Mathematics

Paper : I SWL-11-23

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

H.S.S.C (11th) 1st Annual 2023

Objective – (iii)

Time : 30 Minutes

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 $1+x+x^2+x^3+....+x^r+... =$	$(1+x)^{-1}$	$(1-x)^{-1}$	$(1+x)^{-2}$	$(1+x)^{-3}$
5.	The period of $\operatorname{cosec}\theta$ 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.	$n(n-1)(n-2)....(n-r+I) =$	$\frac{n!}{r!}$	$\frac{n!}{(n-r)!}$	$\frac{n!}{(n+r)!}$	${}^nC_r$
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 $\lvert A\rvert =$	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.	$1+\cot^2\theta =$	$\cos^2\theta$	$\sin^2\theta$	$\operatorname{cosec}^2\theta$	$\sec^2\theta$

CANCELLED

SWL-11-23 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 $\bar{z} = z$ iff z is real.

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

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

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.

SWL-11-23

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 $\sin^{-1}\frac{77}{85} - \sin^{-1}\frac{3}{5} = \cos^{-1}\frac{15}{17}$.

CANCELLED

Mathematics

Paper : I

SWL-21

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

Inter (Part-I)-A-2021

Objective – (III)

Paper Code | 6 | 1 | 9 | 5 |

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 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.	$n\leq 3$	$n<3$	$n\geq 3$	$n>3$
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:	$a=0$	$b=0$	$a\neq 0$	$b\neq 0$
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°

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

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

Paper : I SWL - 21 — 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 ${}^{n}C_5 = {}^{n}C_4$

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)