MATHEMATICS

HSSC (11^{th}) 1^{st} Annual 2024 Roll No ______ (To be filled in by the candidate)

Paper: I **Objective - (iii)** Paper Code | 6 | 1 | 9 | 5 | Marks: 20 Time: 30 Minutes

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 in you answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION – A

Q.1	Questions	A	B	C	D
1.	$2\sin 45° + \frac{1}{2}\operatorname{cosec} 45° =$ ______	1	–1	$\frac{3}{\sqrt{2}}$	$\sqrt{\frac{2}{3}}$
2.	The value of $\sec\left(\sin^{-1}\frac{\sqrt{3}}{2}\right) =$ ______	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	2	$\frac{1}{2}$
3.	In any triangle ABC, $\frac{c^2+a^2-b^2}{2ac} =$ ______	$\cos\alpha$	$\cos\beta$	$\cos\gamma$	$\cos(\beta+\alpha)$
4.	If a = 1, b = 5 then A × H = ______	$\frac{2}{5}$	$\frac{5}{2}$	5	–5
5.	$\sin(-300°) =$ ______	$-\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{2}{\sqrt{3}}$	0
6.	If $\cos x = \frac{1}{\sqrt{2}}$, then reference angle is:	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
7.	Every non-recurring, non-terminating decimal represents ______ number.	rational	irrational	whole	natural
8.	${}^6P_3 =$ ______	6	18	36	120
9.	Range of $\sin\left(\frac{x}{2}\right)$ is:	$\left[\frac{1}{2}, -\frac{1}{2}\right]$	[–2, 2]	[2, –2]	[–1, 1]
10.	If $a_{n-2} = 3n - 11$, then nth term is:	3n + 2	3n – 5	3n + 5	3n – 3
11.	$(A\cup B)^c =$ ______	$A\cup B$	$A\cap B$	$A^c\cup B^c$	$A^c\cap B^c$
12.	The product of the roos of equation $x^2 + 2x + 1 = 0$, is ______	2	3	1	–1
13.	If $4^x = \frac{1}{2}$ then x = ______	$\frac{1}{4}$	$\frac{1}{2}$	$-\frac{1}{2}$	2
14.	Rank of the matrix $\begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}$ is ______	2	–1	0	$\sqrt{-1}$
15.	If $\begin{vmatrix}k & 4\\4 & k\end{vmatrix} = 20$ then k = ______	±36	±24	±16	±6
16.	$A \subseteq B$ then complement of A in B (B-Universal):	A – B	B – A	$A\cap B$	$A\cup B$
17.	$\frac{A}{x-1} + \frac{B}{x+1}$ is a partial fraction of:	$\frac{1}{x^3-1}$	$\frac{1}{x^2-1}$	$\frac{1}{1-x^2}$	$\frac{1}{x^2+1}$
18.	(Z, +) has identity element:	0	i	1	–1
19.	Multiplicative inverse of $(0, -1) \in C$, is:	(0,1)	(1,0)	(–1,0)	(1,1)
20.	$(r+1)^{th}$ term in the expansion of $(a+b)^n$ is:	$\binom{n}{r}a^{n-r}b^r$	$\binom{n}{r}a^{n-r}b^{r-1}$	$\binom{n}{r}a^{n+r}b^r$	$\binom{n}{r}a^{n+r}b^{r+1}$

MATHEMATICS HSSC (11^{th}) 1st Annual 2024 Roll No ______ (To be filled in by the candidate)

Paper: I **Subjective** Marks: 80 Time: 2:30 Hours

Note: Section B is compulsory. Attempt any THREE questions from Section C.

SECTION - B

Q2. Write short answers to any Eight parts. (8×2 = 16)

(i) Factorize $9a^2 + 16b^2$.

(ii) Define modulus of a complex number.

(iii) Find the multiplicative inverse of (−4, 7).

(iv) Express the complex number $1 + i\sqrt{3}$ in polar form.

(v) Write the set $\{x \mid x \in Q \wedge x^2 = 2\}$.

(vi) Convert $(A \cap B)' = A' \cup B'$ into logical form.

(vii) Define diagonal matrix and give an example.

(viii) Show that for a non-singular matrix A, $(A^{-1})^{-1} = A$.

(ix) Define co-factor of an element.

(x) Solve $x^{\frac{1}{2}} - x^{\frac{1}{4}} - 6 = 0$

(xi) Reduce $x^{-2} - 10 = 3x^{-1}$ to quadratic form.

(xii) Show that $x^3 - y^3 = (x - y)(x - \omega y)(x - \omega^2 y)$.

Q3. Write short answers to any Eight parts. (8×2 = 16)

(i) Define improper fraction.

(ii) Change $\frac{x^2 + 1}{x^2 - 1}$ into proper fraction.

(iii) Find 9^{th} term of the sequence $-\frac{1}{5}, -\frac{1}{3}, -1$, ___

(iv) For a = 2i, b = 4i, show that $G^2 = A \times H$.

(v) Find the first term of the geometric series if $a_n = (-3)\left(\frac{2}{5}\right)^n$

(vi) If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in G.P, show that the common ratio is $\pm\sqrt{\frac{a}{c}}$.

