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**Name of candidate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Sign. of Candidate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**MATHEMATICS (HSSC-I)**

**SECTION –A (Marks: 20) Time Allowed: 25 Min**

 **Note:** Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. Each part carries one mark.

|  |  |  |  |  |  |  |  |  |  |
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|  | **Questions**  | **A** | **B** | **C** | **D** | **A** | **B** | **C** | **D** |
| **1.** | Simplify:  | 1+ i | – i –1 | – i | – i +1 |  |  |  |  |
| **2.** | Re =? | $$\frac{4}{15}$$ | $$\frac{3}{13}$$ | $$\frac{3}{11}$$ | $$\frac{2}{13}$$ |  |  |  |  |
| **3.** | If A =  and |A|3 = 125, then =? |  |  | *3* | 0 |  |  |  |  |
| **4.** |  | 1 | 0 | 2024 | 4004 |  |  |  |  |
| **5.** | If A is a square matrix of order 3 then …..(K ≠0) | K3 | K3A3 | KA3 | (3K)A |  |  |  |  |
| **6.** | If an – an - 1 = n + 2 and a1 = 2 then a4= | 7 | 13 | 17 | -11 |  |  |  |  |
| **7.** | The 7th term of the sequence is 2, 6, 11,17 .... . is ….. | 30 | 69 | 41 | None |  |  |  |  |
| **8.** | if  and  are in A . P, then b =………. |   |   |   |   |  |  |  |  |

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| **9.** | No. of ways can 7 people be seated at a round table if they can sit anywhere? | 720 | 820 | 620 | 920 |  |  |  |  |
| **10.** | How many words can be formed out of the letters of the Word “PHYSICS”? | 1200 | 2400 | 1390 | 2520 |  |  |  |  |
| **11.** |  | 2n – 1 | 2n | 2n+1 | 2n-1 |  |  |  |  |
| **12.** | For what values of ‘x’ the expansion (8 – 2x)–1 is valid? | |x|≤ 1 | |x|<1 | |x|< 4 | |x|≤ 4 |  |  |  |  |
| **13.** | The sum of first three terms of series $\sum\_{r=6}^{100}(r-2)^{2} is $: | 2 | 5 | 15 | 77 |  |  |  |  |
| **14.** | If an=5n+1 then sum of n-terms of the series is: | $$\frac{n}{2}$$ | $\frac{n}{2}$(7+3n) | $\frac{n}{2}$(7+4n) | $\frac{n}{2}$(7+5n) |  |  |  |  |
| **15.** |  |  |  |  |  |  |  |  |  |
| **16.** | Area of the equilateral triangle with side x is |  |  |  |  |  |  |  |  |
| **17.** | For what value of the vectors 2i – j + 2k and 3i + 2j are perpendicular. | 3 | 2 | 6 | 4 |  |  |  |  |
| **18.** | Range of y = Sec – 1x is  |  |  |  |  |  |  |  |  |
| **19.** | The solution set of trigonometric equation 1+cos$x$=0 is | {2n$ π\}$ | $$\{π+2nπ\}$$ | $$\{2π+nπ\}$$ | None ofthese |  |  |  |  |
| **20.** |  |  |  |  |  |  |  |  |  |

** HCCS EDUCATIONAL SYSTEM**

 **MATHEMATICS HSSC I**

 **(PRE BOARD EXAM, 2024)(SUBJECTIVE)**

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| **Time allowed: 2:35 Hours Total Marks Section B and C: 80** |
| **Note: The Questions of sections B and C are to be answered on the separately provided answer book. Use supplementary answer sheet i.e. sheet – B if required. Write your answers neatly and legibly.**  |

