☆☆ Roll No _____ to be filled in by the candidate | HSSC-(P-I)-A/2023 | Paper Code | 6 | 1 | 9 | 3 |

Mathematics(Objective) **(For All Sessions)** **Group-I** **Time: 30 Minutes** **Marks : 20**

Note: Write Answers to the Questions on the objective answer sheet provided. Four possible answers A, B, C and D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or Pen ink on the answer sheet provided.

Rwp-11-1-23

1.1 $\frac{abc}{4\Delta} =$

(A) r_1 (B) r (C) R (D) Δ

2. In any ΔABC $\sqrt{\frac{S(S-c)}{ab}}$ is:

(A) $Cos\,\alpha/2$ (B) $Cos\,\beta/2$ (C) $Cos\,\gamma/2$ (D) $Cos\,\alpha$

3. $Cos\,(Tan^{-1}0) =$ ____

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

4. Solution of $1 + Cosx = 0$ in $[0\ 2\pi]$ is:

(A) π (B) $\frac{\pi}{2}$ (C) $\frac{3\pi}{2}$ (D) $\frac{5\pi}{2}$

5. The set{1} possess closure property under:

(A) Addition (B) Multiplication (C) Subtraction (D) Both A & B

6. A function $f: A \to B$ is called an nto function if:

(A) Range of $f = A$ (B) Range of $f \neq A$ (C) Range of $f = B$ (D) Range of $f \neq B$

7. If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 1 \end{bmatrix}$ then $|A| =$ _____.

(A) 4 (B) 7 (C) 10 (D) 13

8. If order of a matrix "A" is $m \times n$ and order of matrix "B" is $n \times p$ then order of product of matrices AB is:

(A) $m \times p$ (B) $n \times p$ (C) $m \times n$ (D) $p \times n$

9. The roots of $x^2 - 7x + 10 = 0$ are:

(A) $-2, -5$ (B) $2, 5$ (C) $-2, 5$ (D) $2, -5$

10. If α, β are the roots of $3x^2 - 2x + 4 = 0$, then sum of roots is:

(A) $\frac{2}{3}$ (B) $-\frac{2}{3}$ (C) $\frac{4}{3}$ (D) $-\frac{4}{3}$

11. Partial fractions of $\frac{1}{(x-1)(x+1)}$ are:

(A) $\frac{A}{x-1} + \frac{B}{x+1}$ (B) $\frac{Ax+B}{x-1} + \frac{C}{x+1}$ (C) $\frac{A}{x-1} + \frac{Bx+c}{x+1}$ (D) $\frac{Ax+B}{x^2-1}$

12. Next two terms of sequence 7, 9, 12, 16, ... are:

(A) 18, 20 (B) 19, 21 (C) 20, 22 (D) 21, 27

13. If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in G.P then common ratio is:

(A) $\pm\sqrt{\frac{c}{a}}$ (B) $\pm\sqrt{\frac{a}{c}}$ (C) $\pm\sqrt{\frac{b}{c}}$ (D) $\pm\sqrt{\frac{c}{b}}$

14. $n_{P_2} = 30$, then n is:

(A) 6 (B) 5 (C) 4 (D) 3

15. In how many ways can 4-keys be arranged on a circular key ring:

(A) 1 (B) 2 (C) 3 (D) 4

16. $n! > n^2$ is true for $n =$:

(A) 1 (B) 2 (C) 3 (D) 4

17. The formula for $(r+1)th$ term of binomial expansion of $(a+x)^n$ is:

(A) $\binom{n}{r} a^{n-r} x^r$ (B) $\binom{n}{r} a^{n+r} x^r$ (C) $\binom{n}{r} a^n x^{n-r}$ (D) $\binom{n}{r} a^n x^{n+r}$

18. Which one is the quadrantal angle:

(A) 30^0 (B) 45^0 (C) 60^0 (D) 90^0

19. $Cos\,2\alpha =$ _____.

(A) $1 - 2\,Cos^2\alpha$ (B) $2\,Cos^2\alpha - 1$ (C) $Sin\,\alpha\,Cos\,\alpha$ (D) $2Sin\,\alpha\,Cos\,\alpha$

20. Period of Cosec $\frac{x}{4}$ is:

(A) 2π (B) 4π (C) 6π (D) 8π

821-11-A7

Roll No _____ to be filled in by the candidate | HSSC-(P-I)-A/2023 | Marks : 80

Mathematics (Subjective) (For All Sessions) (GROUP-I) Time: 2:30 hours

Rwp-11-1-23

SECTION-I

2. Write short answers of any eight parts from the following: (8x2=16)

i. Name the properties used in equations: (a): $100 + 0 = 100$ (b): $1000 \times 1 = 1000$

ii. Separate into real and imaginary parts, if $Z = \frac{i}{1+i}$

iii. Differentiate between Equal and Equivalent sets, with example.