(vii) If ${}^nC_8 = {}^nC_{12}$, find n.

(viii) How many triangles and diagonals can be formed by joining the vetices of 8-sided polygon?

(ix) Define cicular permutation.

(x) From the expansion of $\left(\frac{3x}{2} - \frac{1}{3x}\right)^{11}$, find the sixth term from the end.

(xi) Expand $(8 - 5x)^{-2/3}$ up to four terms.

(xii) Evaluate $\sqrt[5]{31}$ correct to three decimal places.

Q4. Write short answers to any Nine parts. (9×2 = 18)

(i) Express $\theta = 120'40''$ in radians.

(ii) If $\sin\theta = \frac{12}{13}$ and terminal arm of angle is in quadrant I, find $\tan\theta$ and $\cos\theta$.

(iii) Find the value of $\sin(-300°)$.

(iv) Prove that $\sin\left(\theta + \frac{\pi}{6}\right) + \cos\left(\theta + \frac{\pi}{3}\right) = \cos\theta$

(v) Write down the half angle identity for $\tan\left(\frac{\alpha}{2}\right)$.

(vi) Define period of a trigonometric function.

(vii) Prove that period of sin function is 2π.

(viii) Write down the domain and range for y=tan

(ix) Solve the right triangle ABC in which $\gamma = 90°$, a = 3.28, b = 5.74.

(x) Write half angle formulas $\sin\left(\frac{\gamma}{2}\right)$ and $\cos\left(\frac{\gamma}{2}\right)$.

(xi) Define and draw an oblique triangle.

(xii) Find the value of $\sin\left(\cos^{-1}\frac{\sqrt{3}}{2}\right)$.

(xiii) Find the solution $x \in [0, 2\pi]$, $\sin x = -\frac{\sqrt{3}}{2}$

SECTION - C

Note: Attempt any THREE questions. Each question carries (5+5=10) marks.

Q5. (a) **Solve the system of linear equations by Cramer's Rule.**

$2x_1 - x_2 + x_3 = 8$; $x_1 + 2x_2 + x_3 = 6$; $x_1 - 2x_2 - x_3 = 1$

(b) **Solve systems of equations.** $x + y = 5, x^2 + 2y^2 = 17$

Q6. (a) **Resolve** $\frac{x^2 - 10x + 13}{(x-1)(x^2 - 5x + 6)}$ **into partial fraction.**

(b) **Show that the sum of 'n' A.Ms between a and b is equal to n times their A.M.**

Q7. (a) **Prove that** ${}^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$.

(b) **If x is nearly equal to 1 then prove that** $px^p - qx^q = (p - q)x^{p+q}$.

Q8. (a) **Prove that** $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \tan\theta + \sec\theta$

(b) **Prove that** $\tan^{-1}\frac{120}{119} = 2\cos^{-1}\frac{12}{13}$

Q9. (a) **If** $\alpha + \beta + \gamma = 180°$, **show that** $\cot\alpha\cot\beta + \cot\beta\cot\gamma + \cot\gamma\cot\alpha = 1$.

(b) **Prove that** $r_1 + r_2 + r_3 - r = 4R$

Sahiwal Board-2023

Roll No. ______ (To be filled in by the candidate)

Mathematics — **H.S.S.C (11th) 1st Annual 2023** — Time : 30 Minutes

Paper : I — Objective – (iii) — Marks : 20

Paper Code 6 1 9 5

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 in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION–A

Q.1	Questions	A	B	C	D
1.	$\cos^2\alpha - \sin^2\alpha =$	1	$\cos 2\alpha$	$\sin 2\alpha$	$\sin 3\alpha$
2.	$\cos(\sin^{-1}\frac{1}{\sqrt{2}}) =$	$\frac{1}{\sqrt{2}}$	$\frac{-1}{\sqrt{2}}$	$\frac{1}{2}$	$\frac{-1}{2}$
3.	$r_1 =$	$\frac{s}{s-a}$	$\frac{\Delta}{s-a}$	$\frac{\Delta s}{s-a}$	$\frac{\Delta}{s+a}$
4.	The expansion $1+x+x^2+x^3+\ldots+x^r+\ldots =$	$(1+x)^{-1}$	$(1-x)^{-1}$	$(1+x)^{-2}$	$(1+x)^{-3}$
5.	The period of cosec θ is.	2π	π	$\frac{\pi}{2}$	$\frac{\pi}{6}$
6.	Solution of $\cot\theta = \frac{1}{\sqrt{3}}$ which lies in $[0, 2\pi]$	$\frac{\pi}{3}$	$\frac{\pi}{4}$	$\frac{\pi}{6}$	$\frac{\pi}{2}$
7.	Value of $(-1)^{\frac{-21}{2}}$ is.	-1	1	i	$-i$
8.	The statement $n! > 2^n - 1$ is true for	$n=1$	$n=2$	$n<4$	$n \geq 4$
9.	$\frac{a}{2\sin\alpha} =$	r	r_1	Δ	R
10.	$n(n-1)(n-2)\ldots(n-r+1) =$	$\frac{n!}{r!}$	$\frac{n!}{(n-r)!}$	$\frac{n!}{(n+r)!}$	${}^nC_r$
11.	A square matrix $A=[a_{ij}]$ is called hermitian matrix if:	$A^t = A$	$A^t = -A$	$(\bar{A})^t = A$	$(\bar{A})^t = -A$
12.	Next two terms of sequence 7, 9, 12, 16, … are:	21,27	21,26	20,27	20,26
13.	Formula for sum of an infinite geometric series is.	$a_1 + (n-1)d$	$\frac{a_1}{1-r}$	$\frac{a_1(1-r^n)}{1-r}$	$\frac{a_1(r^n-1)}{r-1}$
14.	The rational fraction $\frac{x^2+1}{x^3-1}$ is:	Identity	Irrational	Proper	Improper
15.	$\omega^{28} + \omega^{29} + 1 =$	-1	0	1	2
16.	Which is an exponential equation?	$x^2+1=0$	$x^3+1=0$	$2x+1=0$	$2^x - 1=0$
17.	Value of $\frac{10!}{7!}$ is:	718	719	720	730
18.	If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then $\|A\| =$	ad+bc	bc – ad	ad – bc	ac – bd
19.	The number of elements in power set of {0,1} are.	4	3	2	1
20.	$1+\cot^2\theta =$	$\cos^2\theta$	$\sin^2\theta$	$\mathrm{cosec}^2\theta$	$\sec^2\theta$