**SECTION – B (48 Marks)**

**Q.2 Attempt all parts. All parts carry equal marks. (12 x 4 = 48)**

|  |
| --- |
| **1- Solve the following simultaneous linear equations with complex coefficient. 3x-(2+i)y=i+7 ;(2i-1)x+(3i-2)y=2i+1** |
| **OR** |
| Find an equation of a parabola of the form ax2 +bx +c=y which crosses x-axis  at (-7,0) and (10,0) and a point (4,11) lies on it. |
| **2. Use row operation find the inverse of the matrix**$ \left[\begin{matrix}1&2&-1\\0&-1&3\\1&0&2\end{matrix}\right]$ |
| **OR** |
| Find the value of ‘n’ when 2nC3: nC2=36:3. |
| **3. A dice is thrown twice .what is the probability that the sum of the number of dots shown is 3 or 11** |
| **OR** |
| Show that sin-1(-x)= - sin-1x |
| **4. If y=**$\frac{2}{3}x+\frac{4}{9}x^{2}+\frac{8}{27}x$**3+……and if 0<x<**$\frac{3}{2}$**, then show that** $x=\frac{3y}{2(1+y)}$ |
| **OR** |
| A card is drawn from a deck of 52 playing cards .what is the probability that it is a diamond card or an ace? |
| **5. Use the principle of Mathematical induction to show that 12+32+52+…….+(2n-1)2=**$\frac{n(4n^{2}-1)}{3}$ **for every positive integer** $n$**.** |
| **OR** |
| Determine the middle term in the expansion of $\left(\frac{1}{x}-\frac{x^{2}}{2}\right)^{12}$ |
| **6. Solve the following equation sin2x=cosx** |
| **OR** |
| Find x so that x+7 ,x-3,x-8 form a three term geometric sequence in the given order .Also give the sequence. |
| **7. Find four numbers in an arithmetic sequence whose sum is 20 and the sum of whose square is 120.** |
| **OR** |
| Sum to n terms 1.2.3+2.3.4+3.4.5+……………… |
| **8. Graph the solution region of the system of the linear inequalities and find the corner points:** $3x+7y\leq 21, 2x-y\leq -3, y\geq 0$ |
| **OR** |
| Prove that altitudes of a triangle are concurrent. |
| **9. Find area of triangle determined by the points P, Q and R. P(0, 0, 0) , Q(2, 3, 2) , R(-1, 1, 4) ,** |
| **OR** |
| Find the solution set of trigonometric equation $sinx+cos3x=cos5x$ |
| **10. Prove that cos5**$ θ$ **+2cos3**$ θ$ **+cos**$ θ$ **=4cos2**$ θ$ **cos3**$θ$ |
| **OR** |
| A student is to answer 7 out of 10 questions in an examination. How many choices has he, if he must answer the first 3 questions.  |
| **11. Prove that in an equilateral triangle ABC,r:R:r1=1:2:3** |
| **OR** |
| Prove 2 tan-1$\frac{2}{3}$ =sin-1$\frac{12}{13}$ |
| **12. Verify that** $\frac{1}{2}$**cos-1**$ $**x = Tan-1**$\sqrt{\frac{1-x}{1+x}}$ **for** $\left|x\right|<1.$ |
| **OR** |
| A ball is dropped from x feet above a flat surface. Each time the ball hits the ground after falling a distance h, it rebounds a distance rth where r<1. Compute the total distance the ball travels.  |

**SECTION – C (32 Marks)**

**NOTE: Attempt all questions. All questions carry equal marks. (4 x 8=32)**

**1. Solve the system of following linear equations.**

*x1 +3x2 +2x3 = 3*

*4x1 +5x2 -3x3 = -3*

*3x1 -2x2 +*7*x3 = 4*By reducing its augmented matrix to reduce Echelon form.

**OR**

 Prove that sine law $(\frac{a}{sinα}=\frac{b}{sinβ}=\frac{c}{sinγ})$

**2. Prove that Cos 20o Cos40o Cos60o Cos80o =** $\frac{1}{16}$

**OR**

If 5,7and 9 are added to three consecutive terms of an A.P the resulting numbers are in G.P .find the numbers if there sum is 45.

**3. If 2y =** $\frac{1}{2^{2}}+\frac{1.3}{2!}.\frac{1}{2^{4}}+\frac{1.3.5}{3!}.\frac{1}{2^{6}}+$**……. Then prove that 4y2 + 4y – 1=0**

**OR**

Find the nth term and the sum to n terms of each of following series;

 3+5+11+29+83+245+…….

**4. If** $\overline{a}=4\overline{i}+3\overline{j}+\overline{k}$ **and** $\overline{b}=2\overline{i}-\overline{j}+2\overline{k}$ **then find a unit vector perpendicular to both** $\overline{a}$ **and** $\overline{b}$**. Also find sine of the angle between the vectors** $\overline{a}$**and** $\overline{b}$ **.**

**OR**

Maximize $ and minimize f\left(x,y\right)=2x+5y $subject to the constraints

$2y-x\leq 8;x-y\leq 4;x\geq 0;y\geq 0 $