MATHEMATICS	PAPER CODE – 6197	TIME : 30 MINUTES
GROUP : FIRST	11th CLASS – 1st Annual 2024	MARKS : 20
	OBJECTIVE	

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 marks in that question.

QUESTION NO. 1

1 Factorial form of (n+1) (n) (n-1) is

(A) $\frac{(n+1)!}{(n-2)!}$ ● (B) $\frac{(n-2)!}{(n+1)!}$ (C) $\frac{(n+1)!}{n!}$ (D) $\frac{n!}{(n+1)!}$

2 $(2+i)^2-(2-i)^2$ = ----------

(A) $4i$ (B) $8i$ ● (C) $6i$ (D) $10i$

3 Value of $\sin^2 \pi/4 + \cos^2 \pi/4$ = ----------

(A) 0 (B) -1 (C) 1 ● (D) $\frac{1}{\sqrt{2}}$

4 Sec $(\pi/2-\theta)$ = ----------

(A) - sec θ (B) - cosec θ (C) sec θ (D) cosec θ ●

5 Period of cosec x is ----------

(A) 2π ● (B) π (C) 3π (D) $\pi/2$

6 Radius of escribed circle opposite to vertex A of triangle is ----------

(A) $\frac{\Delta}{s}$ (B) $\frac{\Delta}{s-a}$ ● (C) $\frac{\Delta}{s-b}$ (D) $\frac{\Delta}{s-c}$

7 Cos $x = \frac{1}{2}$, then x = ----------

(A) $\pi/6$ (B) $\pi/4$ (C) $\pi/3$ ● (D) $\pi/2$

8 Sin $(\text{Cos}^{-1}\sqrt{3}/2)$ = ----------

(A) $\pi/6$ (B) $\pi/3$ (C) $\frac{2}{\sqrt{3}}$ (D) $\frac{1}{2}$ ●

9 1 is not ---------- number

(A) Odd (B) Real (C) Prime ● (D) Rational

10 Multiplicative inverse of complex number (0,1)

(A) (0 , -1) ● (B) (-1 , 0) (C) (1 , 0) (D) (0 , 1)

11 Set G is closed and associative with respect to binary operation, then set G is called

(A) Groupoid (B) Semi-Group ● (C) Monoid (D) Group

12 Disjunction of two statements p and q is

(A) $p \wedge q$ (B) $p \vee q$ ● (C) $p \rightarrow q$ (D) $p \leftrightarrow q$

13 Tabular form of $\{x \mid x \in N \wedge x+4=0\}$ is

(A) { } ● (B) {0} (C) {-4} (D) {0,4}

14 A square matrix A is symmetric if A^t =

(A) A^t (B) $-A^t$ (C) A ● (D) - A

15 If order of matrix A is 2 x 5 and order of B is 5 x 7 , then order of AB is ----------

(A) 5 x 2 (B) 7 x 5 (C) 7 x 2 (D) 2 x 7 ●

16 α , β are roots of $x^2+2x+1=0$, then $\alpha^2+\beta^2$ = ----------

(A) 8 (B) 4 (C) -2 (D) 2 ●

17 If ω is cube root of unity, then $(1+\omega+\omega^2)^2$ = ----------

(A) ω (B) ω^2 (C) 0 ● (D) 1

18 $\frac{2}{x^2-1} = \frac{1}{x-1} + \frac{B}{x+1}$, then value of B is

(A) 1 (B) -1 ● (C) 2 (D) -2

19 Sum the series $1+\frac{9}{10}+\frac{81}{100}+$ ----------

(A) 10 ● (B) 9 (C) 9/10 (D) $\frac{10}{9}$

20 5th term of sequence whose general term is $a_n = n + (-1)^n$ is

(A) 4 ● (B) -4 (C) 5 (D) -5

11th CLASS – 1st Annual 2024

MATHEMATICS		TIME: 2 HRS 30 MINUTES
GROUP : FIRST	SUBJECTIVE PART	MARKS: 80

SECTION–I

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

i	Simplify $(7, 9) + (3, -5)$
ii	Find the multiplicative inverse of $(-4, 7)$
iii	$\forall z \in C$, prove that $z.\bar{z} = \lvert z \rvert^2$
iv	Simplify i^{-10}
v	Write the power set of $\{9, 11\}$
vi	Construct the truth table for $(p \wedge \sim p) \rightarrow q$
vii	Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix}$
viii	If A and B are square matrices of the same order, then explain why in general $(A+B)^2 \neq A^2 + 2AB + B^2$
ix	Without expansion show that $\begin{vmatrix} 6 & 7 & 8 \\ 3 & 4 & 5 \\ 2 & 3 & 4 \end{vmatrix} = 0$
x	Solve the equation $x^2 - 2x - 899 = 0$ by completing the square
xi	Evaluate $\omega^{28} + \omega^{29} + 1$
xii	Find the condition that one root of equation $x^2 + px + q = 0$ is double the other.

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

i	Define an identity
ii	Change $\frac{6x^3+5x^2-7}{2x^2-x-1}$ in to proper fraction
iii	Find the next two terms 1 , 3 , 7 , 15 , 31 , ---------
iv	If $a_{n-3} = 2n-5$, find the nth term of the sequence
v	Show that the reciprocals of the terms of the geometric sequence a_1 , a_1r^2, a_1r^4, ---------- form another geometric sequence
vi	Find A.M between $x - 3$ and $x+5$
vii	Find the value of n when ${}^nP_4 : {}^{n-1}P_3 = 9 : 1$
viii	Find the value of n when ${}^nC_{10} = \frac{12 \times 11}{2!}$
ix	Determine the probability of getting 2 heads and 2 tails when a coin is tossed four times
x	Prove $1 + 4 + 7 + \text{--------} + (3n - 2) = \frac{n(3n-1)}{2}$
xi	Calculate by means of Binomial theorem $(0.97)^3$
xii	Expand $(8 - 5x)^{-2/3}$ up to four terms.

(P.T.O)

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

i	If $\tan\theta = \frac{8}{15}$ and terminal arm of the angle is in the III quadrant, find the value of $\sin\theta$ and $\cos\theta$
ii	Prove that $\sec^2\theta - \operatorname{cosec}^2\theta = \tan^2\theta - \cot^2\theta$
iii	If α, β, γ are angles of a triangle ABC, Prove that $\tan(\alpha+\beta) + \tan\gamma = 0$
iv	Find value of $\sec 75^\circ$, without using tables
v	Prove that $\cos 20^\circ + \cos 100^\circ + \cos 140^\circ = 0$
vi	Write the domain and range of $y = \tan x$
vii	Find the period of $\operatorname{cosec} 10x$
viii	Draw the graph of $y = \sin\frac{x}{2}$ for $0 \le x \le 2\pi$
ix	Find the smallest angle of the triangle ABC, when $a = 37.34$, $b = 3.24$, $c = 35.06$
x	Find area of triangle ABC, if $a = 18$, $b = 24$, $c = 30$
xi	Prove that $r\, r_1\, r_2\, r_3 = \Delta^2$
xii	Without using calculator, show that $2\cos^{-1}\frac{4}{5} = \sin^{-1}\frac{24}{25}$
xiii	Find the solution of equation $\operatorname{cosec}\theta = 2$ which lies in $[0, 2\pi]$

SECTION-II

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

Q.5- (A)	For what values of m, will the roots of the equation $x^2 - 2(1+3m)x + 7(3+2m) = 0$ be equal
(B)	Solve the system linear equations by Cramer's Rule $2x_1 - x_2 + x_3 = 8$, $x_1 + 2x_2 + 2x_3 = 6$, $x_1 - 2x_2 - x_3 = 1$
Q.6- (A)	Resolve into partial fractions $\frac{1}{(1-ax)(1-bx)(1-cx)}$
(B)	If $y = \frac{2}{3}x + \frac{4}{9}x^2 + \frac{8}{27}x^3 + \text{----------}$ and if $0 < x < \frac{3}{x}$, then show that $x = \frac{3y}{2(1+y)}$
Q.7-(A)	Prove that ${}^{n-1}C_r + {}^{n-1}C_{r-1} = {}^{n}C_r$
(B)	If x is so small that its square and higher powers can be neglected, show that $\frac{1-x}{\sqrt{1+x}} \approx 1 - \frac{3}{2}x$
Q.8-(A)	Show that $\cos 20^\circ \cos 40^\circ \cos 80^\circ = \frac{1}{8}$
(B)	By using $\Delta = \frac{1}{2}bc\sin\alpha$ drive the Hero's formula
Q.9-(A)	If $\cot\theta = \frac{5}{2}$ and the terminal arm of the angle is in the I quad, find the value of $\frac{3\sin\theta + 4\cos\theta}{\cos\theta - \sin\theta}$
(B)	Prove that $2\tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{7} = \frac{\pi}{4}$

MATHEMATICS	PAPER CODE – 6196	TIME : 30 MINUTES
GROUP : SECOND	11th CLASS – 1st Annual 2024	MARKS : 20
	OBJECTIVE	

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 marks in that question.