323-14-18500 ★★★

Sahiwal Board-2023

Roll No. ☐☐☐☐☐☐ (To be filled in by the candidate)

Mathematics | **H.S.S.C (11th) 1st Annual 2023** | Time : 2:30 Hours

Paper : I | Subjective | Marks : 80

Note: - Section B is compulsory. Attempt any Three questions from section C.

SECTION – B

2. Write short answers to any Eight parts. **(8 x 2 = 16)**

i. Factorize $3x^2 + 3y^2$.

ii. Prove that $\overline{z} = z$ iff z is real.

iii. What is the difference between {a,b} and $\{\{a,b\}\}$?

iv. Show that the statement is a tautology: $\sim q \wedge (p \to q) \to \sim p$

v. Define Monoid.

vi. If $A=\begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix}$, then show that 4A – 3A=A.

vii. Find the inverse of matrix $\begin{bmatrix} 2i & i \\ i & -i \end{bmatrix}$.

viii. Write any two properties of determinants.

ix. Solve the equation by using quadratic formula: $15x^2+2ax-a^2=0$.

x. Define a reciprocal equation and give one example.

xi. Prove that $\left(\frac{1+\sqrt{-3}}{2}\right)^9+\left(\frac{1-\sqrt{-3}}{2}\right)^9=-2$

xii. Discuss the nature of roots of equation $x^2 + 2x+3=0$.

3. Write short answers to any Eight parts. **(8 x 2 = 16)**

i. Define proper rational fraction.

ii. Find a_2 and a_3 of the sequence in which $a_n = na_{n-1}$ and $a_1=1$

iii. Which term of A.P; 5,2, –1,….is –85.

iv. Sum the series $\frac{1}{1+\sqrt{x}}+\frac{1}{1-x}+\frac{1}{1-\sqrt{x}}+....$ to n terms.

v. Define harmonic mean between a and b. Write its formula also.

vi. Find the sum to n term of series whose nth term is $2n+3$.

vii. Write $n(n-1)(n-2)...(n-r+1)$ into factorial form.

viii. Prove that ${}^nC_r = {}^nC_{n-r}$.

ix. Calculate number of diagonals of 5 sided figure.

x. Evaluate $(9.9)^5$

xi. Find middle term in the expansion of $\left(\frac{1}{x}-\frac{x^2}{2}\right)^{12}$

xii. Expand $(8-5x)^{-2/3}$ upto two terms.

4. Write short answers to any Nine parts. **(9 x 2 = 18)**

i. Define the word 'Trigonometry'.

ii. Convert 3 radians into degree.

iii. Find $\sin\theta$ and $\cos\theta$ when $\theta = \frac{-7\pi}{4}$.

iv. Express $\cos 7\theta - \cos\theta$ as product form.

v. Find the value of $\sin 2\alpha$ when $\sin\alpha = \frac{12}{13}$, where $0 < \alpha < \frac{\pi}{2}$.

vi. Find the value of $\tan 105^\circ$.

vii. Find the period of $\cos\frac{x}{6}$.

viii. Solve the right triangle, in which $\alpha = 58^\circ 13'$ $b=125.7$ and $\gamma = 90^\circ$.

ix. Write half angle formulas for $\sin\frac{\alpha}{2}$ and $\sin\frac{\beta}{2}$.

x. By using the cosine and sine law, solve the triangle ABC given that $b=3, c=5, \alpha = 120^\circ$

xi. Find the value of $\tan^{-1}(-\sqrt{3})$.

xii. Define trigonometric equation.

xiii. Find the solution of $\sec x = -2$ which lies in the interval $[0, 2\pi]$.

SECTION – C

Note: Attempt any Three questions. Each question carries (5+5=10) marks. **(10 x 3 = 30)**

5. (a) Find the value of x if $\begin{vmatrix} 3 & 1 & x \\ -1 & 3 & 4 \\ x & 1 & 0 \end{vmatrix} = -30$

(b) Show that the roots of $x^2 + (mx + c)^2 = a^2$ will be equal, if $c^2 = a^2(1+m^2)$.

