PAPER CODE - 6191
11th CLASS – 12021

MATHEMATICS , GROUP FIRST

D44-91-21

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 $(a+b)^{12}$, $\gamma =$
(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
GROUP : FIRST

11th CLASS – 12021
SUBJECTIVE
SECTION-I D4K-91-21

TIME : 2.30 HOURS
MARKS : 80

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 $2, \sqrt{2}, 1, \ldots\ldots$
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 $\theta = 30°, 45°$
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°)
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 , $\alpha = 30°50'$
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

DGK-G1-21

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 $2\tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{7} = \frac{\pi}{4}$