DGK-G1-11-19

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 $y = \cos x$ 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 , $\gamma_1 =$
(A) $\frac{\Delta}{s-b}$ (B) $\frac{\Delta}{s-a}$ (C) $\frac{\Delta}{s-c}$ (D) $\frac{s-a}{\Delta}$

(19) $\text{Tan}^{-1}(1) =$
(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) $\pi/3$, $2\pi/3$

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DGK-GI-11-19

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	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 8th term of $1, -3, 5, -7, 9, -11, \ldots\ldots\ldots, a_8$
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 $x^2 - y^2$, $x + y$, $\frac{x+y}{x-y}$, ... 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 $2 + (1 - i) + \frac{1}{i} + \ldots\ldots\ldots$ 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 6th term in the expansion of $\left(x^2 - \frac{3}{2x}\right)^{10}$
12	Using Binomial theorem find the value of $5\sqrt{31}$

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° 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 $\sec\left(\sin^{-1}\left(-\frac{1}{2}\right)\right)$
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)

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SECTION-II

e: **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 $\tan^{-1}\frac{3}{4} + \tan^{-1}\frac{3}{5} - \tan^{-1}\frac{8}{19} = \frac{\pi}{4}$

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DGK-G2 11-19

PAPER CODE - 6192

(11^{th} CLASS - 12019)

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

OBJECTIVE

OTE: 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) $\{\pi/4\}$

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DGK-G2-11-19

COND

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 $\{(x,y)/\ x^2+y^2=9,\ \|x\|\leq 3,\ \|y\|\leq 3\}$
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)

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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 : $\text{Sin } 19^\circ \cdot \text{Cos } 11^\circ + \text{Sin } 71^\circ \cdot \text{Sin } 11^\circ = \frac{1}{2}$
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 $\tan^{-1}\frac{3}{4} + \tan^{-1}\frac{3}{5} - \tan^{-1}\frac{8}{19} = \frac{\pi}{4}$

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