6. (a) Resolve $\frac{x^2+1}{x^3+1}$ into partial fraction.

(b) Two dice are thrown twice. What is the probability that sum of dots shown in the first throw is 7 and that of second is 11?

7. (a) Find 'n' so that $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ may be the A.M. between a and b.

(b) Use mathematical induction to prove that $x+y$ is a factor of $x^{2n-1} + y^{2n-1}$, $x \neq -y$.

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 $\alpha + \beta + \gamma = 180^\circ$, show that $\cot\alpha.\cot\beta + \cot\beta.\cot\gamma + \cot\gamma.\cot\alpha = 1$

9. (a) Solve the triangle ABC in which $a = \sqrt{3} - 1$, $b = \sqrt{3} + 1$ and $\gamma = 60^\circ$.

(b) Prove that $\sin^{-1}\frac{77}{85} - \sin^{-1}\frac{3}{5} = \cos^{-1}\frac{15}{17}$.

Sahiwal Board-2021

Roll No. ________ (To be filled in by the candidate

Mathematics — Inter (Part-I)-A-2021 — Time : 30 Minutes

Paper : I — Objective – (III) — Marks : 20

Paper Code	6	1	9	5

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 the question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

Q.1	Questions	A	B	C	D
1.	$\sin\left(\frac{3\pi}{2}-\theta\right)=$	$\sin\theta$	$\cos\theta$	$-\sin\theta$	$-\cos\theta$
2.	$Tan^{-1}\left(-\sqrt{3}\right)=$	$\frac{2\pi}{3}$	$\frac{-2\pi}{3}$	$\frac{-\pi}{6}$	$\frac{-\pi}{3}$
3.	Radius of the inscribed circle is:	$r=\frac{\Delta}{S}$	$r=\frac{abc}{4\Delta}$	$r=\frac{S}{\Delta}$	$r=\frac{S-a}{\Delta}$
4.	If n is any positive integer, then $2^n > 2(n+1)$ is true for all.	$n\le 3$	$n<3$	$n\ge 3$	$n>3$
5.	The period of $3\sin 3x$ is:	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	π
6.	If $\sin x=\frac{-\sqrt{3}}{2}$, then solution is:	$\frac{4\pi}{6},\frac{5\pi}{6}$	$\frac{4\pi}{3},\frac{5\pi}{3}$	$\frac{5\pi}{6},\frac{7\pi}{6}$	$\frac{\pi}{3},\frac{7\pi}{3}$
7.	Any real number "a" is equal to:	ia	(a,b)	a	(b,a)
8.	What angle is quadrantal angle?	$120°$	$270°$	$60°$	$45°$
9.	If a,b,c have their usual meanings then $\frac{c^2+a^2-b^2}{2ac}=$	$\cos\alpha$	$\cos\beta$	$\cos\gamma$	$\sin\beta$
10.	$\frac{^nP_r}{r!}$ is equal to:	^nC_r	$^nC_{r-1}$	$^{n+1}C_r$	$^{n-1}C_r$
11.	Rank of matrix $\begin{bmatrix}1&0&0\\0&1&0\\0&0&0\end{bmatrix}$ is:	1	2	3	4
12.	If a, A, b are in A.P, then 2A is:	$a-b$	$\frac{a+b}{2}$	$a+b$	$b-a$
13.	If $a_{n-3}=2n-5$, its nth term is:	$2n+1$	$2n+3$	$2n-2$	$2n-8$
14.	$\frac{x^3+1}{(x-1)(x+2)}$ is:	proper fraction	improper fraction	identity	both B & C
15.	If one root of the equation $x^2-3x+a=0$ is 2, then a is:	2	-2	3	-3
16.	An equation of the form $ax^2+bx+c=0$ is called quadratic if:	$a=0$	$b=0$	$a\ne 0$	$b\ne 0$
17.	Let A, G, H be the A.M, G.M and H.M between a and b respectively, then $G^2=$	$A+H$	$\sqrt{ab}$	$\frac{A}{H}$	AH
18.	If A is a matrix of order 3×4, then the order of AA' is:	4×3	3×3	3×4	4×4
19.	$\{x \mid x\in E \wedge 4<x<6\}$ equals:	$\{4\}$	$\{5\}$	$\{6\}$	ϕ
20.	If $\cos\theta=\frac{1}{\sqrt{2}}$, then θ is equal to:	$30°$	$45°$	$60°$	$90°$

209-321-A-25000 ★★★

Roll No. | | | | | | (To be filled in by the candidate)

Mathematics Inter (Part-I)-A-2021 Time : 2:30 Hours

Paper : I Subjective Marks : 80

Note: - Section I is compulsory. Attempt any three questions from section II.

