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PAPER CODE - 6196
11th CLASS - 12021

MATHEMATICS
GROUP SECOND

DGK-G2-21

OBJECTIVE

TIME: 30 MINUTES
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^o (B) -180^o (C) 90^o (D) -90^o

(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) $0 < x < \pi$

(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 DGK-G2-21

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 $A+(\overline{A})^t$ 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 ${}^{11}P_n = 11.10.9$
8	What is the probability that a slip of a number divisible by 4 is picked from the slips bearing numbers $1, 2, 3, \ldots\ldots 10$?
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 $\cot\theta=\frac{-1}{\sqrt{3}}$, $\theta\in[0, 2\pi]$

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 $\gamma = 60^\circ$