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Answer Sheet No. \_\_\_\_\_

Sig. of Candidate. \_\_\_\_\_

Sig. of Invigilator. \_\_\_\_\_

25

**MATHEMATICS HSSC-I**  
**SECTION – A (Marks 20)**

Time allowed: 25 Minutes

Version Number 

1	7	4	2
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**Note:** Section – A is compulsory. All parts of this section are to be answered on the OMR Answer Sheet provided separately. It should be completed in the first 25 minutes and handed over to the Centre Superintendent along with the Question Paper. Deleting/overwriting is not allowed. Do not use lead pencil.

**Q. 1** Choose the correct answer A / B / C / D by filling the relevant bubble for each question on the OMR Answer Sheet according to the instructions given there.

- 1) What will be the range of  $y = \cot^{-1} x$  ?  
A.  $\frac{-\pi}{2} < x < \frac{\pi}{2}$     B.  $-1 < x < 1$     C.  $0 \leq x \leq \pi$     D.  $0 < x < \pi$
- 2)  $(-i)^{19} = ?$   
A.  $-i$     B.  $1$     C.  $-1$     D.  $i$
- 3) How many inverse elements correspond to each element of a group?  
A. At least two    B. At least one    C. Only one    D. Two
- 4) Which of the following is the vulgar fraction of 1.3434.... ?  
A.  $\frac{331}{99}$     B.  $\frac{33}{99}$     C.  $\frac{133}{99}$     D.  $\frac{333}{99}$
- 5) If  $\frac{2}{(x+1)(x-1)} = \frac{E}{x+1} + \frac{F}{x-1}$  then:  
A.  $E = -1, F = -1$     B.  $E = 1, F = -1$     C.  $E = -1, F = 1$     D.  $E = 1, F = 1$
- 6) What is the product of the roots of quadratic equation  $x^2 - 3x + 6 = 0$   
A.  $-6$     B.  $3$     C.  $-3$     D.  $6$
- 7) The rank of the matrix  $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 2 \\ 0 & 0 & 0 \end{bmatrix}$  is:  
A.  $0$     B.  $3$     C.  $2$     D.  $1$
- 8)  ${}^n C_r \cdot r! = ?$   
A.  ${}^n P_r$     B.  ${}^{n+1} C_r$     C.  ${}^n C_{r+1}$     D.  ${}^{n+1} P_r$
- 9) For what least value of  $n$ , the expression  $n! > 2^n - 1$  is true when  $n \in \mathbb{Z}$  ?  
A.  $n = 4$     B.  $n = 1$     C.  $n = 2$     D.  $n = 3$
- 10) Which of the following angles are coterminal?  
A.  $\frac{\pi}{3}, \frac{5\pi}{6}$     B.  $\frac{\pi}{3}, \frac{5\pi}{3}$     C.  $\frac{\pi}{3}, \frac{4\pi}{3}$     D.  $\frac{\pi}{3}, \frac{13\pi}{3}$
- 11) The range of function  $y = \sin 3\theta$  is:  
A.  $-3 < y < 3$     B.  $-1 < y < 1$     C.  $-1 < y \leq 0$     D.  $-1 \leq y \leq 1$