Section – I

2. Write short answers to any Eight parts. **(8 x 2 = 16)**

i. Find the multiplicative inverse of $(\sqrt{2}, -\sqrt{5})$

ii. Prove that $-\frac{7}{12}-\frac{5}{18}=\frac{-21-10}{36}$

iii. If $z_1=2+i,\ z_2=3-2i,\ z_3=1+3i$ then express $\frac{\overline{z_1}\ \overline{z_3}}{z_2}$ in the form $a+ib$

iv. Write the inverse and contrapositive of conditional $\sim p \rightarrow \sim q$

v. Show $A-B$ and $B-A$ by Venn diagram when A and B are overlapping sets.

vi. If a and b are elements of a group G, then solve the equation $xa=b$

vii. Find the matrix X if $X\begin{bmatrix}5 & 2\\ -2 & 1\end{bmatrix}=\begin{bmatrix}-1 & 5\\ 12 & 3\end{bmatrix}$

viii. Show that $\begin{vmatrix}1 & 1 & 1\\ x & y & z\\ yz & zx & xy\end{vmatrix}=\begin{vmatrix}1 & 1 & 1\\ x & y & z\\ x^2 & y^2 & z^2\end{vmatrix}$

ix. If $A=\begin{bmatrix}-1 & 2\\ 1 & 4\\ 2 & -1\end{bmatrix}$ and $B=\begin{bmatrix}1 & 3\\ -2 & 1\end{bmatrix}$ show that $(AB)'=B'A'$

x. Find two consecutive numbers, whose product is 132.

xi. Evaluate $\left(-1+\sqrt{-3}\right)^5+\left(-1-\sqrt{-3}\right)^5$

xii. Find numerical value of K if the polynomial x^3+kx^2-7x+6 has a remainder of -4, when divided by $x+$

3. Write short answers to any Eight parts. **(8 x 2 = 16)**

i. Write into partial fraction form of $\frac{4x^2}{(x^2+1)^2(x-1)}$ without finding constants.

ii. Write into partial fraction form of $\frac{1}{(x-1)^2(x^2+2)}$ without finding constants.

iii. If $a_{n-3}=3n-11$, find nth term of the sequence.

iv. Find the Geometric Mean between $-2i$ and $8i$.

v. If $y=1+2x+4x^2+8x^3+\ldots$ show that $x=\frac{y-1}{2y}$

vi. Find 8th term of H.P; $\frac{1}{2},\frac{1}{5},\frac{1}{8},\ldots$

vii. Write $\frac{52.51.50.49}{4.3.2.1}$ in the factorial form.

viii. Find the value of n when ${}^{11}P_n=11.10.9$

ix. Find the value of n, when ${}^nC_5={}^nC_4$

x. Show that the inequality $4^n>3^n+4$ is true, for integral values of $n\geq 2$.

xi. Calculate $(9.98)^4$ by means of binomial theorem.

xii. Expand $(1+x)^{\frac{-1}{3}}$ upto 4 terms.

(Turn Over)

Roll No. ____________ Annual 2019

Mathematics **(INTERMEDIATE PART – I, Class 11th) - (III)** **Paper : I**

Time: 30 Minutes **Objective** **Code : 6195** **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.

1. 1. If ω is cube root of unity, then $(1+\omega-\omega^2)^3 =$

(A) -8ω (B) 8ω (C) 8 (D) -8

2. $\frac{p(x)}{x^2+1}$ will be proper fraction if degree of $p(x)$ is

(A) 1 (B) 2 (C) 3 (D) 4

3. The series $a + ar + ar^2 + \text{——} \propto$

(A) $|r| > 1$ (B) $|r| \geq 1$ (C) $|r| \leq 1$ (D) $|r| < 1$

4. A , G , H , are in

(A) A . P (B) G . P (C) H . P (D) series

5. For an event A, range of its probability P (A) is

(A) $-1 \leq P(A) \leq 1$ (B) $0 < P(A) \leq 1$ (C) $0 \leq P(A) \leq 1$ (D) $P(A) = 1$

6. If ${}^nc_4 - {}^nc_5 = 0$, then $n =$

(A) 0 (B) 4 (C) 6 (D) 9

7. $(1+i)^8 =$

(A) 2 (B) 4 (C) 8 (D) 16

8. The conjunction of two statements p and q is denoted by

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

9. If $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = 2$ then $\begin{vmatrix} c & d \\ a & b \end{vmatrix} =$

(A) 2 (B) -2 (C) ±2 (D) 0

10. If $|A| = 5$, then $|A'| =$

(A) - 5 (B) $\frac{1}{5}$ (C) 0 (D) 5

11. No. of roots of the equation $(x-4)^2 = x^2 - 8x + 16$ are

(A) 2 (B) 4 (C) 8 (D) infinite

(Turn Over)

12. In an equilateral $\triangle ABC$

(A) $r_1 > r_2$ (B) $r_1 < r_2$ (C) $r_1 = r_2$ (D) $r_1 \neq r_2$

13. With usual notations $a+b-c=$

(A) $2s$ (B) $2s-2c$ (C) $2s-2b$ (D) $2s-2a$

14. $Sin^{-1}(0)+Cos^{-1}(0)=$

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{6}$ (C) $\frac{2\pi}{5}$ (D) $\frac{\pi}{4}$

15. If $Sinx=-\frac{\sqrt{3}}{2}$, then $x=$

(A) $\frac{\pi}{3}$ (B) $\frac{4\pi}{3}$ (C) $\frac{2\pi}{3}$ (D) $\frac{5\pi}{3}$

16. If n is even, middle term of $(a+b)^n$ is

(A) $(\frac{n}{2})th\ term$ (B) $(\frac{n+2}{2})th\ term$ (C) $(\frac{n+1}{2})th\ term$ (D) $(\frac{n+3}{2})th\ term$

17. 2^{nd} term of $(a+b)^7$ is

(A) a^7 (B) $7ab^6$ (C) $7a^6b$ (D) $7ab$

18. $Tan(\alpha-90^\circ)=$

(A) $Cot\alpha$ (B) $-Cot\alpha$ (C) $Tan\alpha$ (D) $-Tan\alpha$

19. $\frac{\pi}{3}rad$ is an angle.