QUESTION NO. 1

1 If polynomial $x^2 - 2x + 2$ is divided by $x - 1$, then remainder is
(A) -1 (B) 1 ● (C) 0 (D) 2

2 Partial fraction of $\frac{x}{(x-1)(x+2)} = \frac{1}{3(x-1)} + \frac{B}{x+2}$, then value of B is
(A) -3/2 (B) 3/2 (C) 2/3 ● (D) -2/3

3 Sum of n-arithmatic means between a and b is
(A) $\frac{a+b}{2}$ (B) n(a+b) (C) (a+b) (D) $n\left(\frac{a+b}{2}\right)$ ●

4 Next term of sequence 7 , 9 , 12 , ... Is
(A) 14 (B) 15 (C) 16 ● (D) 18

5 Number of necklaces can be made from 6 beads
(A) 720 (B) 120 (C) 90 (D) 60 ●

6 Middle term in expansion of $(3 + x)^4$ is
(A) $81x^2$ (B) $54x^2$ ● (C) $26x^2$ (D) $108x^2$

7 One degree is equal to ..... radian
(A) $\frac{180}{\pi}$ (B) $\frac{\pi}{180}$ ● (C) $\frac{\pi}{90}$ (D) π

8 cot (90 - α) = ...
(A) $\tan\alpha$ ● (B) $-\tan\alpha$ (C) $\cot\alpha$ (D) $-\cot\alpha$

9 Period of sin x/3 is
(A) 2π (B) $2\pi/3$ (C) 6π ● (D) 3π

10 cos $\alpha/2$ = ...
(A) $\frac{s(s-a)}{bc}$ (B) $\frac{s(s-b)}{ac}$ (C) $\sqrt{\frac{s(s-a)}{bc}}$ ● (D) $\sqrt{\frac{s(s-b)}{ac}}$

11 sec $(\cos^{-1}\frac{1}{2})$ = ----------
(A) 1/2 (B) 2 ● (C) $\pi/3$ (D) $\pi/6$

12 If cos x = $-\sqrt{3}/2$, then value of x is
(A) $\frac{5\pi}{6}$ (B) $\frac{\pi}{6}$ ● (C) $\frac{\pi}{3}$ (D) $-\pi/3$

13 $a < b \Rightarrow -a > -b$, $a, b \in R$ property used is
(A) Transitive (B) Additive (C) Multiplicative ● (D) Trichotomy

14 If $Z = 1 - i$, then $|Z|$ = ...
(A) 2 (B) -2 (C) $\sqrt{-2}$ (D) $\sqrt{2}$ ●

15 A and B are disjoint sets then
(A) $A \cap B = \emptyset$ ● (B) $A \cup B = \emptyset$ (C) $A - B = \emptyset$ (D) $B - A = \emptyset$

16 Tabular form of $\{x \mid x \in E \wedge 2 < x \leq 4\}$
(A) {2 , 3 , 4} (B) {2 , 4} (C) {4} ● (D) { $\emptyset$ }

17 The set A has m elements , Number of elements in power set of A
(A) 2^{m-1} (B) 2^m ● (C) 2^{m+1} (D) $2^{m/2}$

18 Rank of $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ is
(A) Zero (B) 1 ● (C) - 1 (D) 2

19 Determinant of [-5] is
(A) Zero (B) Not possible (C) - 5 ● (D) 5

20 α , β are roots of $ax^2 - bx + c = 0$, then $\alpha + \beta$ = ----------
(A) $\frac{b}{a}$ ● (B) $-\frac{b}{a}$ (C) $\frac{c}{a}$ (D) $-\frac{c}{a}$

11th CLASS – 1st Annual 2024

MATHEMATICS	SUBJECTIVE PART	TIME: 2 HRS 30 MINUTES
GROUP : SECOND		MARKS: 80

SECTION–I

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

i	Simplify $(5, -4)(-3, -2)$
ii	Separate into real and imaginary parts $\frac{2-7i}{4+5i}$
iii	Prove that $\bar{Z} = Z$ if Z is real
iv	Simplify $(a+bi)^2$
v	Write two proper subsets of $\{a, b, c\}$
vi	Show that $(p \wedge q) \rightarrow p$ is a tautology
vii	Find x and y if $\begin{bmatrix} 2 & 0 & x \\ 1 & y & 3 \end{bmatrix} + 2\begin{bmatrix} 1 & x & y \\ 0 & 2 & -1 \end{bmatrix} = \begin{bmatrix} 4 & -2 & 3 \\ 1 & 6 & 1 \end{bmatrix}$
viii	Find the matrix X if $\begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix} X = \begin{bmatrix} 2 & 1 \\ 5 & 10 \end{bmatrix}$
ix	If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 1 \end{bmatrix}$, then find A_{12} and A_{32}
x	Evaluate $\omega^{28} + \omega^{29} + 1$
xi	Use remainder theorem to find the remainder when $x^2 + 3x + 7$ is divided by $x + 1$
xii	Discuss the nature of the roots of equation $2x^2 - 5x + 1 = 0$

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

i	Define partial fraction resolution
ii	Suppose $\frac{7x+25}{(x+3)(x+4)} = \frac{A}{x+3} + \frac{B}{x+4}$ Find the values of A and B
iii	Write the first four terms of the following sequence, if $a_n = (-1)^n n^2$
iv	Which term of the A.P $5, 2, -1, \ldots\ldots$ is -85 ?
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	Show that $G^2 = AH$ if $a = 2i$, $b = 4i$
vii	Find the value of n if ${}^nP_2 = 30$
viii	Find the number of the diagonals of a 6-sided figure
ix	A die is rolled. What is the probability that the dots on the top are greater than 4 ?
x	Prove that $4^k > 3^k + 4$ is true for $k = 2, 3$
xi	Calculate $(0.97)^3$ by means of binomial theorem
xii	Expand up to 4 terms $(1-x)^{1/2}$, taking the values of x such that the expansion is valid

(P.T.O)

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

i	Find ℓ , when $\theta = 65^\circ 20'$, $r = 18$ mm
ii	Verify that $2 \sin 45^\circ + \frac{1}{2} \operatorname{cosec} 45^\circ = \frac{3}{\sqrt{2}}$
iii	Without using the tables , find the value of sec (- 300)
iv	Prove that $\frac{\cos 8^\circ - \sin 8^\circ}{\cos 8^\circ + \sin 8^\circ} = \tan 37^\circ$
v	Prove that $1 + \tan \alpha \tan 2\alpha = \sec 2\alpha$
vi	Write down the domain and range of $\sin x$
vii	Find the period of $\cot \frac{x}{2}$
viii	Draw the graph of $y = \cos x$ for $0 \leq x \leq 360^\circ$
ix	What is difference between right angle triangle and oblique triangle
x	Find the area of the triangle ABC , if $a = 200$, $b = 120$, $\gamma = 150^\circ$
xi	Find the radius of in-circle if $a = 13$, $b = 14$, $c = 15$
xii	Without using calculator , show that $\tan^{-1} \frac{5}{12} = \sin^{-1} \frac{5}{13}$
xiii	Solve the equation $\sin x + \cos x = 0$

SECTION-II

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

Q.5- (A)	Solve the equation $\sqrt{5x^2 + 7x + 2} - \sqrt{4x^2 + 7x + 18} = x - 4$
(B)	Use matrices to solve the following system of equation $2x_1 + x_2 + 3x_3 = 3$ $x_1 + x_2 - 2x_3 = 0$ $-3x_1 - x_2 + x_3 = -4$
Q.6- (A)	Resolve the following into partial fractions $\frac{x^2}{(x-2)(x-1)^2}$
(B)	Find n so that $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ may be the A.M. between a and b
Q.7-(A)	A natural number is chosen out of the first fifty natural numbers. What is the probability that the chosen number is multiple of 3 or 5 ?
(B)	Expand $\left(\frac{x}{2} - \frac{2}{x^2}\right)^6$ by using binomial theorem
Q.8-(A)	Show that $\cos 20^\circ \cos 40^\circ \cos 80^\circ = \frac{1}{8}$
(B)	The sides of triangle are $x^2 + x + 1$, $2x + 1$ and $x^2 - 1$ Prove that the greatest angle of the triangle is 120°
Q.9-(A)	Prove that : $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$ Where θ is not an odd multiple of $\frac{\pi}{2}$
(B)	Prove that : $\cos^{-1} A + \cos^{-1} B = \cos^{-1} [AB - \sqrt{1 - A^2}\sqrt{1 - B^2}]$

PAPER CODE – 6195

11th CLASS – 1st Annual 2023

MATHEMATICS

OBJECTIVE

TIME: 30 MINUTES

GROUP : FIRST

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 ${}^nC_r$ 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° (B) 20° (C) 45° (D) 15°

7 $\sin 390^\circ$ is equal to

(A) $\cos 30^\circ$ (B) Zero (C) $\sin 30^\circ$ (D) $\sin 60^\circ$

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

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 $x, 1, 2-x, 3-2x, \ldots\ldots$
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 $n = -1, 0$ $\quad 3+5+7+\ldots\ldots\ldots+(2n+5) = (n+2)(n+4)$
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 $\frac{\text{Cosec}^2\theta - \sec^2\theta}{\text{Cosec}^2\theta + \sec^2\theta}$
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 $\text{Cos}^{-1}\frac{4}{5} = \text{Cot}^{-1}\frac{4}{3}$
xii	Solve $\sec^2\theta = \frac{4}{3}$, $\theta \in [0, 2\pi]$
xiii	Find the value of θ $\quad 2\sin^2\theta - \sin\theta = 0$, $\theta \in [0, 2\pi]$

