DGK-G1-11-19

PAPER CODE - 6191
(11th CLASS - 12019)

THEMATICS , 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) $\tan^{-1}(1) =$
(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) $\pi/3$, $2\pi/3$

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 $1, -3, 5, -7, 9, -11, \ldots\ldots, a_8$
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 $\sqrt{31}$

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 θ 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)

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