(A) acute (B) obtuse (C) straight (D) reflexive

20. Period of $\frac{1}{2}\sin 2x$ is

(A) $\frac{\pi}{2}$ (B) π (C) 2π (D) 4π

Roll No. _______________ Annual 2019

Chemistry (New Scheme) (INTERMEDIATE PART - I) Paper : I

Time : 2 : 40 Hours Marks : 68

Subjective

Note :- Section I is compulsory. Attempt any three (3) questions from Section II.

(Section I)

2. Write short answers to any Eight Parts. (8 x 2 = 16)

i. N_2 and CO molecules have equal number of protons and neutrons. Justify.

ii. Mg atom is twice heavier than C-atom. Why?

iii. What is justification of two strong peaks of almost equal heights in the mass spectrum for Bromine?

iv. How crystals are dried in vacuum desiccator?

v. Why fluted filter paper is used for greater rate of filtration than ordinary cone filter paper?

vi. Write any two characteristics of plasma.

vii. Why real gases deviate from ideal behaviour?

viii. Define Avogadro's Law. How many molecules of an ideal gas present in $22.4dm^3$ at STP?

ix. $-273.15°C$ is known to be the lowest temperature of an ideal gas. Give reason.

x. Relative lowering of vapour pressure is independent of temperature. Justify this statemen

xi. Define hydrolysis. Give chemical equation for hydrolysis of ammonium chloride.

xii. Define molality. Give one of its mathematical expression.

3. Write short answers to any Eight parts. (8 x 2 = 16)

i. Cleavage of the crystals is itself an isotropic behaviour. Justify.

ii. How liquid crystals are used to locate veins, arteries, infections and tumors?

iii. Lower alcohols are soluble in H_2O but hydrocarbons are insoluble. Give reason.

iv. Why graphite is good conductor of electricity but diamond is bad conductor of electricity?

v. Give two importances of Moseley Law.

vi. State Heisenberg's uncertainty principle.

vii. Differentiate between orbits and orbitals.

viii. How the dual nature of electron was verified?

ix. How acidic and basic buffers are prepared? Give one example of each.

x. State Law of Mass Action.

xi. Define activation energy and activated complex.

xii. How does the increase of temperature increases the rate of the chemical reaction.

(Turn Over)

Sahiwal Board-2019

4. Write short answers to any Six parts. (2 x 6 = 12)

i. Why did the atomic Radii cannot be measured precisely?

ii. In NH_3 bond angle is 107.5° but in NF_3 it is 102°. Explain it.

iii. NH_3 can form coordinate covalent bond with H^+. Explain!

iv. Oxygen molecule is paramagnetic in nature. Justify!

v. Prove that $\Delta E = q_v$.

vi. Define the terms Heat and Work.

vii. A salt bridge maintain the electrical neutrality in galvanic cell. Explain.

viii. Define standard electrode potential?

ix. Write down chemical reactions taking place in alkaline battery.

(Section – II)

Note: Attempt any three (3) questions from Section II. Each question carries 08 marks.(3 x 8 = 24)

5. (a) Define limiting reactant. Write different steps involved in the identification of limiting reactant. How does it control the yield of product formed in chemical reaction.

(b) Describe manometric method for the measurement of vapour pressure of a liquid.

6. (a) $250cm^3$ of the sample of hydrogen effuses four times as rapidly as $250cm^3$ of an unknown gas. Calculate the molar mass of unknown gas.

(b) Derive the equation for the radius of nth orbit of hydrogen atom using Bohr's model.

7. (a) Define hybridization. Explain sp^3 hybridization with the example of methane (CH_4).

(b) How enthalpy of reaction is determined by glass calorimeter?

8. (a) $N_2(g)$ and $H_2(g)$ combine to $NH_3(g)$. The value of K_c in this reaction at $500^\circ C$ is 6.0×10^{-2}. Calculate the value of K_p for this reaction.

(b) Describe the homogeneous and heterogeneous catalysis with one example of each.

9. (a) Write note on (i) Hydration (ii) Hydrates

(b) Explain the construction of fuel cell.

 Roll No. ________ Annual 2018

Mathematics (INTERMEDIATE PART – I , Class 11th) - (IV) **Paper : I**

Time: 30 Minutes **Objective** **Code : 6197** **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.