P.T.O

DG Khan Board-2023

SECTION-II

Note: Attempt any Three questions from this section pakcity.org **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 ${}^{n-1}C_r + {}^{n-1}C_{r-1} = {}^{n}C_r$
Q. 7-(A)	If $y = \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{8} + \ldots\ldots\ldots$ and if $0 < x < 2$ then prove that $x = \frac{2y}{1+y}$
(B)	Identify the series : $1 + \frac{1}{3} + \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + \ldots\ldots\ldots$ 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 $\frac{2\sin\theta\sin 2\theta}{\cos\theta+\cos 3\theta} = \tan 2\theta \tan\theta$
Q. 9 -(A)	Prove that $r_1 + r_2 + r_3 - r = 4R$
(B)	Prove that $\cos^{-1}\frac{63}{65} + 2\tan^{-1}\frac{1}{5} = \sin^{-1}\frac{3}{5}$

PAPER CODE – 6194

11th CLASS – 1st Annual 2023

MATHEMATICS **OBJECTIVE** **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) 2r (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 $|a + ib|$ 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) ∪ (D) ∅

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) $[a_{ij}]_{n\times n}$

MATHEMATICS **SUBJECTIVE** **TIME : 2.30 HOURS**
GROUP : SECOND **SECTION-I** **MARKS : 80**

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 {∅}
iv	Verify De – Morgan's laws for sets $\cup = \{1,2,3,\ldots,20\}$ $A = \{2,4,6,\ldots,20\}$, $B = \{1,3,5,\ldots,19\}$
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 $(-1+\sqrt{-3})^5 + (-1-\sqrt{3})^5$
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 ${}^nP_2 = 30$
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 **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 ΔABC, 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 $\sin^{-1}\frac{5}{13} + \sin^{-1}\frac{7}{25} = \cos^{-1}\frac{253}{325}$

MATHEMATICS , GROUP FIRST **TIME: 30 MINUTES , MARKS: 20**

OBJECTIVE

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) Multiplicative identity in complex numbers is
(A) (0,0) (B) (0,1) (C) (1,1) (D) (1,0)

(2) Set $\{1 , w , w^2\}$ is closed w.r.t
(A) Addition (+) (B) Multiplication (×) (C) Both A and B (D) Division (÷)

(3) Let A be not a square matrix , then $|A^t| =$
(A) A^{-1} (B) $|A|^t$ (C) $|A|$ (D) Not defined

(4) If A is a matrix of order 3×1 , then the order of AA^t is
(A) 1×3 (B) 1×1 (C) 3×3 (D) 3×1

(5) If $x^{1/4} = -2$ then $x =$
(A) 8 (B) - 8 (C) 16 (D) - 16

(6) Remainder is = 11 if $x^2 + 3x + 7$ is divided by
(A) x+1 (B) x+2 (C) x+3 (D) x-1

(7) The number of co-efficients in the partial fraction of $\frac{1}{(x-1)^2(x^2+16)}$ are
(A) 2 (B) 3 (C) 4 (D) 5

(8) 26^{th} term of $a_n = (-1)^{n+1}$ is
(A) 1 (B) -1 (C) 26 (D) - 26

(9) Relation between A , G , H , is
(A) A > G > H (B) A < G < H (C) Both A and B (D) A > G < H

(10) Reciprocal of the sequence 1/3 , 1/5 , 1/7 , ... forms
(A) Geomatric sequence (B) Arithmatic sequence (C) Harmonic sequence (D) Null sequence

(11) ${}^{n+1}C_r + {}^{n+1}C_{r-1} =$
(A) ${}^{n+1}C_r$ (B) ${}^{n+2}C_{r-1}$ (C) ${}^{n+1}C_{r+1}$ (D) ${}^{n+2}C_r$

(12) In the middle term T_{r+1} of the binomial expansion of $(a+b)^{12}$, $r =$
(A) 6 (B) 7 (C) 5 (D) 12

(13) Which of the following is quadrental Angle
(A) 350° (B) -390° (C) -360° (D) 410°

(14) $\frac{-9\pi}{2}$ coincides with
(A) OX (B) OY (C) OX′ (D) OY′

(15) $\sin(-300^\circ) =$
(A) $\frac{-\sqrt{3}}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{2}{\sqrt{3}}$ (D) $\frac{1}{\sqrt{2}}$

(16) The period of $3\sin\frac{x}{3}$ is
(A) 6π (B) 2π (C) 3π (D) 4π

(17) The radius of inscribed circle is
(A) $\frac{abc}{4\Delta}$ (B) $\frac{\Delta}{S}$ (C) $\frac{\Delta}{S-a}$ (D) $\frac{\Delta}{S-b}$

(18) $\frac{c^2 \sin\propto \sin\beta}{\sin\gamma} =$
(A) Δ (B) $\frac{\Delta}{2}$ (C) 2Δ (D) ΔS

(19) $\cos(\tan^{-1}(0)) =$
(A) 0 (B) - 1 (C) 1 (D) ∞

(20) If $\cos x = 0$ then number of solutions are
(A) 2 (B) 4 (C) 6 (D) Infinite

MATHEMATICS | **11th CLASS – 12021** | **TIME : 2.30 HOURS**
GROUP : FIRST | **SUBJECTIVE** | **MARKS : 80**

SECTION-I

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

1	Check the closure property in the set {0 , -1} w.r.t addition and multiplication
2	Find the multiplicative inverse of the number $(\sqrt{2}, -\sqrt{5})$
3	If Z is any complex number , then prove that $Z\bar{Z} = \|Z\|^2$
4	Write the descriptive form and tabular form of the set $\{x \mid x \in O \wedge 5 \leq x \leq 7\}$
5	Show that the statement $(p \wedge q) \rightarrow P$ is a tautology
6	Show that the set of natural numbers N is non-commutative and non-associative w.r.t subtraction
7	Find the values of x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} y & 1 \\ -3 & 2x \end{bmatrix}$
8	Find the matrix X , if $X \begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 12 & 3 \end{bmatrix}$
9	Find the value of λ if matrix $A = \begin{bmatrix} 4 & \lambda & 3 \\ 7 & 3 & 6 \\ 2 & 3 & 1 \end{bmatrix}$ is singular
10	Find the roots of the equation $5x^2 - 13x + 6 = 0$
11	Find four fourth roots of unity
12	When the polynomial $x^4+2x^3+kx^2+3$ is divided by $x - 2$, the remainder is 1. Find the value of k

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

1	Resolve $\frac{9}{(x+2)^2(x-1)}$ into partial fraction without finding the constants A,B and C
2	Resolve $\frac{3x+7}{(x^2+4)(x+3)}$ into partial fraction without finding the constants A,B and C.
3	Which term of the A.P -2 , 4 , 10 ..... is 148 ?
4	Find the 5th term of the G.P 3 , 6 , 12 , ...
5	Find the sum of the infinite G.P 2 , $\sqrt{2}$, 1 , ...
6	Find A , G , H if $a = \frac{-2}{5}$, $b = \frac{-8}{5}$
7	Evaluate ${}^9P_8$
8	How many arrangements of the letters of the word " ATTACKED " can be made if each arrangement begins with C and ends with K ?
9	Find the value of n when ${}^nC_{12} = {}^nC_6$
10	Show that the inequality $4^n > 3^n + 4$ is true for n = 2 , 3
11	Calculate $(9.98)^4$ by using binomial theorem.
12	Expand $(8-2x)^{-1}$ up to 4 terms by using binomial theorem

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

1	Express the sexagesimal measure of angle 120′40″ in radian
2	Verify $\sin 2\theta = 2\sin\theta \cos\theta$, when $\theta = 30^\circ , 45^\circ$
3	Prove that $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$, where θ is not an odd multiple of $\frac{\pi}{2}$
4	Without using the tables , Find the value of $\cot(-855^\circ)$
5	Prove that $\frac{1-\tan\theta\tan\phi}{1+\tan\theta\tan\phi} = \frac{\cos(\theta+\phi)}{\cos(\theta-\phi)}$
6	Express the difference $\sin 8\theta - \sin 4\theta$ as product
7	Find the period of $3\cos\frac{x}{5}$
8	A vertical pole is 8m high and length of its shadow is 6m .What is the angle of elevation of the sun at that moment?
9	Find the smallest angle of the triangle ABC , when a = 37.34 , b = 3.24 , c = 35.06
10	Find the area of a triangle ABC , when b = 37 , c = 45 , $\propto = 30^\circ 50'$
11	Without using tables/calculator , Find $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$
12	Find the solution of $\sin x = -\frac{\sqrt{3}}{2}$ which lie in $[0 , 2\pi]$
13	Solve the trigonometric equation $\tan^2\theta = \frac{1}{3}$ in $[0 , 2\pi]$

