Roll No. | | | | | | |

Answer Sheet No._____

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) The solution set of $\sec x = -2$ is:

A. Empty set

B. $\left\{\frac{\pi}{6}+2x\pi\right\}\cup\left\{\frac{11\pi}{6}+2x\pi\right\}$ $n\in z$

C. $\left\{\frac{2\pi}{3}+2x\pi\right\}\cup\left\{\frac{4\pi}{3}+2x\pi\right\}$ $n\in z$

D. $\left\{\frac{\pi}{3}+2x\pi\right\}\cup\left\{\frac{5\pi}{3}+2x\pi\right\}$ $n\in z$

(ii) Multiplicative Inverse of $-3-5i$ is:

A. $\frac{-3-5i}{8}$ B. $\frac{3-5i}{34}$ C. $\frac{3+5i}{34}$ D. $\frac{-3+5i}{34}$

(iii) $(A-B)\cap B =$

A. Universal set B. ϕ C. A D. B

(iv) The value of the determinant $\begin{vmatrix}2 & 3 & -1\\ 1 & 1 & 0\\ 2 & -3 & 5\end{vmatrix}$ =

A. 4 B. 10 C. 0 D. 13

(v) The matrix $\begin{bmatrix}0 & 2-3i\\ -2-3i & 0\end{bmatrix}$ is:

A. Identity matrix B. Singular matrix

C. Skew Hermitian matrix D. Symmetric matrix

(vi) If ω is a cube root of unity, then an equation whose roots are 3ω and $3\omega^2$ will be:

A. $x^2+3x+6=0$ B. $x^2-9x-3=0$ C. $x^2-3x-9=0$ D. $x^2+3x+9=0$

(vii) The formation of Partial fractions of $\frac{x^4}{1-x^4}$ will be:

A. $\frac{A}{1-x}+\frac{B}{1+x}+\frac{Cx+D}{1+x^2}$

B. $A+\frac{B}{1-x}+\frac{C}{1+x}+\frac{Dx+E}{1+x^2}$

C. $\frac{A}{1-x^2}+\frac{B}{1+x^2}$

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

(viii) If $a_{n-2}=3n-11$, then 8^{th} term will be:

A. 24 B. 13 C. 20 D. 19

(ix) The sum of infinite G.P $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots\ldots$ is:

A. 9 B. 0 C. 4 D. 1

(x) If ${}^nC_8 = {}^nC_{12}$ then $n=$

A. 10 B. 20 C. 4 D. 96

(xi) The factorial form of $\frac{(n+1)n(n-1)}{3.2.1}$ is:

A. $\frac{(n-1)!}{3!}$ B. $\frac{(n+1)!}{(3!)(n!)}$ C. $\frac{(n+1)!}{3!\,n(n-2)!}$ D. $\frac{(n-1)!}{3!\,(n+2)!}$

DO NOT WRITE ANYTHING HERE

(xii) The $6th$ term from end in the expansion of $\left(\frac{3}{2}x-\frac{1}{3x}\right)^{11}$ is:

A. $9th$ term B. $12th$ term C. $7th$ term D. $5th$ term

(xiii) The middle term in the expansion of $\left(2x-\frac{1}{2x}\right)^{2m+1}$ is:

A. $(m+2)th$ term B. $(m+1)th$ and $(m+2)th$ term
C. $2mth$ term D. $(m+1)th$ term

(xiv) If $\tan\theta=\frac{8}{15}$, terminal arm lies in III quadrant, then $\sec\theta=$

A. $\frac{8}{17}$ B. $\frac{-17}{15}$ C. $\frac{-17}{8}$ D. $\frac{-15}{17}$

(xv) $\cos^2 2\theta=$

A. $4\cos^3\theta-3\cos\theta$ B. $\frac{1+\cos 4\theta}{2}$ C. $4\cos^2\theta\sin^2\theta$ D. $\cos 2\theta-\sin 2\theta$

(xvi) $\cos\left(\frac{3\pi}{2}-\theta\right)=$

A. $-\cos\theta$ B. $\cos\theta$ C. $\sin\theta$ D. $\cos\left(\frac{\pi}{2}+\theta\right)$

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

A. 30π B. 2π C. 10π D. 6π

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

A. 0 B. $2\sec^2\theta$ C. $2\cos^2\theta$ D. $\frac{1}{\cos\theta}$

(xix) $90^\circ\pm\theta$, $180^\circ\pm\theta$, $270^\circ\pm\theta$, $360^\circ\pm\theta$ are called:

A. Obtuse angles B. Supplementary angles
C. Allied angles D. Acute angles

(xx) $\cos^{-1}(-x)-\cos^{-1}(x)=$

A. $\sin^{-1}x$ B. π C. 0 D. 1

For Examiner's use only:

Total Marks:	**20**
Marks Obtained:	

MATHEMATICS HSSC–I

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 $\frac{(-2+3i)^2}{1+i}$

(ii) Convert to logical form and prove by constructing truth table $(A \cap B)^c = A^c \cup B^c$

(iii) Without expansion verify $\begin{vmatrix} 1 & a^2 & \frac{a}{bc} \\ 1 & b^2 & \frac{b}{ac} \\ 1 & c^2 & \frac{c}{ab} \end{vmatrix} = 0$

(iv) If the roots of $px^2+qx+q=0$ are α and β then prove that $\sqrt{\frac{\alpha}{\beta}}+\sqrt{\frac{\beta}{\alpha}}+\sqrt{\frac{q}{p}}=0$

(v) Resolve into partial fractions $\frac{3x-11}{(x^2+1)(x+3)}$

(vi) Which term of the sequence $x^2-y^2, x+y, \frac{x+y}{x-y}, \ldots\ldots$ is $\frac{x+y}{(x-y)^9}$?

(vii) In how many ways can letter of the word "MISSISSIPPI" be arranged, when all letters are to be used?

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

(ix) Prove the identity $\frac{1+\cos\theta}{1-\cos\theta}=(\operatorname{cosec}\theta+\cot\theta)$

(x) Prove that $\sin 3\alpha = 3\sin\alpha - 4\sin^3\alpha$

(xi) Prove that $\frac{1}{r}=\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}$

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

(xiii) Prove that $2\tan^{-1}\frac{1}{3}+\tan^{-1}\frac{1}{7}=\frac{\pi}{4}$

(xiv) Solve the equation $\sin x=\frac{1}{2}$

SECTION – C (Marks 40)

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

Q. 3 Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 2 \end{bmatrix}$

Q. 4 Solve the equation $(x+1)(x+2)(x+3)(x+4)=24$

Q. 5 Find four members in A.P. whose sum is 32 and the sum of whose squares is 276

Q. 6 If $y=\frac{2}{5}+\frac{1.3}{2!}\left(\frac{2}{5}\right)^2+\frac{1.3.5}{3!}\left(\frac{2}{5}\right)^3+\ldots\ldots$ then prove that $y^2+2y-4=0$

Q. 7 If α, β, γ are the angles of ΔABC, then prove that $\tan\alpha+\tan\beta+\tan\gamma=\tan\alpha\tan\beta\tan\gamma$

Q. 8 Prove that $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$

Q. 9 Draw the graph of $y=\sin x$ from -2π to 2π