1. i. $\frac{n!}{(n-r)!}$ is always equal to

(A) $^{n}p_{r}$ (B) $^{n}c_{r}$ (C) $^{r}p_{n}$ (D) $^{r}c_{n}$

ii. If 1/a , 1/b and 1/c are in G.P then common ratio is equal to:

(A) $\pm\sqrt{\frac{c}{a}}$ (B) $\pm\sqrt{\frac{a}{c}}$ (C) $\pm\sqrt{a+c}$ (D) $\pm\sqrt{a-c}$

iii. Sum of n - arithmetic means between a and b is equal to :

(A) $\frac{a-b}{2}$ (B) $n(\frac{a-b}{2})$ (C) $\frac{a+b}{2}$ (D) $n(\frac{a+b}{2})$

iv. $\frac{A}{x-1}+\frac{B}{x+1}$ is a partial fraction form of the proper fraction;

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

v. If '$x-2$' is a factor of polynomial x^3+2x^2+kx+4 then k equals :

(A) 10 (B) -10 (C) 2 (D) 4

vi. The sum of all cube roots of unity equals:

(A) 1 (B) ω (C) 0 (D) ω^2

vii. Let $A=\begin{bmatrix}1 & 2 & 3x\\ 2 & 3 & 6x\\ 3 & 5 & 9x\end{bmatrix}$ then $|A|$ is equal to:

(A) 1 (B) 3 (C) 2 (D) 0

viii. If A is a square matrix and $A' = A$, then A is called

(A) hermitian matrix (B) skew hermitian matrix (C) symmetric matrix (D) skew symmetric matrix

ix. If 'p' is a logical statement , then $p \wedge \sim p$ is always:

(A) absurdity (B) contingency (C) tautology (D) conditional

x. If $(x+iy)^2 = a+ib$ then x^2-y^2 equals:

(A) a^2+b^2 (B) a^2-b^2 (C) $a-b$ (D) $a+b$

xi. Period of Cot $x/2$ is equal to :

(A) 2π (B) 4π (C) π (D) 3π

A coin is tossed twice then probability of getting all heads equal:

xii. (A) 1/2 (B) 1/3 (C) 1/4 (D) 2/3

xiii. $\frac{a}{Sin\alpha}=\frac{b}{Sin\beta}=\frac{c}{Sin\gamma}$ is called

(A) Sine law (B) Cosine Law (C) Tangent law (D) Fundamental law

xiv. If α, β and γ are angles of triangle ABC, then $\cos(\frac{\alpha+\beta}{2})$ will be equal to :

(A) $Sin\alpha$ (B) $Sin\gamma$ (C) $Sin\frac{\gamma}{2}$ (D) $Sin\beta$

xv. In an oblique triangle ABC, if $a=2$ and $\alpha=30^\circ$, then circum- radius 'R' is equal to:

(A) 4 (B) 3 (C) 1 (D) 2

xvi. $Sin^{-1}\left[A\sqrt{1-B^2}+B\sqrt{1-A^2}\right]$ is equal to

(A) $Cos^{-1}A+Cos^{-1}B$ (B) $Cos^{-1}A-Cos^{-1}B$ (C) $Sin^{-1}A+Sin^{-1}B$ (D) $Sin^{-1}A-Sin^{-1}B$

xvii. The solution of $Sin\,x=-\frac{\sqrt{3}}{2}$ in interval $[0,2\pi]$ equals

(A) $\frac{4\pi}{3},\frac{2\pi}{3}$ (B) $\frac{4\pi}{3},\frac{5\pi}{3}$ (C) $\frac{\pi}{3},\frac{5\pi}{3}$ (D) $\frac{4\pi}{3},\frac{\pi}{3}$

xviii Second term in the expansion of $(\sqrt{x}+\frac{1}{2x^2})^{10}$ equals:

(A) $5x^{2/5}$ (B) $10x^{2/5}$ (C) $10x^{5/2}$ (D) $5x^{5/2}$

xix. If the number of terms in the expansion of $(a+b)^n$ is 16 then 'n' equals

(A) 18 (B) 16 (C) 17 (D) 15

xx. Length 'l' of an arc of a circle with radius r and central angle θ is equal to :

(A) $r^2\theta$ (B) $r\theta$ (C) $r\theta^2$ (D) $\frac{1}{2}r^2\theta$

 Roll No.______________ Annual 2018

(INTERMEDIATE PART – I , Class 11th)

Mathematics **Paper : I**

Time : 2:30 Hours **(SUBJECTIVE)** **Marks : 80**

Note : Section I is compulsory. Attempt any three (3) questions from section II.

(SECTION – I)

2. Write short answers to any Eight parts : **(8 × 2 = 16)**

i. Prove that $\frac{-7}{12}-\frac{5}{18}=\frac{-21-10}{36}$.

ii. Separate $\frac{2-7i}{4+5i}$ in to real and imaginary parts.

iii. If $\forall\, z_1\,,\, z_2 \in C$ prove that $\overline{z_1+z_2}=\overline{z_1}+\overline{z_2}$.

iv. Show A-B and B-A by Venn diagram when A and B are overlapping sets. (1+1=2)

v. Show that the statement $\sim (p \to q) \to p$ is a tautology.

vi. Find the inverse of the relation $\{(x,y)/\, y=2x+3,\, x\in \mathbb{R}\}$.

vii. Solve the matrix equation 3X - 2A = B. If $A=\begin{bmatrix}2 & 3 & -2\\ -1 & 1 & 5\end{bmatrix}$ and $B=\begin{bmatrix}2 & -3 & 1\\ 5 & 4 & -1\end{bmatrix}$

viii. 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.

ix. Define co-factor of an element of a matrix .

x Solve by completing square $x^2-3x-648=0$.

xi. Solve the equation : $x^{2/5}+8=6x^{1/5}$.

xii. Show that $x^3-y^3=(x-y)(x-\omega y)(x-\omega^2 y)$ where ω is the cube root of unity.