P.T.O

DG Khan Board-2021

SECTION-II

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

Q. 5-(A)	Use Cramer's rule to solve $3x_1 + x_2 - x_3 = -4$, $x_1 + x_2 - 2x_3 = -4$, $-x_1 + 2x_2 - x_3 = 1$
(B)	Show that the roots of $x^2 + (mx + c)^2 = a^2$ will be equal if $c^2 = a^2(1 + m^2)$
Q. 6 -(A)	Resolve into partial fraction $\frac{x^2+1}{x^3+1}$
(B)	For what value of n, $\frac{a^n+b^n}{a^{n-1}+b^{n-1}}$, is the positive geometric mean between a and b
Q. 7-(A)	How many numbers greater than 1000,000 can be formed from the digits 0 , 2 , 2 , 2 , 3 , 4 , 4
(B)	Find the term independent of x in the expansion of $\left(x - \frac{2}{x}\right)^{10}$
Q. 8 -(A)	Prove that : $\sin^6\theta - \cos^6\theta = (\sin^2\theta - \cos^2\theta)(1 - \sin^2\theta \cos^2\theta)$
(B)	If $\tan \propto = \frac{3}{4}$, $\cos \beta = \frac{5}{13}$ and neither the terminal side of the angle of measure $\propto$ nor that of β is in the I quadrant , Find $\sin(\propto + \beta)$
Q. 9 -(A)	Prove that in an equilateral triangle $r : R : r_1 = 1 : 2 : 3$
(B)	Prove that $2\tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{7} = \frac{\pi}{4}$

PAPER CODE - 6196

11th CLASS - 12021

MATHEMATICS **TIME: 30 MINUTES**

GROUP SECOND **OBJECTIVE** **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 degree of P(x) is less than degree of Q(x) then rational fraction $\frac{P(x)}{Q(x)}$ is called

(A) Proper rational fraction (B) Improper rational fraction (C) Common fraction (D) Rational number

(2) Next term of the sequence 7 , 9 , 12 , 16 , ... is

(A) 20 (B) 21 (C) 22 (D) 23

(3) A.M between $2+\sqrt{3}$ and $2-\sqrt{3}$ is

(A) 4 (B) $\sqrt{3}$ (C) 2 (D) $2\sqrt{3}$

(4) No term of a Harmonic sequence can be

(A) 1 (B) - 1 (C) 2 (D) 0

(5) Factorial of 0 i.e 0! is equal to

(A) 2 (B) 0 (C) Does not exists (D) 1

(6) The number of terms in the binomial expansion $(a+x)^6$ are

(A) 7 (B) 6 (C) 5 (D) 4

(7) 60^{th} part of a minute is called

(A) Second (B) Minute (C) Degree (D) Hour

(8) $\frac{1}{2}$ Rotation in clock wise direction equals to

(A) 180° (B) -180° (C) 90° (D) -90°

(9) $\sin\left(\frac{\pi}{2}+\propto\right)$ equals to

(A) $-\cos\propto$ (B) $\sin\propto$ (C) $\cos\propto$ (D) $-\sin\propto$

(10) Period of Secant Function is

(A) π (B) 3π (C) 4π (D) 2π

(11) In any triangle ABC with usual notations $\frac{b^2+c^2-a^2}{2bc}$ equals to

(A) $\cos\beta$ (B) $\cos\propto$ (C) $\sin\beta$ (D) $\sin\propto$

(12) If the sides of a triangle are 18 , 24 , 30 then the value of S is

(A) 36 (B) 72 (C) 144 (D) 24

(13) The function $y = \cos x$ is called principal cosine if

(A) $\frac{-\pi}{2} \le x \le \frac{\pi}{2}$ (B) $\frac{-\pi}{2} < x < \frac{\pi}{2}$ (C) $0 \le x \le \pi$ (D) $0 \not< x < \pi$

(14) If $\sin x = \frac{-1}{\sqrt{2}}$ then the reference angle is

(A) $\frac{\pi}{3}$ (B) $\frac{-\pi}{4}$ (C) $\frac{-\pi}{3}$ (D) $\frac{\pi}{4}$

(15) " 0 " is

(A) Irrational number (B) Positive integer (C) Rational number (D) Negative integer

(16) The set $\{x \mid x \in R \wedge x \neq x\}$ is

(A) Empty set (B) Infinite set (C) Singleton set (D) Binary set

(17) Which of the following has no inverse ?

(A) Identity matrix (B) Singular matrix (C) Diagonal matrix (D) Non singular matrix

(18) If order of the matrix A is m×n and order of B is n×P then order of AB is equal to

(A) P×m (B) m×m (C) n×n (D) m×P

(19) If 1 , w , w^2 are cube roots of unity then $w + w^2 =$

(A) 1 (B) w (C) – 1 (D) 0

(20) The degree of the polynomial $ox^{15} + x^{14} + x^{12} + 5$ is

(A) 15 (B) 14 (C) 12 (D) 5

MATHEMATICS | **11th CLASS – 12021** | **TIME : 2.30 HOURS**
GROUP : SECOND | **SUBJECTIVE** | **MARKS : 80**
SECTION-I

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

1	Prove that $\frac{a}{c}+\frac{b}{c}=\frac{a+b}{c}$
2	Simplify $(2,6)(3,7)$
3	Factorize a^2+4b^2
4	Verify the commutative property of union if $A=\{1,2,3,4,5\}$; $B=\{4,6,8,10\}$
5	Write two proper subsets of $\{a,b,c\}$
6	Find the inverse of the relation $\{(1,3),(2,5),(3,7),(4,9),(5,11)\}$
7	Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix}=\begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix}$
8	If $A=\begin{bmatrix} 2 & -1 & 3 & 0 \\ 1 & 0 & 4 & -2 \\ -3 & 5 & 2 & -1 \end{bmatrix}$ then find AA^t
9	If $A=\begin{bmatrix} i & 1+i \\ 1 & -i \end{bmatrix}$ Show that $A+(\bar{A})^t$ is hermitian
10	Solve $x^2+7x+12=0$ by factorization
11	Show that $x^3-y^3=(x-y)(x-wy)(x-w^2y)$
12	Show that the roots of the equation $(P+q)x^2-Px-q=0$ will be rational

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

1	Resolve into partial fraction $\frac{x^2+x-1}{(x+2)^3}$ without finding values of unknown constants
2	Resolve $\frac{7x+25}{(x+3)(x+4)}$ into partial fraction
3	Find the next two terms of $1, 3, 7, 15, 31, \ldots\ldots\ldots$
4	Find the Arithmetic Mean (A.M) between $x-3$ and $x+5$
5	Find the sum of Geometric progression $2, \sqrt{2}, 1, \ldots\ldots\ldots$
6	Find the 12th term of $\frac{1}{3}, \frac{2}{9}, \frac{1}{6}, \ldots\ldots\ldots$
7	Find the value of n when ${}^{n}P_{n}=11.10.9$
8	What is the probability that a slip of a number divisible by 4 is picked from the slips bearing numbers $1, 2, 3, \ldots\ldots\ldots 10$?
9	A dic is thrown twice, what is the probability that the sum of the numbers of dots shown 3 or 11
10	Evaluate $\sqrt[3]{30}$ correct to three decimal
11	Use mathematical induction to prove that $1+5+9+\ldots\ldots+(4n-3)=n(2n-1)$ is true for $n=1$ and $n=2$
12	Determine the middle term of the expansion $\left(\frac{1}{x}-\frac{x^2}{2}\right)^{12}$

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

1	Find the value of $\sin\theta$ and $\cos\theta$ if $\theta=\frac{-9\pi}{2}$
2	Prove that $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}}=\sec\theta-\tan\theta$, where θ is not an odd multiple of $\frac{\pi}{2}$
3	Convert $54^\circ 45'$ into radian
4	Prove that $\sin\left(\frac{\pi}{4}-\theta\right)\sin\left(\frac{\pi}{4}+\theta\right)=\frac{1}{2}\cos 2\theta$
5	Prove that $\cot\propto-\tan\propto=2\cot 2\propto$
6	Without using calculator , prove that $\cos 330^\circ \sin 600^\circ+\cos 120^\circ \sin 150^\circ=-1$
7	Find the period of $\cos 2x$
8	The area of triangle is 121.34 . If $\propto=32^\circ 15'$, $\beta=65^\circ 37'$, then find c and angle γ
9	Prove that $\frac{1}{r^2}+\frac{1}{r_1^2}+\frac{1}{r_2^2}+\frac{1}{r_3^2}=\frac{a^2+b^2+c^2}{\Delta^2}$
10	Solve the right triangle ABC in which $\gamma=90^\circ$ and $\propto=62^\circ 40'$, $b=796$
11	Show that $\sin^{-1}(-x)=-\sin^{-1}x$
12	Solve the equation $\cot\theta=\frac{-1}{\sqrt{3}}$, $\theta\in[0,2\pi]$

DG Khan Board-2021

SECTION-II

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

Q. 5-(A)	Find the rank of matrix $\begin{bmatrix} 1 & -4 & -7 \\ 2 & -5 & 1 \\ 1 & -2 & 3 \\ 3 & -7 & 4 \end{bmatrix}$
(B)	Prove that $\frac{x^2}{a^2} + \frac{(mx+c)^2}{b^2} = 1$ will have equal roots if $c^2 = a^2m^2 + b^2$, $a \neq 0$, $b \neq 0$
Q. 6 -(A)	Resolve into partial fractions $\frac{9}{(x+2)^2(x-1)}$
(B)	Find four numbers in A.P. whose sum is 32 and sum of whose squares is 276
Q. 7-(A)	A natural number is chosen out of the first fifty natural numbers. What is the probability that the chosen number is a multiple of 3 or of 5
(B)	Use mathematical induction to prove that $1^3 + 3^3 + 5^3 + \ldots\ldots + (2n-1)^3 = n^2(2n^2 - 1)$ is true for every positive integer ' n '
Q. 8 -(A)	Find the values of all trigonometric functions of the angle $\theta = \frac{-17\pi}{3}$
(B)	Prove without using calculator $\sin 19^\circ \cos 11^\circ + \sin 71^\circ \sin 11^\circ = \frac{1}{2}$
Q. 9 -(A)	Prove that $\tan^{-1}\frac{1}{11} + \tan^{-1}\frac{5}{6} = \tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{2}$
(B)	Solve the triangle ABC in which $a = \sqrt{3} - 1$, $b = \sqrt{3} + 1$ and $\gamma = 60^\circ$

PAPER CODE - 6191

(11th CLASS - 12019)

'HEMATICS , GROUP FIRST

TIME: 30 MINUTES , MARKS: 20

OBJECTIVE

E: 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.