DO NOT WRITE ANYTHING HERE

- 12) What is the value of  $r$  if  $r \cos \phi = 4$  and  $r \sin \phi = -3$
- A.  $-5$       B.  $25$       C.  $\pm 5$       D.  $5$
- 13) The value of  $\cos(\sin^{-1} x)$  is:
- A.  $\sqrt{1-x^2}$       B.  $\sqrt{1+x^2}$       C.  $\sqrt{1-x}$       D.  $\sqrt{1+x}$
- 14)  $\sqrt{\frac{(S-b)(S-c)}{bc}} = ?$
- A.  $\cos \frac{\gamma}{2}$       B.  $\sin \frac{\beta}{2}$       C.  $\sin \frac{\alpha}{2}$       D.  $\cos \frac{\alpha}{2}$
- 15) If  $16^x = 4$  and  $5^{x+y} = 625$  then  $y = ?$
- A.  $\frac{1}{2}$       B.  $2$       C.  $\frac{7}{2}$       D.  $\frac{3}{2}$
- 16) The solution set of  $\sin x - \cos x = 0$  in  $[0, \pi]$  is:
- A.  $\frac{5\pi}{3}$       B.  $\frac{5\pi}{4}$       C.  $\frac{\pi}{3}$       D.  $\frac{\pi}{4}$
- 17) What is the Multiplicative inverse of  $1-2i$ ?
- A.  $\frac{1+2i}{\sqrt{5}}$       B.  $\frac{1-2i}{4}$       C.  $\frac{1+2i}{5}$       D.  $\frac{1-2i}{\sqrt{5}}$
- 18) If  $A, G, H$  are arithmetic, geometric and harmonic means between the distinct positive numbers 'a' and 'b' then:
- A.  $A > G > H$       B.  $A < G < H$       C.  $A < H < G$       D.  $A > H > G$
- 19) If  $A$  is non-empty set, then  $(P(A), \cap)$  is?
- A. Abelian group      B. Group      C. Semi Group      D. Monoid
- 20) The hour hand of a clock turns through \_\_\_\_\_ radians in one hour:
- A.  $\frac{\pi}{3}$       B.  $\frac{\pi}{8}$       C.  $\frac{\pi}{4}$       D.  $\frac{\pi}{6}$

For Examiner's use only:

Total Marks:

20

Marks Obtained:

— 1HS 1711-1742 —



# MATHEMATICS HSSC-I

26

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) If  $Z_1 = 2+i$ ,  $Z_2 = 3-2i$ ,  $Z_3 = 1+3i$  then express  $\frac{\overline{Z_1 Z_3}}{Z_2}$  in the form  $a+ib$ .

(ii) Show that  $\begin{vmatrix} a & b+c & a+b \\ b & c+a & b+c \\ c & a+b & c+a \end{vmatrix} = a^3 + b^3 + c^3 - 3abc$

(iii) Show that  $\sim q \wedge (p \rightarrow q) \rightarrow \sim p$  is a tautology.

(iv) Find the condition that one root of  $ax^2 + bx + c = 0$ ,  $a \neq 0$  is square of the other.

(v) Find the term independent of  $x$  in the expansion of  $\left(\sqrt{x} + \frac{1}{2x^2}\right)^{10}$ .

(vi) The ratio of the sum of  $n$  terms of two series in Arithmetic progression is  $3n+2 : n+1$ . Find the ratio of their 8th terms.

(vii) Resolve  $\frac{9x-7}{(x^2+1)(x+3)}$  into partial fraction.

(viii) In how many ways can a hockey team of 11 players be selected out of 15 players? How many of them will include a particular player?

(ix) Find the values of the trigonometric function of angle  $1530^\circ$ .

(x) A number exceeds its square root by 56. Find the number.

(xi) Prove  $\frac{\cos 3\theta}{\cos \theta} + \frac{\sin 3\theta}{\sin \theta} = 4 \cos 2\theta$

(xii) Show that  $2\pi$  is the period of  $\sin \theta$

(xiii) Prove that  $(r_1 + r_2) \tan \frac{\gamma}{2} = C$

(xiv) Solve the equation  $1 + \cos x = 0$

## SECTION - C (Marks 40)

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

( 5 x 8 = 40 )

Q. 3 Find inverse by Row or Column operation  $\begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 2 \end{bmatrix}$

Q. 4 If  $y = 1 + 2x + 4x^2 + 8x^3 + \dots$  then:

(i) Show that  $x = \frac{y-1}{2y}$

(ii) Find the interval in which the series is convergent.

Q. 5 Solve the equations  $x^2 - y^2 = 5$ ,  $4x^2 - 3xy = 18$

Q. 6 Reduce  $\cos^4 \theta$  to an expression involving only function of multiple of  $\theta$ , raised to the first power.

Q. 7 Measure of two sides of a triangle are in the ratio 3:2 and they include an angle of measure  $57^\circ$ . Find the remaining two angles.

Q. 8 Prove  $\sin^{-1} \frac{4}{5} + \sin^{-1} \frac{5}{13} + \sin^{-1} \frac{16}{65} = \frac{\pi}{2}$

Q. 9 If  $x$  is so small that its square and higher power can be neglected then show that  $\frac{\sqrt{4+x}}{(1-x)^3} = 2 + \frac{25}{4}x$