3. Write short answers to any Eight parts : **(8 × 2 = 16)**

i. Resolve $\frac{x^2+1}{x^2-1}$ into partial fraction. (1+1=2)

ii. If $\frac{1}{a},\frac{1}{b},\frac{1}{c}$ are in G.P, show that common ratio is $\pm\sqrt{\frac{a}{c}}$. (1+1=2)

iii. Which term of A.P 5 , 2 , -1, ... is -85? (1+1=2)

iv. Define G.M between two numbers 'a' and 'b' and show that (G.M) geometric mean $=\pm\sqrt{ab}$ (1+1=2)

v. In series $y=1+2x+4x^2+8x^3+.....$, show that $x=\frac{y-2}{2y}$. (1+1=2)

vi. If $a=-2\,,\, b=-8$, find G and H, also show that G < H for (G < O) with usual notation. (1+1=2)

vii. Prove that ${}^nP_r=n.\,{}^{n-1}P_{r-1}$, where p is permutation.

viii. How many necklaces can be made from 6 beads of different colours? (1+1=2)

ix. How many triangles can be formed by joining the vertices of polygon having 8 sides? (1+1=2)

x. Show that $1+2+4+....+2^{n-1}=2^n-1$ is true for n = 4 , 5. (1+1=2)

xi. Show that n^2+n is divisible by 2 for n = 2, 3. (1+1=2)

xii. Expand $(2-3x)^{-1}$ up to three terms. (1+1=2)

4. Write short answers to any Nine parts : **(9 × 2 = 18)**

i. Evaluate $\frac{\tan\pi/3-\tan\pi/6}{1+\tan\pi/3\,\tan\pi/6}$.

ii. Prove that $\frac{Cos\theta-Sin\theta}{Cos\theta+Sin\theta}=\frac{Cot\theta-1}{Cot\theta+1}$.

iii. Prove that $(Cos\theta - \tan\theta)^2 = \frac{(1-Sin\theta)}{1+Sin\theta}$

iv. By using fundamental law of trigonometry, show that $Sin(\pi/2+\alpha) = Cos\alpha$

v. Prove that $Sin(45^\circ+\alpha) = \frac{1}{\sqrt{2}}(Sin\alpha + Cos\alpha)$.

vi. Find the period of Cot 8x .

vii. Find that value of $Cos\,2\alpha$ for $Cos\,\alpha = 3/5$ where $0 < \alpha < \pi/2$.

viii. If $\beta = 60^\circ$, $\gamma = 15^\circ$, $b = \sqrt{6}$ then find c and α for any triangle ABC.

ix. Find the area of triangle, given two sides and their included angle,
a = 4.33 , b = 9.25 , $r = 56^\circ\,44'$

x. Show that $r_1 = s\,\tan\frac{\alpha}{2}$.

xi. Find the value of the expression $Cosec\left(\tan^{-1}(-1)\right)$.

xii. Find the solutions of $\sin x = -\sqrt{\frac{3}{2}}$ in $[0, 2\pi]$.

xiii. Find the value of θ, satisfying the equation $3\tan^2\theta + 2\sqrt{3}\tan\theta + 1 = 0$.

(SECTION – II)

Note: Attempt any three (3) questions: **(3 X 10 = 30)**

5. (a) Convert $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ to logical form and prove by constructing truth table. (2 + 3)

(b) Use Cramer's rule to solve the system:

$$\left.\begin{aligned} 2x_1 - x_2 + x_3 &= 8 \\ x_1 + 2x_2 + 2x_3 &= 6 \\ x_1 - 2x_2 - x_3 &= 1 \end{aligned}\right\}$$

(2+1+1+1)

6. (a) Prove that $\frac{x^2}{a^2} + \frac{(mn+c)^2}{b^2} = 1$ will have equal roots, if $c^2 = a^2m^2 + b^2$ (5)

(b) Resolve into partial fraction:

$$\frac{x^3+2x+2}{(x^2+x+1)^2}$$ (5)

7. (a) Find the sum of an infinite series $r + (1+k)y^2 + (1+k+k^2)r^3 + ...$ (5)

(b) Find the co-efficient of x^n in the expansion of $\frac{(1+x)^2}{(1-x)^2}$. (5)

8. (a) Prove that $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \tan\theta + \sec\theta$ (5)

(b) Reduce $\sin^4\theta$ to an expression involving only function of multiples of θ, raised to the first power. (5)

9. (a) Prove that: $abc(\sin\alpha + \sin\beta + \sin\gamma) = 4\Delta s$ using usual notations. (5)

(b) Prove that $\sin^{-1}\frac{5}{13} + \sin^{-1}\frac{7}{13} = Cos^{-1}\frac{253}{325}$. (5)