\frac{1}{2}\right)\right]$
xii	Find the solution of equation which lies in $[0, 2\pi]$ $\sec x = -2$
xiii	Find the value of θ satisfying the following equation $2\sin^2\theta - \sin\theta = 0$, $\theta \in [0, 2\pi]$

P.T.O

SECTION-II

Note: Attempt any Three questions from this section DGK-11-2-23 **10 x 3 = 30**

Q. 5-(A)	Show that $\begin{vmatrix} x & 1 & 1 & 1 \\ 1 & x & 1 & 1 \\ 1 & 1 & x & 1 \\ 1 & 1 & 1 & x \end{vmatrix} = (x+3)(x-1)^3$
(B)	Solve the equation simultaneously $\sqrt{x^2+x+1} - \sqrt{x^2+x-1} = 1$
Q. 6 -(A)	Resolve $\frac{x^2+x-1}{(x+2)^3}$ into partial fraction
(B)	There are 20 chits marked 1,2,3,……., 20 in a bag. Find the probability of picking a chit, the number written on which is a multiple of 4 or a multiple of 7
Q. 7-(A)	If ℓ, m, n are the pth, qth and rth terms of A.P , show that $\ell(q-r) + m(r-p) + n(p-q) = 0$
(B)	Find the term involving x^5 in the expansion of $\left(\frac{3x}{2} - \frac{1}{3x}\right)^{11}$
Q. 8 -(A)	If $\operatorname{cosec}\theta = \frac{m^2+1}{2m}$ and $m > 0$ $\left(0 < \theta < \frac{\pi}{2}\right)$, find the values of the remaining trigonometric ratios.
(B)	If α, β, γ are angles of Δ ABC , prove that $\tan\alpha + \tan\beta + \tan\gamma = \tan\gamma\tan\beta\tan\alpha$
Q. 9 -(A)	Prove that $r_1r_2 + r_2r_3 + r_3r_1 = s^2$
(B)	Prove that $\sin^{-1}\frac{5}{13} + \sin^{-1}\frac{7}{25} = \cos^{-1}\frac{253}{325}$