iv. Write the set: $\{x | x \in N \wedge 4 < x < 12\}$, in descriptive and tabular forms:

v. Define semi-group.

vi. Find values of x if $\begin{vmatrix} 3 & 1 & x \\ -1 & 3 & 4 \\ x & 1 & 0 \end{vmatrix} = -30$

vii. If the matrices A and B are symmetric and $AB = BA$, show that AB is symmetric.

viii. If $A = \begin{bmatrix} i & 1+i \\ 1 & -i \end{bmatrix}$, find $A + (\bar{A})^t$

ix. Solve: $x(x+7)=(2x-1)(x+4)$ by factorization.

x. If ω is a cube root of unity, form an equation whose roots are $Z\omega$ and $Z\omega^2$

xi. Find two consecutive numbers, whose product is 132.

xii. Find the three cube roots of -8

3. Write short answers of any eight parts from the following: (8x2=16)

i. Without finding constants write $\frac{x^2-10+13}{(x-1)(x^2-5x+6)}$ into partial fractions.

ii. Find vulgar fraction equivalent to recurring decimal 0.7

iii. Find the nth term of sequence $\left(\frac{4}{3}\right)^2, \left(\frac{7}{3}\right)^2, \left(\frac{10}{3}\right)^2, \ldots$

iv. Calculate geometric means between 4 and 16.

v. If $y = \frac{2x}{3} + \frac{4x^2}{9} + \frac{8x^3}{27} + \cdots$ and if $0 < x < 3/2$, then show that $x = \frac{3y}{2(1+y)}$

vi. Find 12th term of H.P: $1/3, 2/9, 1/6, \ldots$

vii. Find the term involving x^{-2} in the expansion of $\left(x - \frac{2}{x^2}\right)^{13}$

viii. How many words can be formed from PLANE using all letters when no letter is to be repeated.

ix. Write formula for ${}^nP_r$ and ${}^nC_r$

x. A die is thrown. Find the probability that dots on top are prime numbers.

xi. Expand $(1-x)^{1/2}$ up to 4 terms by binomial theorem.

xii. If x is so small that its square and higher powers be neglected, then show that: $\frac{\sqrt{1+2x}}{\sqrt{1-x}} \approx 1 + \frac{3x}{2}$

4. Write short answers of any nine parts from the following: (9x2=18)

i. Define the word "Trigonometry"

ii. Find $tan\theta$ and $cot\theta$ for $\theta = \frac{19\pi}{3}$

iii. Show that $sin^2\left(\frac{\pi}{6}\right) + sin^2\left(\frac{\pi}{3}\right) + tan^2\left(\frac{\pi}{4}\right) = 2$

iv. Find the value of $cos\left(\frac{\pi}{12}\right)$

v. Prove that $Sin(180^0 + \propto)\, Sin(90^0 - \propto) = -Sin \propto Cos \propto$.

vi. Define the principal tangent function.

vii. Prove that $Sin(\propto + \beta)Sin(\propto - \beta) = cos^2\beta - cos^2 \propto$.

viii. Define the period of a Trigonometry function

ix. Solve the right triangle ABC in which: $r = 90^0$, $b = 68.4$, $c = 96.2$

x. Solve the triangle ABC if $\beta = 60^0$, $r = 15^0$, $b = \sqrt{6}$

xi. Find the area of triangle ABC for $b = 21.6$, $c = 30.2$, $\propto = 52^0 40'$

xii. Define the trigonometric equation.

xiii. Find the solution of Cosec $\theta = 2$ which lie in the interval $[0, 2\pi]$

SECTION-II

Note Attempt any three questions. Each question carries equal marks: (10x3=30)

5. (a) Find the matrix A if: $\begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix} A = \begin{bmatrix} 0 & -3 & 8 \\ 3 & 3 & -7 \end{bmatrix}$

(b) For what values of "m" the roots of the equation $x^2 - 2(1+3m)x + 7(3+2m) = 0$ be equal?

6. (a) Resolve into partial fractions $\frac{x^2}{(x-2)(x-1)^2}$

(b) Find the values of n and r when ${}^{n-1}C_{r-1} : {}^nC_r : {}^{n+1}C_{r+1} = 3 : 6 : 11$

7. (a) Sum the series up to n terms $2 + (2+5) + (2+5+8) + \cdots$

(b) Use binomial theorem to show that: $1 + \frac{1}{4} + \frac{1.3}{4.8} + \frac{1.3.5}{4.8.12} + \cdots = \sqrt{2}$

8. (a) Prove that $\frac{tan\theta + Sec\theta - 1}{tan\theta - sec\theta + 1} = tan\theta + sec\theta$

(b) Prove that $cos20^0 + cos100^0 + cos140^0 = 0$

9. (a) The measures of sides of a triangular plot are 413,214 and 375 meters. Find the measure of corner angles of the plot.

(b) $\frac{3}{\ldots}$ $\frac{8}{\ldots}$ $Sin^{-1}\frac{77}{\ldots}$