Roll No. | | | | | | |

Answer Sheet No. 33

Sig. of Candidate. _____

Sig. of Invigilator. _____

MATHEMATICS HSSC–I

SECTION – A (Marks 20)

Time allowed: 25 Minutes

NOTE: Section–A is compulsory and comprises pages 1-2. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

(i) Real part of $\frac{3}{\sqrt{6}-\sqrt{-12}}$ is:

A. $\sqrt{6}$ B. $\frac{3}{\sqrt{6}}$ C. $\frac{1}{\sqrt{6}}$ D. None of these

(ii) Number of elements in the set $\{\{a,b\},\{b,c\},\{c,d\}\}$ is:

A. 3 B. 5 C. 4 D. None of these

(iii) The set $\{1,\omega,\omega^2\}$, where $\omega^3=1$ is an abelian group under:

A. Addtition B. Multiplication C. Division D. None of these

(iv) If $\begin{vmatrix}2 & 3 & 0\\ 3 & 9 & 6\\ 2 & 15 & 1\end{vmatrix} = \alpha \begin{vmatrix}2 & 1 & 0\\ 1 & 1 & 2\\ 2 & 5 & 1\end{vmatrix}$ then $\alpha =$

A. 3 B. 6 C. 9 D. 12

(v) For a square matrix $A, A-A^t$ is:

A. Symmetric B. Hermitian C. Skew Hermitian D. Skew symmetric

(vi) $\left(-1+\sqrt{-3}\right)^5+\left(-1-\sqrt{-3}\right)^5=$

A. 16 B. 48 C. –32 D. –1

(vii) The formation of partial fractions of $\frac{3x^2-4x-5}{(x-2)(x^2+7x+10)} =$

A. $\frac{A}{x-2}+\frac{Bx+C}{x^2+7x+10}$ B. $\frac{Ax+B}{x-2}+\frac{C}{x^2+7x+10}$

C. $\frac{A}{x-2}+\frac{B}{x+2}+\frac{C}{x+5}$ D. None of these

(viii) If $\frac{1}{a},\frac{1}{b},\frac{1}{c}$ are in A.P, then b=

A. $\frac{a+c}{2ac}$ B. $\frac{a-c}{2ac}$ C. $\frac{2ac}{a+c}$ D. $\frac{2ac}{a-c}$

(ix) The sum of infinite geometric series $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots\ldots\ldots\ldots=$

A. 1 B. 14 C. 12 D. None of these

(x) Factorial form of $n(n-1)(n-2)\ldots\ldots(n-r+1)=$

A. $\frac{n!}{(n-r)!}$ B. $\frac{(n+1)!}{(n-r+2)!}$ C. $\frac{n!}{(n-r+1)!}$ D. None of these

(xi) If ${}^nP_2 = 30$ then $n =$

A. 5 B. 6 C. 10 D. 15

(xii) In the expansion of $\left(\frac{3}{2}x - \frac{1}{3x}\right)^{11}$, the sixth term from the end is:

A. 5th term B. 7th term C. 4th term D. None of these

(xiii) $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta} =$

A. 2 B. 0 C. $\frac{2}{\cos^2\theta}$ D. None of these

(xiv) $\frac{19\pi}{3} =$

A. 30^o B. 120^o C. 45^o D. 60^o

(xv) $\tan(2\pi + \theta) =$

A. $\cot\theta$ B. $-\cot\theta$ C. $\frac{1}{\cot\theta}$ D. $-\frac{1}{\cot\theta}$

(xvi) $\cos 3\alpha =$

A. $4\sin^3\alpha - 3\sin\alpha$ B. $2\cos\frac{3\alpha}{2}\sin\frac{3\alpha}{2}$

C. $\cos^2\frac{3\alpha}{2} - \sin^2\frac{3\alpha}{2}$ D. None of these

(xvii) Period of $3\cos\frac{x}{5} =$

A. 2π B. 6π C. 30π D. 10π

(xviii) $\sin^{-1}x =$

A. $\frac{\pi}{2} + \cos^{-1}x$ B. $\cos^{-1}x - \frac{\pi}{2}$ C. $\tan^{-1}x - \frac{\pi}{2}$ D. $\frac{\pi}{2} - \cos^{-1}x$

