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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.

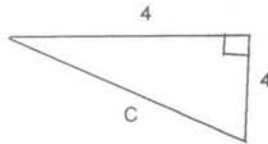
- (i) Multiplicative inverse of $-i$ is _____
A. i B. $-i$ C. 1 D. -1
- (ii) Contrapositive of $p \rightarrow q$ is _____
A. $p \rightarrow \sim q$ B. $\sim q \rightarrow \sim p$ C. $\sim p \rightarrow q$ D. None of these
- (iii) If A is a matrix of order $m \times n$ and B is a matrix of order $n \times p$, then order of AB will be _____
A. $p \times m$ B. $p \times n$ C. $m \times p$ D. None of these
- (iv) When polynomial $X^3 + 4X^2 - 2X + 5$ is divided by $X - 1$, the remainder is _____
A. 6 B. 4 C. 8 D. 0
- (v) Partial Fractions of $\frac{1}{x(x+1)}$ are _____
A. $\frac{1}{x} - \frac{1}{x+1}$ B. $\frac{1}{x} + \frac{1}{x+1}$ C. $\frac{1}{x} + \frac{2}{x+1}$ D. $\frac{1}{x} - \frac{2}{x+1}$
- (vi) For what value of n , $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ is the positive geometric mean between a and b ?
A. $n = -1$ B. 1 C. $\frac{1}{2}$ D. 0
- (vii) Factorial form of $\frac{(n+1)(n)(n-1)}{3 \cdot 2 \cdot 1}$ is _____
A. $\frac{(n-1)!}{3! \cdot 2!}$ B. $\frac{(n+1)!}{3!(n-2)!}$
C. $\frac{n!}{3!(n-2)!}$ D. None of these
- (viii) The sum of coefficients in the Binomial expansion is equal to _____
A. 2^n B. 2^{n-1} C. $2n$ D. 0
- (ix) $54^\circ 45'$ = _____ radians
A. 0.958 B. 0.0175 C. 0.65 D. None of these
- (x) For two mutually exclusive events A and B, we have _____
A. $A \cup B = \phi$ B. $A \cap B = \phi$ C. $A \cup B = A \cap B$ D. None of these
- (xi) What is the middle term in the expansion of $(a+b)^n$ for even values of n ?
A. $\frac{n+1}{2}$ B. $\frac{n+3}{2}$ C. $\frac{n}{2}$ D. $\frac{n}{2} + 1$

DO NOT WRITE ANYTHING HERE

- (xii) Period of $3 \cos \frac{x}{5}$ is _____
 A. 10π B. 2π C. π D. None of these

- (xiii) $\sin 2\theta =$ _____
 A. $\frac{1 + \tan^2 \theta}{1 - \tan^2 \theta}$ B. $\frac{2 \tan \theta}{1 - \tan^2 \theta}$ C. $\frac{2 \tan \theta}{1 + \tan^2 \theta}$ D. None of these

- (xiv) The value of C in the given triangle is



- A. $4\sqrt{2}$ B. 16 C. $8\sqrt{2}$ D. None of these
- (xv) Hero's Formula is used to calculate _____
 A. Area of a triangle B. Sides of a triangle
 C. Angles of a triangle D. None of these

- (xvi) $2 \tan^{-1} A =$ _____
 A. $\tan^{-1} \frac{A}{1 - A^2}$ B. $\tan^{-1} \frac{A^2}{1 - A}$ C. $\tan^{-1} \frac{2A}{1 - A^2}$ D. None of these

- (xvii) Solution set of equation $1 + \cos x = 0$ is _____
 A. $\{\pi + n\pi\}$ B. $\{2\pi + n\pi\}$ C. $\{\pi + 2n\pi\}$ D. $\left\{\frac{3\pi}{2} + n\pi\right\}, n \in \mathbb{Z}$

- (xviii) Harmonic Mean between a and b is _____
 A. $\frac{2ab}{a+b}$ B. $\frac{a+b}{2}$ C. $\frac{a+b}{2ab}$ D. \sqrt{ab}

- (xix) If α, β are the roots of $ax^2 + bx + c = 0$, then $\alpha^2 + \beta^2 =$ _____
 A. $\frac{-b}{a}$ B. $\frac{b^2 - 2ac}{a^2}$ C. $\frac{b^2 - 4ac}{a^2}$ D. None of these

- (xx) A bijective function is _____
 A. Both one-one and onto B. One-one but not onto
 C. Onto, but not one-one D. Neither one-one nor onto

For Examiner's use only:

Total Marks:

20

Marks Obtained:

-----1HA 1111(L)-----



MATHEMATICS HSSC-I

Time allowed: 2:35 Hours

Total Marks Sections B and C: 80

NOTE:- Answer 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.

SECTION – B (Marks 40)

Q. 2 Attempt any TEN parts. All parts carry equal marks.

(10 x 4 = 40)

(i) Simplify by expressing in the form $a+bi$

$$\frac{2}{\sqrt{5} + \sqrt{-8}}$$

(ii) Construct truth table for the following statement:

$$(p \wedge \sim p) \rightarrow q$$

(iii) If $A = \begin{pmatrix} 5 & 3 \\ 1 & 1 \end{pmatrix}$, find A^{-1}

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

(v) Resolve $\frac{x^2+1}{x^3+1}$ into Partial Fractions.

(vi) The A.M of two positive integral numbers exceeds their (positive) G.M. by 2 and their sum is 20. Find the numbers.

(vii) In how many ways can 8 books including 2 on English be arranged on a shelf in such a way that English books are never together.

(viii) Find the term involving y^3 in the expansion of $(x - \sqrt{y})^{11}$

(ix) With usual notations prove that $\theta = \frac{\ell}{q}$

(x) Prove that $\sin 780^\circ \sin 480^\circ + \cos 120^\circ \sin 30^\circ = \frac{1}{2}$

(xi) Draw the graph of $y = 2\cos x$ for the interval $[0, \pi]$ by tabulating its values at subintervals of $\frac{\pi}{6}$.

(xii) The sides of a triangle are $x^2 + x + 1$, $2x + 1$ and $x^2 - 1$. Prove that the greatest angle of the triangle is 120°

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

(xiv) Solve the equation $2 \sin \theta + \cos^2 \theta - 1 = 0$

SECTION – C (Marks 40)

Note:- Attempt any FIVE questions. All questions carry equal marks.

(5 x 8 = 40)

Q. 3 If x is so small that its square and higher powers may be neglected, then show that

$$\frac{(1+x)^{1/2}(4-3x)^{3/2}}{(8+5x)^{1/3}} \approx 4 \left(1 - \frac{5x}{6} \right)$$

Q. 4 Prove that $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$

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

Q. 6 Use Matrices to solve the following system:

$$\begin{cases} 2x_1 + x_2 + 3x_3 = 3 \\ x_1 + x_2 - 2x_3 = 0 \\ -3x_1 - x_2 + 2x_3 = -4 \end{cases}$$

Q. 7 A man standing on the bank of a canal observes that the measure of the angle of elevation of a tree on the other side of the canal is 60° . On retreating 40 metres from the bank, he finds the measure of angle of elevation of the tree as 30° . Find the height of the tree and width of the canal.

Q. 8 If the numbers 1, 4 and 3 are subtracted from three consecutive terms of an A.P, the resulting numbers are in G.P. Find the original numbers if their sum is 6.

Q. 9 Find the solution set of the equation $\cos 2x = \sin 3x$