STION NO. 1

(1) The multiplicative identity of real numbers is
(A) 0 (B) 1 (C) 2 (D) 3

(2) The tabular form of the set $\{x|x\in Q \wedge x^2=2\}$ is
(A) $(\sqrt{2}, -\sqrt{2})$ (B) {4} (C) { } (D) {4 , - 4}

(3) The additive inverse of a matrix A is
(A) A (B) - A (C) A^2 (D) $\frac{adj(A)}{|A|}$

(4) If $A = [a_{ij}]_{mxn}$, then cofactor of a_{ij} is
(A) $(-1)^{ij}M_{ij}$ (B) $(-1)^{i+j}M_{ij}$ (C) $(-1)^{i-j}M_{ij}$ (D) $(1)^{i+j}M_{ij}$

(5) The polynomial $3x^2-2x+1$ has degree
(A) 0 (B) 3 (C) 2 (D) 4

(6) If w is cube root of unity , then w^3 =
(A) 1 (B) 0 (C) w^2 (D) 2w

(7) Partial fractions of $\frac{x}{(x-1)(x+2)}$ will be of the form
(A) $\frac{A}{x-1}+\frac{B}{x+2}$ (B) $\frac{1}{x-1}$ (C) $\frac{1}{x+2}$ (D) $1+\frac{A}{x-1}+\frac{B}{x+2}$

(8) The next term of the sequence 7 , 9 , 12 , ... is
(A) 16 (B) 15 (C) 14 (D) 18

(9) Reciprocal of A.P. is called
(A) A.P (B) G.P. (C) H.P. (D) H.M

(10) Factorial form of $n(n-1)(n-2)$ is
(A) $\frac{n!}{(n-1)!}$ (B) $\frac{n!}{(n-2)!}$ (C) $\frac{n!}{(n-3)!}$ (D) $\frac{n!}{(n+3)!}$

(11) If n(S) = 20 , n(B) = 2 , then P(B) equals
(A) 10 (B) $\frac{1}{10}$ (C) $-\frac{1}{10}$ (D) 1

(12) If n is any positive integer then $2^n > 2(n+1)$ is true for all
(A) $n \leq 3$ (B) $n < 3$ (C) $n \geq 3$ (D) $n > 3$

(13) Number of terms in the expansion of $(1+x)^{2n+1}$ is
(A) 2n + 1 (B) 2n (C) 2n + 2 (D) 3n + 1

(14) The 60^{th} part of 1-degree is called
(A) second (B) minute (C) degree (D) Radian

(15) $\sin(-\propto)$ =
(A) sec $\propto$ (B) - sin $\propto$ (C) sin $\propto$ (D) - cos $\propto$

(16) The range of y = cosx is
(A) $-1 \leq x \leq 1$ (B) $-\infty < x < \infty$ (C) $-1 \leq y \leq 1$ (D) $-\infty < y < \infty$

(17) Angle below the horizontal ray is called
(A) Right angle (B) Oblique angle (C) Angle of depression (D) Angle of elevation

(18) With usual notation , γ_1 =
(A) $\frac{\Delta}{s-b}$ (B) $\frac{\Delta}{s-a}$ (C) $\frac{\Delta}{s-c}$ (D) $\frac{s-a}{\Delta}$

(19) $Tan^{-1}(1)$ =
(A) $\pi/3$ (B) $\pi/4$ (C) $\pi/6$ (D) π

(20) If $\sin x = -\frac{1}{2}$, then x =
(A) $\pi/6$, $5\pi/6$ (B) $-\pi/6$, $5\pi/6$ (C) $-\pi/6$, $-5\pi/6$ (D) $\pi/3$, $2\pi/3$

11^{th} CLASS – 12019
SUBJECTIVE
SECTION-I

TIME : 2.30 HOURS
MARKS : 80

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

1	Name the property $-3 < -2 \Rightarrow 0 < 1$
2	Simplify $(-i)^{19}$
3	Express the complex number $1 + i\sqrt{3}$ in polar form
4	Define a group
5	Differentiate between equal and equivalent sets
6	Define a function. Also give one example of a function
7	Show that $B = \begin{bmatrix} 0 & -4 & 1 \\ 4 & 0 & -3 \\ -1 & 3 & 0 \end{bmatrix}$ is skew symmetric
8	If $A = \begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}$, show that $A^4 = I_2$
9	What is the rank of a matrix ?
10	What are the extraneous roots of an equation ?
11	If (x+1) and (x – 2) are factors of $x^3 + px^2 + qx + 2$, find the values of P and q.
12	Discuss the nature of the roots of equation $x^2 + 2x + 3 = 0$

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

1	Define conditional equation
2	If $\frac{7x+25}{(x+3)(x+4)} = \frac{A}{x+3} + \frac{B}{x+4}$ find value of B
3	Write partial fraction form of $\frac{4x^2+8x}{x^4+2x^2+9}$
4	Find the 8^{th} term of $1, -3, 5, -7, 9, -11, \ldots\ldots, a_8$
5	If $\frac{1}{a}, \frac{1}{b}$ and $\frac{1}{c}$ are in A.P, show that the common difference is $\frac{a-c}{2ac}$
6	Which term of the sequence $x^2 - y^2, x + y, \frac{x+y}{x-y}, \ldots\ldots$ is $\frac{x+y}{(x-y)^9}$?
7	If a^2, b^2 and c^2 are in A.P, show that $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in A.P
8	Sum the series $2 + (1 - \frac{1}{i}) + \frac{1}{i} - \ldots\ldots$ to 8 terms
9	Find the value of n when ${}^nC_{10} = \frac{12 \times 11}{2!}$
10	Expand $(x + \sqrt{x^2 - 1})^3$
11	Find the 6^{th} term in the expansion of $\left(x^2 - \frac{3}{2x}\right)^{10}$
12	Using Binomial theorem find the value of $\sqrt{31}$

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

1	Convert the $35^\circ 20'$ to radians
2	Find the value of $\sin\theta$ if $\cos\theta = \frac{9}{41}$ and terminal arm of the angle is in quadrant IV
3	Prove $(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$
4	Find the value of $\sin 75^\circ$ without using table/calculator
5	Prove that $\frac{\sin 3\theta}{\sin\theta} - \frac{\cos 3\theta}{\cos\theta} = 2$
6	Show that $\frac{\sin 8x + \sin 2x}{\cos 8x + \cos 2x} = \tan 5x$
7	What is period of a function ?
8	In the right angled triangle ABC if $\gamma = 90^\circ$, $\alpha = 58^\circ 13'$ $b = 125.7$. Find a
9	Find area of the triangle ABC, if $a = 18$, $b = 24$, $c = 30$
10	Define In-circle of a triangle
11	Find the value of $\sec\left(\sin^{-1}(-\frac{1}{2})\right)$
12	Solve $\sin x + \cos x = 0$ in $[0, \pi]$
13	Solve $\tan^2\theta = \frac{1}{3}$, $\theta \in [0, \pi]$

(P.T.O)

DG Khan Board-2019

SECTION-II

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

Q. 5-(A)	State and prove the reversal law of inverse
(B)	Find " n " so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be the H.M between " a " and " b "
Q. 6-(A)	Solve the system of linear equations $x - y = 2$, $2x - z = 1$, $2y - 3z = -1$
(B)	In how many ways 8 books including 2 on English be arranged on the shelf in such a way that the English books are never together
Q.7-(A)	If α , β are the roots of the equation $ax^2 + bx + c = 0$, form the equation whose roots are $\alpha + \frac{1}{\alpha}$, $\beta + \frac{1}{\beta}$
(B)	Identify the following series as binomial expansion and find its sum $1 + \frac{3}{4} + \frac{3.5}{4.8} + \frac{3.5.7}{4.8.12} + \ldots\ldots$
Q.8-(A)	Prove that : $\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta} + \frac{\cos\theta-\sin\theta}{\cos\theta+\sin\theta} = \frac{2}{1-2\sin^2\theta}$
(B)	Prove that : $\cos 20^\circ \cos 40^\circ \cos 80^\circ = \frac{1}{8}$
Q.9-(A)	Prove that with usual notations $(\gamma_3 - \gamma) \cot \frac{\gamma}{2} = C$
(B)	Prove that $\tan^{-1}\frac{3}{4} + \tan^{-1}\frac{3}{5} - \tan^{-1}\frac{8}{19} = \frac{\pi}{4}$

PAPER CODE - 6192

(11th CLASS - 12019)

ATHEMATICS , GROUP SECOND TIME: 30 MINUTES , MARKS: 20

OBJECTIVE

)TE: 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.