(xix) $\sin\frac{a}{2} =$

A. $\frac{1+\cos\alpha}{2}$ B. $\frac{1-\sin\alpha}{2}$ C. $\frac{1+\sin\alpha}{2}$ D. $\sqrt{\frac{(s-b)(s-c)}{bc}}$

(xx) Solution set of $\sin x = -\sqrt{\frac{3}{2}}$ is:

A. $\left\{\frac{4\pi}{3} + 2n\pi\right\} U \left\{\frac{5\pi}{3} + 2n\pi\right\}$ B. $\left\{\frac{\pi}{3} + 2n\pi\right\} U \left\{\frac{2\pi}{3} + 2n\pi\right\}$

C. $\left\{\frac{2\pi}{3} + 2n\pi\right\} U \left\{\frac{4\pi}{3} + 2n\pi\right\}$ D. None of these

For Examiner's use only:

Total Marks:	**20**
Marks Obtained:	

MATHEMATICS HSSC–I

34

Time allowed: 2:35 Hours **Total Marks Sections B and C: 80**

NOTE: Attempt any ten parts from Section 'B' and any five questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly. Graph paper will be provided on request.

SECTION – B (Marks 40)

Q. 2 Attempt any TEN parts. All parts carry equal marks. **(10 x 4 = 40)**

(i) Show that $\forall z \in C, z^2 + \bar{z}^2$ is a real number.

(ii) Construct the truth table of $[(p \to q) \wedge p] \to q$

(iii) Show that $\begin{vmatrix} a+l & a & a \\ a & a+l & a \\ a & a & a+l \end{vmatrix} = l^2(3a+l)$

(iv) Show that roots of $(mx+c)^2 = 4ax$ will be equal if $c = \frac{a}{m}$ $\quad m \neq 0$

(v) Resolve into partial fractions $\frac{1}{(x^2+1)(x+1)}$

(vi) How many terms of the series $(-7)+(-5)+(-3)+\ldots\ldots$ amount to 65?

(vii) How many arrangements of the letters of the given word, taken all together, can be made "PAKISTAN"?

(viii) Find the term independent of x, in the expansion of $\left(x - \frac{2}{x}\right)^{10}$

(ix) What is the circular measure of the angle between the hands of a watch at 4 o'clock?

(x) Prove the Identity $(\sec\theta - \tan\theta)^2 = \frac{1-\sin\theta}{1+\sin\theta}$

(xi) Prove that $\frac{\cos 11^o + \sin 11^o}{\cos 11^o - \sin 11^o} = \tan 56^o$

(xii) Find the area of the triangle ABC, given three sides $a = 524$, $b = 276$, $c = 315$

(xiii) Show that $\frac{1}{2rR} = \frac{1}{ab} + \frac{1}{bc} + \frac{1}{ca}$

(xiv) Prove $\tan^{-1}\frac{1}{11} + \tan^{-1}\frac{5}{6} = \tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{2}$

SECTION – C (Marks 40)

Note: Attempt any FIVE questions. All questions carry equal marks. **(5 x 8 = 40)**

Q. 3 Use Matrices to solve the system

$$x_1 - 2x_2 + x_3 = -4$$
$$2x_1 - 3x_2 + 2x_3 = -6$$
$$2x_1 + 2x_2 + x_3 = 5$$

Q. 4 If $x+1$, $x-2$ are factors of $x^3 + px^2 + qx + 6$, by use of Synthetic division find the values of p and q.

Q. 5 Sum to n terms of the series $3 + 33 + 333 + \ldots\ldots$

Q. 6 Prove that $^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$

Q. 7 Find the values of remaining trigonometric functions, $\sin\theta = -\frac{1}{\sqrt{2}}$ and terminal arm of the angle is not in quadrant III.

