2009

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 Insert the correct option i.e. A / B / C / D in the empty box provided opposite each part. Each part carries one mark.

(i) $1\times(-1)\times i\times(-i)$ is: ☐

A. 1 B. -1
C. i D. $-i$

(ii) Modulus of $8-15i$ is: ☐

A. 8 B. -15
C. 17 D. $8+5i$

(iii) If A has 3 elements and B has 6 elements, then minimum number of elements in $A\cup B$ is: ☐

A. 3 B. 6
C. 9 D. 18

(iv) A matrix whose determinant value is zero is known as: ☐

A. Zero matrix B. Singular matrix
C. Non singular matrix D. Identity matrix

(v) If the sum of the roots of the equation $ax^2-2x+2a=0$ is equal to their product, then the value of a is: ☐

A. 1 B. 2
C. 3 D. 4

(vi) The quotient of two polynomials $\frac{P(x)}{Q(x)}$ where $Q(x)\neq 0$ with no common factor is called a: ☐

A. Rational fraction B. Irrational fraction
C. Polynomial D. None of these

(vii) The sum of the series $2+7+12+-----$ up to 12 the terms is: ☐

A. $\frac{n}{2}(3n+7)$ B. $\frac{n}{3}(3n-7)$
C. $\frac{n}{3}(3n+3)$ D. None of these

(viii) What is the probability of getting a 3 when one die is thrown? ☐

A. $\frac{1}{6}$ B. $\frac{1}{2}$
C. $\frac{1}{4}$ D. $\frac{1}{3}$

(ix) An expression consisting of two terms is called: ☐

A. Monomial B. Trinomial
C. Binomial D. None of these

2009

DO NOT WRITE ANYTHING HERE

(x) Value of $\cos^2\left(\frac{\pi}{3}\right)+\sin^2\left(\frac{\pi}{6}\right)+\cot^3\left(\frac{\pi}{4}\right)$ is:

A. $\frac{2}{3}$ B. $\frac{3}{2}$

C. 3 D. 2

(xi) In fourth quadrant positive functions are:

A. $\sin\alpha$ and $\operatorname{cosec}\alpha$ B. $\cos\alpha$ and $\sec\alpha$

C. $\tan\alpha$ and $\cot\alpha$ D. None of these

(xii) $\cos(\alpha+\beta)+\cos(\alpha-\beta)=$ _____.

A. $2\cos\alpha\sin\beta$ B. $-2\sin\alpha\cos\beta$

C. $2\cos\alpha\cos\beta$ D. $-2\sin\alpha\sin\beta$

(xiii) $\tan(2\pi-\theta)=$ _____.

A. $-\tan\theta$ B. $\tan\theta$

C. $\cot\theta$ D. $-\cot\theta$

(xiv) In any triangle ABC $r r_1 r_2 r_3 =$ _____.

A. Δ B. Δ^2

C. Δ^3 D. Δ^4

(xv) $\tan^{-1}x=$ _____.

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

C. $\frac{\pi}{2}-\cot^{-1}x$ D. $\frac{\pi}{2}-\tan^{-1}x$

(xvi) $\sin\theta$ is:

A. Odd function B. Even function

C. Both even and odd D. None of these

(xvii) Roots of the equation $ax^2+bx+c=0$ are rational if:

A. $b^2-4ac=0$ B. $b^2-4ac>0$

C. $b^2-4ac<0$ D. b^2-4ac a perfect square

(xviii) G.M between 5 and 80 are:

A. $\pm\frac{85}{2}$ B. $\pm\frac{800}{85}$

C. ± 20 D. None of these

(xix) $10_{P_7}=$ _____.

A. 604800 B. 60400

C. $60,000$ D. None of these

(xx) If A and B are any two matrices then:

A. $AB=0$ B. $AB=BA$

C. $AB=I$ D. AB may not be defined

For Examiner's use only:

Total Marks: 20

Marks Obtained:

2009

MATHEMATICS HSSC–I

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

NOTE:- Sections 'B' and 'C' comprise pages 1–2 and questions therein are to be answered on the separately provided answer book. Answer any ten parts from Section 'B' and attempt any five questions from Section 'C'. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly.

SECTION – B (Marks 40)

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

(i) Find the multiplicative inverse of $-3-5i$

(ii) Without expansion verify that $\begin{vmatrix} bc & ca & ab \\ 1/a & 1/b & 1/c \\ a & b & c \end{vmatrix} = 0$

(iii) Construct the truth table of $\left[\left(p \longrightarrow q\right) \wedge p\right] \longrightarrow q$

(iv) If α, β are the roots of $x^2 - px - p - c = 0$, prove that $(1+\alpha)(1+\beta) = 1-c$

(v) Resolve into Partial Fraction $\dfrac{x^2+1}{(x+1)(x-1)}$

(vi) Which term of the A.P $5, 2, -1, -----$ is -85?

(vii) Prove that ${}^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$

(viii) Use principle of extended mathematical induction to prove that:

$1+nx \leq (1+x)^n$ for $n \geq 2$ and $x > -1$

(ix) If $\operatorname{cosec}\theta = \dfrac{m^2+1}{2m}$ and $\left(0 < \theta < \dfrac{\pi}{2}\right)$. Find the value of $\cot\theta$.

(x) Prove that $(\tan\theta + \cot\theta)^2 = \sec^2\theta \operatorname{cosec}^2\theta$

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

2009

(xii) Find the period of $\operatorname{cosec}\frac{x}{4}$

(xiii) Solve the triangle ABC, if $\beta = 60^\circ$, $\gamma = 15^\circ$, $b = \sqrt{6}$

(xiv) Prove that $r = \frac{\Delta}{s}$ with usual notations.

SECTION – C (Marks 40)

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

Q. 3 Prove that $\sqrt{2}$ is an irrational number.

Q. 4 Solve the equation $2^x + 2^{-x+6} - 20 = 0$

Q. 5 Use matrices to solve the system:

$$\left.\begin{aligned} x - 2y + z &= -1 \\ 3x + y - 2z &= 4 \\ y - z &= 1 \end{aligned}\right\}$$

Q. 6 Show that the set consisting of elements of the form $a + \sqrt{3}b$ (a, b being rational), is an abelian group w.r.t. addition.

Q. 7 If S_2, S_3, S_5 are the sums of $2n$, $3n$, $5n$ terms of an A.P show that $S_5 = 5(S_3 - S_2)$

Q. 8 Reduce $\sin^4\theta$ to an expression involving only function of multiples of θ, raised to the first power.

Q. 9 Solve $\sin x + \cos x = 0$