ESTION NO. 1

(1) If $Z = -3 - 4i$ Then $|Z|$ is

(A) 4 (B) 7 (C) 1 (D) 5

(2) If a , b are the elements of a group G , then $(ab)^{-1}$ =

(A) $a^{-1}b^{-1}$ (B) $b^{-1}a^{-1}$ (C) $\frac{-1}{ab}$ (D) $\frac{1}{(ab)^{-1}}$

(3) If A is a matrix of order 2x2 then |KA| =

(A) K|A| (B) $K^2|A|$ (C) $K|A|^2$ (D) KA

(4) If $\begin{bmatrix} \lambda & 1 \\ -2 & -1 \end{bmatrix}$ is singular matrix then λ =

(A) 2 (B) i (C) -1 (D) - 2

(5) Product of four 4^{th} roots of unity is

(A) i (B) - i (C) - 1 (D) 1

(6) If α , β are the roots of $3x^2 - 2x + 4 = 0$ the $\alpha + \beta$ =

(A) $\frac{1}{2}$ (B) $\frac{2}{5}$ (C) $\frac{2}{3}$ (D) $\frac{-2}{5}$

(7) Partial fraction of $\frac{4x^3}{(x^2-1)(x+1)^2}$ is of the form

(A) $\frac{A}{x-1} + \frac{B}{x+1}$ (B) $\frac{A}{x^2-1} + \frac{B}{(x+1)^2}$ (C) $\frac{A}{x-1} + \frac{B}{x+1} + \frac{C}{(x+1)^2} + \frac{D}{(x+1)^3}$ (D) $\frac{Ax+B}{x^2-1} + \frac{C}{x+1} + \frac{D}{(x+1)^2}$

(8) If $a_{n-3} = 2n - 5$ then 7^{th} term is

(A) 9 (B) 15 (C) 11 (D) 13

(9) Arithmetic mean between $\sqrt{2}$ and $3\sqrt{2}$ is

(A) $3\sqrt{2}$ (B) $\sqrt{2}$ (C) 2 (D) $2\sqrt{2}$

(10) A fair coin is tossed twice then probability of getting tail both times is

(A) 1 (B) ½ (C) ¾ (D) ¼

(11) If ${}^nC_6 = {}^nC_8$ then n will be

(A) 2 (B) 6 (C) 8 (D) 14

(12) The expansion of $(3 - 5x)^{1/2}$ is valid only if

(A) $|x| < 3$ (B) $|x| < 5$ (C) $|x| < 5/3$ (D) $|x| < 3/5$

(13) Sum of exponents of a and b in every term of $(a+b)^6$ is

(A) 6 (B) 7 (C) 3 (D) 12

(14) In anti clock wise direction $\frac{1}{4}$ rotation is equal to

(A) 90° (B) 180° (C) 270° (D) 45°

(15) $\sin 8\theta - \sin 4\theta$ =

(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) $-2 \sin 6\theta \cos 2\theta$

(16) The period of sin 3x is

(A) π (B) 2π (C) $\frac{\pi}{3}$ (D) $\frac{2\pi}{3}$

(17) If an angle is in standard form then its vertex is at

(A) (1,0) (B) (0,0) (C) (0,1) (D) (1,1)

(18) For a triangle ABC with usual notations γ =

(A) $\frac{\Delta}{s}$ (B) $\frac{\Delta}{s-a}$ (C) $\frac{\Delta}{s-b}$ (D) $\frac{\Delta}{s-c}$

(19) The value of $\sin^{-1}(\cos \pi/6)$ is

(A) $\pi/6$ (B) $\pi/2$ (C) $\frac{3\pi}{2}$ (D) $\pi/3$

(20) The solution of $\tan x = \frac{1}{\sqrt{3}}$ for $x \in [0 , \pi]$ is

(A) $\{\pi/2\}$ (B) $\{\pi/6\}$ (C) $\{\pi/3\}$ (D) $\{\pi/4\}$

11th CLASS – 12019
SUBJECTIVE
SECTION-I

TIME : 2.30 HOURS
MARKS : 80

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

1	Prove the following rule $\frac{a}{b}+\frac{c}{d}=\frac{ad+bc}{bd}$
2	Simplify $(5,-4)\times(-3,-2)$
3	Express the complex number $1+i\sqrt{3}$ in polar form
4	Show that the statement $p \rightarrow (p \vee q)$ is a tautology
5	Write inverse of the relation and also tell whether relation and its inverse is a function or not $\{(x,y)/\ x^2+y^2=9,\ \|x\| \le 3,\ \|y\| \le 3\}$
6	If a, b are elements of a group G, then show that $(ab)^{-1}=b^{-1}a^{-1}$
7	Find the inverse of the matrix : $\begin{bmatrix} 2i & i \\ i & -i \end{bmatrix}$
8	Without expansion verify that $\begin{vmatrix} bc & ca & ab \\ \frac{1}{a} & \frac{1}{b} & \frac{1}{c} \\ a & b & c \end{vmatrix}=0$
9	If the matrices A and B are symmetric and AB = BA, show that AB is symmetric
10	Evaluate $(1+w-w^2)(1-w+w^2)$, where w is complex cube root of unity
11	Show that the roots of the equation will be rational : $px^2-(p-q)x-q=0$
12	Solve the equation by factorization x^2-x-2

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

1	Define a partial fraction
2	Resolve into partial fraction $\frac{x^2+1}{(x-1)(x+1)}$
3	Write in mixed form $\frac{3x^2+1}{x-1}$
4	Find the next two terms of $-1, 2, 12, 40, \ldots\ldots\ldots$
5	If $S_n=n(2n-1)$, Find the series
6	Find the 5th term of GoP, 3, 6, 12, ...
7	Find the G.M between $-2i$ and $8i$
8	Sum the infinite geometric series $4+2\sqrt{2}+2+\sqrt{2}+1+\ldots\ldots\ldots$
9	Find n, if ${}^{11}P_n = 11.10.9$
10	Write the principles of Mathematical induction
11	Calculate by binomial theorem $(.97)^3$ up to three decimal places
12	If x is so small, that its square and higher powers be neglected, Prove $\frac{1-x}{\sqrt{1+x}} \approx 1-\frac{3x}{2}$

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

1	Prove that $\tan\theta+\cot\theta=\operatorname{cosec}\theta\sec\theta$
2	Find x if $\tan^2 45^\circ-\cos^2 60^\circ=x\sin 45^\circ\cos 45^\circ\tan 60^\circ$
3	Define radian
4	Prove that $\sin(45^\circ+\alpha)=\frac{1}{\sqrt{2}}(\sin\alpha+\cos\alpha)$
5	Prove that $\frac{\sin 2\alpha}{1+\cos 2\alpha}=\tan\alpha$
6	Express $\sin 12^\circ \sin 46^\circ$ as sum or difference
7	Find period of sin 3x
8	The area of triangle is 2437 if a = 79 and c = 97 then find angle β
9	State law of tangents (any two)
10	If a = 7, b = 3, c = 5 Find α
11	Show that $\cos(\sin^{-1}x)=\sqrt{1-x^2}$
12	Solve the equation $\sin x=\frac{1}{2}$
13	Solve the trigonometric equation $\tan\theta=\frac{1}{\sqrt{3}}$

(P.T.O)

DG Khan Board-2019

SECTION-II

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

Q. 5-(A)	Prove that the set $S = \{1, -1, i, -i\}$ is an abelian group under multiplication
(B)	A person invests Rs 2000 at 4 % interest compounded annually. What total amount will he get after 5 year
Q. 6-(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)	How many signals can be given by 6 – flags of different colours when any number of flags can be used at a time
Q.7-(A)	Find the three cube roots of unity
(B)	If x is so small that its cube and higher power can be neglected, then show that $\sqrt{\frac{1-x}{1+x}} = 1 - x + \frac{1}{2}x^2$
Q.8-(A)	Without calculator find the values of the trigonometric functions of the angle $\frac{-71\pi}{6}$
(B)	Without using calculator, Prove that : $\sin 19^\circ \cos 11^\circ + \sin 71^\circ . \sin 11^\circ = \frac{1}{2}$
Q.9-(A)	If the measures of the sides of a triangle ABC are 17, 10, 21 . Find R, r, r_1, r_2 and r_3
(B)	Prove that $\tan^{-1}\frac{3}{4} + \tan^{-1}\frac{3}{5} - \tan^{-1}\frac{8}{19} = \frac{\pi}{4}$

PAPER CODE - 6191
(11th CLASS - 12018)