Q. 8 Draw the graph of $\cos x$ from 0^o to 360^o

Q. 9 Solve the equation $\sin 2x = \cos x$

Roll No. | | | | | | |

Answer Sheet No. 35

Sig. of Candidate. _____

Sig. of Invigilator. _____

MATHEMATICS HSSC–I

SECTION – A (Marks 20)

Time allowed: 25 Minutes

NOTE: Section–A is compulsory and comprises pages 1-2. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

(i) Imaginary part of $\frac{i}{1+i}$:

A. 1 B. -1 C. $\frac{1}{2}$ D. $\frac{-1}{2}$

(ii) $(A-B)^C \cap B =$

A. B^C B. A C. B D. A^C

(iii) The value of the determinant $\begin{vmatrix} 1 & 2 & 3x \\ 2 & 3 & 6x \\ 3 & 3 & 9x \end{vmatrix} =$

A. 6 B. 11 C. $18x$ D. 0

(iv) If A is a symmetric or skew symmetric matrix, then A^2 will be:

A. Symmetric B. Skew Symmetric

C. Hermitian D. Skew Hermitian

(v) If ω is a cube root of unity, then an Equation whose roots are $2\omega, 2\omega^2$, will be:

A. $x^2+2x+4=0$ B. $x^2-2x+4=0$

C. $x^2-4x-2=0$ D. $x^2+4x+2=0$

(vi) The formation of partial fractions of $\frac{x^2+1}{x^2-1}$ will be:

A. $\frac{A}{x-1}+\frac{B}{x+1}$ B. $A+\frac{B}{x-1}+\frac{C}{x+1}$

C. $\frac{Ax+B}{x-1}+\frac{Cx+D}{x+1}$ D. None of these

(vii) If $a_{n-3} = 2n-5$, then nth term will be:

A. $2n$ B. $2n+1$ C. $n-1$ D. $n+1$

(viii) $\sum_{k=1}^{n} K^2 =$

A. $\frac{n(n+1)(2n+1)}{6}$ B. $\frac{n(n+1)}{2}$

C. $\left[\frac{n(n+1)}{2}\right]^2$ D. None of these

(ix) If $P_n^{11} = (9)(10)(11)$, then $n =$

A. 6 B. 9 C. 3 D. 10

(x) The number of necklaces that can be made from 6 beads of different colours is:

A. 720 B. 120 C. 100 D. 60

(xi) Middle term of $(1+x)^{2n}$ will be:

A. nth term B. (n-1)th term

C. (n+1)th term D. None of these

(xii) $(2n+1)$ th term from the end in the expansion of $\left(x-\frac{1}{2x}\right)^{3n}$ =

A. (n+1)th term B. nth term C. (n-1)th term D. (n+2)th term

(xiii) $\frac{1-\sin\theta}{\cos\theta}$ =

A. $\frac{1-\cos\theta}{\sin\theta}$ B. $\frac{\cos\theta}{1+\sin\theta}$ C. $\frac{1+\cos\theta}{\sin\theta}$ D. None of these

(xiv) $\tan\left(\frac{3\pi}{2}-\theta\right)$ =

A. $Tan\theta$ B. $-\cot\theta$ C. $\frac{1}{Tan\theta}$ D. $-Tan\theta$

(xv) $\sin(\pi+\theta)$ =

A. $-\cos\theta$ B. $\sin\theta$ C. $\cos\theta$ D. $\frac{-1}{\cos ec\theta}$

(xvi) $\cos 2\alpha$ =

A. $2\sin^2\alpha-1$ B. $2\cos^2\alpha-1$ C. $2\cos\frac{\alpha}{2}\sin\frac{\alpha}{2}$ D. None of these

(xvii) $\sin 3\alpha$ =

A. $2\sin\frac{3\alpha}{2}\cos\frac{3\alpha}{2}$ B. $3\sin\alpha\cos\alpha$

C. $4\cos^3\alpha-3\cos\alpha$ D. $sin^2\alpha-\cos^2\alpha$

(xviii) Period of $\sec 9x$ =

A. 2π B. $\frac{1}{9\pi}$ C. 18π D. $\frac{2\pi}{9}$

(xix) $\sec\left[\sin^{-1}(-\frac{1}{2})\right]$ =

A. $\frac{1}{2}$ B. 2 C. $\frac{2}{\sqrt{3}}$ D. $\frac{\sqrt{3}}{2}$

(xx) Solution set of $\sin x=\frac{1}{2}$ is:

A. $\left\{\frac{\pi}{6}+2n\pi\right\}U\left\{\frac{5\pi}{6}+2n\pi\right\}$ B. $\left\{\frac{\pi}{6}+2n\pi\right\}U\left\{\frac{\pi}{6}+2n\pi\right\}$

C. $\left\{\frac{\pi}{3}+2n\pi\right\}U\left\{\frac{2\pi}{3}+2n\pi\right\}$ D. None of these

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For Examiner's use only:

Total Marks: 20

Marks Obtained:

MATHEMATICS HSSC–I

36

Time allowed: 2:35 Hours **Total Marks Sections B and C: 80**

NOTE: Attempt any ten parts from Section 'B' and any five questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly. Graph paper will be provided on request.

SECTION – B (Marks 40)

Q. 2 Attempt any TEN parts. All parts carry equal marks. **(10 x 4 = 40)**

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

(ii) If $(G,*)$ a group with e its identity, then e is unique

(iii) Evaluate $\begin{vmatrix} a+l & a-l & a \\ a & a+l & a-l \\ a-l & a & a+l \end{vmatrix}$

(iv) When the Polynomial x^3+2x^2+kx+4 is divided by $x-2$, the remainder is 14. Find the value of k.

(v) Resolve $\frac{7x+25}{(x+3)(x+4)}$ into Partial Fractions.

(vi) Find the sum of 20 terms of the series whose rth term is $3r+1$.

(vii) How many signals can be made with 4 – different flags when any number of them are to be used at a time?

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

(ix) Two cities A and B lie on the equator such that their longitudes are $45^o E$ and $25^o W$ respectively. Find the distance between two cities, taking radius of Earth as 6400 kms.

(x) Prove the identity $\sin^6\theta+\cos^6\theta = 1-3\sin^2\theta\cos^2\theta$

(xi) Prove without using calculator $\cos 306^o+\cos 234^o+\cos 162^o+\cos 18^o = 0$

(xii) Prove that $\frac{\sin\theta+\sin 3\theta+\sin 5\theta+\sin 7\theta}{\cos\theta+\cos 3\theta+\cos 5\theta+\cos 7\theta} = \tan 4\theta$

(xiii) Prove that $\frac{1}{r^2}+\frac{1}{r_1^2}+\frac{1}{r_2^2}+\frac{1}{r_3^2} = \frac{a^2+b^2+c^2}{\Delta^2}$

(xiv) Prove $2\tan^{-1}\frac{2}{3} = \sin^{-1}\frac{12}{13}$

SECTION – C (Marks 40)

Note: Attempt any FIVE questions. All questions carry equal marks. **(5 x 8 = 40)**

Q. 3 Use Cramer's rule to solve the system

$$3x_1+x_2-x_3 = -4$$
$$x_1+x_2-2x_3 = -4$$
$$-x_1+2x_2-x_3 = 1$$

Q. 4 Solve the equation $\sqrt{5x^2+7x+2}-\sqrt{4x^2+7x+18} = x-4$

Q. 5 Find 6 A.Ms between 2 and 5.

Q. 6 If $2y = \frac{1}{2^2}+\frac{1.3}{2!}\cdot\frac{1}{2^4}+\frac{1.3.5}{3!}\cdot\frac{1}{2^6}+\ldots\ldots$ then prove that $4y^2+4y-1=0$

Q. 7 If $\alpha+\beta+\gamma = 180^o$ show that $\cot\alpha\cot\beta+\cot\beta\cot\gamma+\cot\gamma\cot\alpha = 1$

Q. 8 Draw the graph of $\sin x$ from 0^o to 360^o.

Q. 9 Solve the equation $\sin^2 x+\cos x = 1$