MATHEMATICS , GROUP FIRST

TIME: 30 MINUTES , MARKS: 20

OBJECTIVE

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) The number π is
(A) a whole number (B) a natural number (C) a rational number (D) an irrational number

(2) The number of ways in which a set can be described are
(A) 1 (B) 2 (C) 3 (D) 4

(3) If A and B are matrices , then $(AB)^t$ =
(A) B^tA^t (B) A^tB^t (C) AB (D) BA

(4) Rank of the matrix $\begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}$ is
(A) 1 (B) 2 (C) 3 (D) 4

(5) The roots of the equation $ax^2+bx+c=0$ will be imaginary if
(A) $b^2-4ac=0$ (B) $b^2-4ac>0$ (C) $b^2-4ac<0$ (D) $b^2-4ac=1$

(6) If $b^2-4ac>0$ and perfect square then roots are
(A) Rational (B) Irrational (C) Equal (D) Complex

(7) The fractions $\frac{x-3}{x+1}$ is
(A) Improper (B) Proper (C) Identity (D) Equivalent

(8) A geometric mean (G.M) between " a " and " b " is
(A) $\frac{a+b}{2}$ (B) $\frac{2}{a+b}$ (C) $\sqrt{ab}$ (D) $\frac{2ab}{a+b}$

(9) The formula for the sum of n terms of an A.P is
(A) $\frac{n}{2}\{2a+(n+1)d\}$ (B) $\frac{n}{2}\{a+(n-1)d\}$ (C) $\frac{n}{2}\{2a+(n-1)d\}$ (D) $\frac{n}{2}\{a-(n-1)d\}$

(10) From a box containing 5 green and 3 red balls , one ball is taken out. The probability that the ball drawn is black is
(A) 1 (B) $\frac{1}{2}$ (C) $\frac{3}{8}$ (D) 0

(11) Value of $\frac{9!}{6!\,3!}$ is
(A) 84 (B) 48 (C) 24 (D) 42

(12) Expansion of $(1+2x)^{1/5}$ is valid if
(A) $|x|<1$ (B) $|x|<2$ (C) $|x|<\frac{1}{2}$ (D) $|x|\leq 1$

(13) The expression n^2-n+41 represents a prime number for $n \in N$ where
(A) $n \leq 10$ (B) $n \leq 20$ (C) $n \leq 40$ (D) $n \leq 5$

(14) If $\sin\theta = \frac{1}{2}$ then θ is equal to
(A) 30° (B) 45° (C) 60° (D) 90°

(15) $\cos 2\theta$ is equal to
(A) $\frac{2\tan\theta}{1-\tan^2\theta}$ (B) $\frac{2\tan\theta}{1+\tan^2\theta}$ (C) $\frac{1-\tan^2\theta}{1+\tan^2\theta}$ (D) $2\cos^2\theta+1$

(16) The smallest positive integer p for which $f(p+x)=f(x)$ is called
(A) Domain (B) Range (C) Co-Domain (D) Period

(17) With usual notation in triangle Δ ABC , If $a=7$, $b=3$, $c=5$ then value of ' S ' is equal to
(A) 15 (B) $\frac{15}{2}$ (C) 55 (D) 105

(18) If Δ ABC is right anlge triangle , the law of cosine reduces to the
(A) Law of Sine (B) Area of triangle (C) Law of tangent (D) Pythagoras theorem

(19) The value of $\frac{\pi}{2} - \sin^{-1}x$ is equal to
(A) $\cos^{-1}x$ (B) $\sin^{-1}x$ (C) $\cos x$ (D) $\sin x$

(20) An equation containing at least one trigonometric function is called
(A) algebraic equation (B) quadratic equation (C) linear equation (D) trigonometric equation

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

1	Check the closure property of addition and multiplication for the set {0 , -1}
2	If Z_1 and Z_2 are complex numbers then show that $\overline{Z_1 Z_2} = \overline{Z_1}\,\overline{Z_2}$
3	Express the complex number $(1+i\sqrt{3})$ in the polar form
4	If A = {1 , 2 , 3} then find the power set of A
5	Define tautology and absurdity
6	Define Group
7	If $A = \begin{bmatrix} 2i & i \\ i & -i \end{bmatrix}$ then find A^{-1}
8	Define cofactor of an element of a matrix and give an example
9	Without expansion show that $\begin{vmatrix} \alpha & \beta+\gamma & 1 \\ \beta & \gamma+\alpha & 1 \\ \gamma & \alpha+\beta & 1 \end{vmatrix} = 0$
10	Find the condition when one root of $x^2 + px + q = 0$ is double the other
11	Show that the roots of $px^2 - (p-q)x - q = 0$ are rational
12	If w is the cube root of unity then show that $x^3+y^3 = (x+y)(x+wy)(x+w^2y)$

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

1	Define partial fraction ; Give example
2	If $\frac{1}{a}$, $\frac{1}{b}$ and $\frac{1}{c}$ are in A.P. Show that common difference is $\frac{a-c}{2ac}$
3	Insert two G.M's. between 1 and 8
4	If the numbers $\frac{1}{k}$, $\frac{1}{2k+1}$ and $\frac{1}{4k-1}$ are in H.P. find k
5	If H.M. and A.M. between two numbers are 4 and $\frac{9}{2}$ respectively , find the number
6	Find the sum of first 15 terms of the geometric sequence $1 , \frac{1}{3} , \frac{1}{9} , \ldots\ldots\ldots\ldots$
7	Find the value of n when $^{n}P_{n} = 11.10.9$ P is permotation
8	Find the number of diagonals of a 6 – sided figure
9	In how many ways 4 keys can be arranged on a circular key ring?
10	Verify that : the inequality for 4 , 5 . $n! > n^2$ for n = 4,5
11	Expand $(3a - \frac{x}{3a})^4$ up to 2 terms by Binomial theorem
12	Find the value of $3\sqrt{65}$ to ' 2 ' places of decimal by using Binomial series

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

1	Find value of r in a circle , when : $\ell = 56$ cm , $\theta = 45^\circ$
2	When $\theta = \frac{-9}{2}\pi$, with the help of general angle , find values of sin θ and cos θ
3	Prove that : $\frac{2\tan\theta}{1+\tan^2\theta} = 2\sin\theta\cos\theta$
4	Prove that : $\cos(\alpha + 45^\circ) = \frac{1}{\sqrt{2}}(\cos\alpha - \sin\alpha)$
5	Express sin 5x + sin 7x as a product
6	Prove that $\sqrt{\frac{1+\sin\alpha}{1-\sin\alpha}} = \frac{\sin\frac{\alpha}{2}+\cos\frac{\alpha}{2}}{\sin\frac{\alpha}{2}-\cos\frac{\alpha}{2}}$
7	Find the period of $\sin\frac{x}{3}$
8	When the angle between the ground and the sun is 30° , flag pole casts a shadow of 40m long. Find the height of the top of the flag
9	Find the smallest angle of the triangle Δ ABC , when a = 37.34 , b = 3.24 , c = 35.06
10	Find the area of the triangle Δ ABC having its two sides and the included angle as : b = 37 , c = 45 , $\alpha = 30^\circ 50'$
11	Show that $\sin(2\cos^{-1}x) = 2x\sqrt{1-x^2}$
12	Define general trigonometric equation
13	Using reference angle find the solutions (roots) of $\sin x = \frac{-\sqrt{3}}{2}$, $x \in [0 , 2\pi]$

SECTION-II

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

5-(A)	Give the logical proof of De, Morgan,s laws
(B)	Prove that $\begin{vmatrix} b+c & a & a^2 \\ c+a & b & b^2 \\ a+b & c & c^2 \end{vmatrix} = (a+b+c)(a-b)(b-c)(c-a)$
6-(A)	Solve $\frac{a}{ax-1} + \frac{b}{bx-1} = a+b$; $x \neq 1/a$ and $x \neq 1/b$
(B)	Split $\frac{7x+25}{(x+3)(x+4)}$ into partial fractions form
7-(A)	For what value of n , $\frac{a^n+b^n}{a^{n-1}+b^{n-1}}$ is the positive geometric mean between " a " and " b"
(B)	Identify the series as binomial expansion also find the sum of the series $1 + \frac{3}{4} + \frac{3.5}{4.8} + \frac{3.5.7}{4.8.12} + \ldots\ldots\ldots\ldots$
8-(A)	Prove that : $\sin^6\theta - \cos^6\theta = (\sin^2\theta - \cos^2\theta)(1 - \sin^2\theta\cos^2\theta)$
(B)	Prove that : $\sin 10^\circ \sin 30^\circ \sin 50^\circ \sin 70^\circ = \frac{1}{16}$ (without using calculator)
9-(A)	Prove that $R = \frac{abc}{4\Delta}$ where a , b , c are the lengths of the sides of triangle and " Δ " denotes the area of triangle
(B)	Prove that (i) $\tan^{-1}\frac{120}{199} = 2\cos^{-1}\frac{12}{13}$
	(ii) $\sin^{-1}\frac{5}{13} + \sin^{-1}\frac{7}{25} = \cos^{-1}\frac{253}{325}$

PAPER CODE - 6192
(11th CLASS - 12018)

MATHEMATICS , GROUP SECOND TIME: 30 MINUTES , MARKS: 20

OBJECTIVE

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) Multiplicative inverse of complex number (0,-1) is
(A) (-1,0) (B) (0,1) (C) (1,0) (D) (0,-1)

(2) The contra-positive of $p \rightarrow q$ is
(A) $q \rightarrow p$ (B) $\sim q \rightarrow p$ (C) $q \rightarrow \sim p$ (D) $\sim q \rightarrow \sim p$

(3) If the matrix $\begin{bmatrix} \lambda & 1 \\ -2 & -1 \end{bmatrix}$ is singular then $\lambda =$
(A) 2 (B) 1 (C) -1 (D) - 2

(4) If matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 1 & -1 & 1 \end{bmatrix}$ then the cofactor $A_{32} =$
(A) 1 (B) 2 (C) -1 (D) -2

(5) The roots of equation $x^2+2x+3 = 0$ will be
(A) Complex (B) Equal (C) Rational (D) Irrational

(6) If w is the cube root of unity then $(1+w-w^2)^8 =$
(A) 256 (B) -256 (C) -256 w (D) 256 w

(7) The fraction $\frac{x^2-3}{3x+1}$ is
(A) Proper fraction (B) Improper fraction (C) Equation (D) Polynomial

(8) If $a_{n-2} = 3n-11$ then nth term is
(A) 3n+5 (B) 3n-3 (C) 3n-5 (D) 3n+2

(9) Arithmetic mean between $2+\sqrt{2}$ and $2-\sqrt{2}$ is
(A) 2 (B) 4 (C) $2\sqrt{2}$ (D) 0

(10) A die is rolled once then the probability of 3 or 4 dots on the top is
(A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{1}{6}$

(11) If in usual notations ${}^nC_6 = {}^nC_8$ then n is equal to
(A) 6 (B) 8 (C) 2 (D) 14

(12) The expansion of $(3-5x)^{1/2}$ is valid if
(A) $|x| < 5/2$ (B) $|x| < 5/3$ (C) $|x| < 1$ (D) $|x| < 3/5$

(13) In the expansion of $(1+x)^{-3}$ the 4^{th} term is
(A) -3x (B) $-10x^3$ (C) $6x^2$ (D) $10x^3$

(14) If $\tan\theta = 8/15$ and $\pi \leq \theta \leq \frac{3\pi}{2}$ then $\cos\theta =$
(A) $-17/15$ (B) $17/15$ (C) $15/17$ (D) $-15/17$

(15) The value of $\cos 75^\circ =$
(A) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (B) $\frac{-\sqrt{3}+1}{2\sqrt{2}}$ (C) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ (D) $\frac{-\sqrt{3}-1}{2\sqrt{2}}$

(16) The period of 3 sin x is
(A) 3π (B) π (C) 2π (D) $\pi/3$

(17) If $\propto = 90^\circ$ then by law of cosine
(A) $c^2 = a^2+b^2$ (B) $a^2 = b^2 + c^2$ (C) $b^2 = a^2 + c^2$ (D) $a^2 = b^2 - c^2$

(18) Radius of escribed circle opposite to vertex B in Δ ABC is
(A) $\frac{\Delta}{S}$ (B) $\frac{\Delta}{S-a}$ (C) $\frac{\Delta}{S-C}$ (D) $\frac{\Delta}{S-b}$

(19) Domain of principal sine function is
(A) $[0, \pi/2]$ (B) $[0, \pi]$ (C) $[-\pi/2, \pi/2]$ (D) $[0, 2\pi]$

(20) The solution of $\sin x + \cos x = 0$ in $[0, \pi]$ is
(A) $\frac{3\pi}{4}$ (B) $\pi/4$ (C) $\pi/6$ (D) $\pi/3$

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

1	Define terminating decimal ; Give one example
2	Find multiplicative inverse of $(-4, 7)$
3	Show that $\forall Z \in C$, $Z^2 + \overline{Z^2}$ is a real number
4	Write $\{x \mid x \in O \wedge 5 \leq x < 7\}$ in the descriptive and tabular form
5	Write converse , contra positive of $q \rightarrow p$
6	State Domain and range of relation $\{(x, y) \mid x+y > 5\}$ in $A = \{1,2,3,4\}$
7	If $B = \begin{bmatrix} 5 & -2 & 5 \\ 3 & -1 & 4 \\ -2 & 1 & -2 \end{bmatrix}$, find cofactor B_{21} and B_{22}
8	Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} y & 1 \\ -3 & 2x \end{bmatrix}$
9	Without expansion show that $\begin{vmatrix} \alpha & \beta+\gamma & 1 \\ \beta & \gamma+\alpha & 1 \\ \gamma & \alpha+\beta & 1 \end{vmatrix} = 0$
10	Solve : $x^2 - x = 2$ by factorization
11	Find four fourth roots of 16
12	If α, β are roots of $3x^2 - 2x + 4 = 0$, find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$

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

1	Resolve $\frac{7x+25}{(x+3)(x+4)}$ into partial fractions
2	Write the first four terms of $a_n = \frac{n}{2n+1}$
3	Find the Arithmetic Mean (A.M) between $x-5$ and $x+5$
4	Sum up to 13-terms of the Arithmetic series $\frac{3}{\sqrt{2}} + 2\sqrt{2} + \frac{5}{\sqrt{2}} + \ldots\ldots\ldots\ldots$
5	Find two Geometric mean between i and 8
6	Calculate the sum of 8-terms of the Geometric series $2+(1-i)+\frac{1}{i}+\ldots\ldots\ldots\ldots$
7	Evaluate $\frac{9!}{2!(9-2)!}$
8	Find the value of n, when (a) ${}^nC_5 = {}^nC_4$ and (b) ${}^nC_{10} = \frac{12\times11}{2!}$, (C stands for combination)
9	There are 5-green and 3-red balls in a box. What is the probability of getting a green ball
10	Use mathematical induction to verify the result for $n = 1,2$ $1+2+4+\ldots\ldots\ldots\ldots+2^{n-1} = 2^n - 1$
11	Calculate $(2.02)^4$ by means of Binomial theorem
12	Expand up to 3-terms , taking the value of x such that the expansion is valid $(8-2x)^{-1}$

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

1	Find r if $\ell = 56$ cm , $\theta = 45^\circ$
2	Find x if $\tan^2 45^\circ - \cos^2 60^\circ = x \sin 45^\circ \cos 45^\circ \tan 60^\circ$
3	Prove $\cos^2\theta - \sin^2\theta = \frac{1-\tan^2\theta}{1+\tan^2\theta}$
4	Prove that $\cos 306^\circ + \cos 234^\circ + \cos 162^\circ + \cos 18^\circ = 0$
5	Prove $\tan(\frac{\pi}{4} - \theta) + \tan(\frac{3\pi}{4} + \theta) = 0$
6	Prove $\frac{1-\cos\alpha}{\sin\alpha} = \tan\frac{\alpha}{2}$
7	Find the period of $\tan\frac{x}{7}$
8	In the right triangle ΔABC , $\alpha = 37^\circ 20'$, $a = 243$, $\gamma = 90^\circ$, Find "β" and "C"
9	Find the area of a ΔABC , in which $a = 18$, $b = 24$, $c = 30$
10	Prove that $R = \frac{abc}{4\Delta}$, with usual notations
11	Prove $\tan^{-1}A + \tan^{-1}B = \tan^{-1}\left(\frac{A+B}{1-AB}\right)$
12	Find the solutions of the equation $\sec x = -2$, $x \in [0, 2\pi]$
13	Find the values of θ , satisfying the equation $3\tan^2\theta + 2\sqrt{3}\tan\theta + 1 = 0$

DG Khan Board-2018

SECTION-II

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

5-(A)	Give logical proof of $(A \cup B)' = A' \cap B'$ when A , B are two sets
(B)	Without expansion , Prove that $\begin{vmatrix} x & a+x & b+c \\ x & b+x & c+a \\ x & c+x & a+b \end{vmatrix} = 0$
6-(A)	Show that the roots of $(mx+c)^2 = 4ax$ will be equal if $c = \frac{a}{m}$
(B)	Resolve $\frac{x^2}{(x-2)(x-1)^2}$ into partial fractions
7-(A)	If S_2 , S_3 , S_5 are the sum of 2n , 3n , 5n terms of Arithmatic Progression (A.P) , Show that $S_5 = 5\,(S_3 - S_2)$
(B)	If $y = \frac{2}{5} + \frac{1.3}{2!}\left(\frac{2}{5}\right)^2 + \frac{1.3.5}{3!}\left(\frac{2}{5}\right)^3 + \ldots\ldots\ldots\ldots$ then prove that $y^2+2y-4=0$
8-(A)	If $\cot\theta = {}^{15}/_{8}$ and the terminal arm of the angle is not in quadrant-I , Find the values of $\cos\theta$ and $\operatorname{cosec}\theta$
(B)	Reduce $\sin^4\theta$ to an expression involving only function of multiples of θ , raised to the first power
9-(A)	Solve the triangle Δ ABC , using first law of tangent and then of law of sines : $a = 93$, $c = 101$ and $\beta = 80^\circ$
(B)	Prove that : $\sin^{-1}A - \sin^{-1}B = \sin^{-1}\left(A\sqrt{1-B^2} + B\sqrt{1-A^2}\right)$