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.

MATHEMATICS HSSC–I

SECTION – A (Marks 20)

Time allowed: 25 Minutes

حصہ اول لازمی ہے۔ سوالات کے جوابات اسی صفحہ پر دیے گئے دائرہ کو پُر کریں۔ ایک سے زائد دائرہ پُر کرنے کی اجازت نہیں ہے۔ کاٹ کر دوبارہ لگانے کی اجازت نہیں ہے۔ لیکوئڈ کا استعمال منع ہے۔

Fill the relevant bubble against each question:

ہر سوال کے سامنے دیے گئے درست دائرہ کو پُر کریں۔

1. For a complex number z, all the following formulas are true **EXCEPT**:
   ○ $\bar{\bar{z}} = z$ ○ $z\bar{z} = |z|^2$ ○ $z^2 = |z|^2$ ○ $|z| = |\bar{z}|$

2. Which of the following sets forms an abelian group under the operation of multiplication?
   ○ Set of rational numbers ○ Set of integers ○ Set of natural numbers ○ Set of non-zero real numbers

3. Suppose the number of players that play cricket and hockey are 15 and 13 respectively. If the total number of players is 21, what is the number of players that play both the games?
   ○ 6 ○ 8 ○ 7 ○ 28

4. If A is a matrix of order 3×4, then which of the following equalities is **TRUE**?
   ○ $AI_3 = A$ ○ $I_4A = A$ ○ $AA^t = I_4$ ○ $AI_4 = A$

5. $\begin{vmatrix} 1 & 0 & 0 \\ 2 & -i & 0 \\ 3 & -2 & i \end{vmatrix} =$
   ○ 1 ○ −1 ○ i ○ $-i$

6. If $f(x)$ is a polynomial with only two roots 1 and 2, then $f(x) =$
   ○ x^2+3x-2 ○ x^2+3x+2 ○ x^2-3x+2 ○ x^2-3x-2

7. If one root of the equation $f(x)=0$ is -1, then $5-f(-1) =$
   ○ 6 ○ 4 ○ 5 ○ −6

8. The partial fraction of $\frac{1}{1-x^3}$ will be in the form of:
   ○ $\frac{A}{1-x}+\frac{Bx+C}{1-x^2}$ ○ $\frac{A}{1-x}+\frac{Bx+C}{1+x+x^2}$ ○ $\frac{A}{1-x}+\frac{Bx+C}{(1-x)^2}$ ○ $\frac{A}{1-x}+\frac{B}{1-x+x^2}$

9. If $a_1=-1$ in a sequence with general term $a_n = n+a_{n-1}$ then sum of first two terms S_2 is:
   ○ 0 ○ 1 ○ −1 ○ 2

10. If b is a harmonic mean between -2 and 4 then b=...
    ○ 8 ○ −8 ○ 1 ○ −1

11. $\binom{8}{7}+\binom{8}{6} =$
    ○ 72 ○ 48 ○ 63 ○ 36

12. If a fair die is rolled, then what is the probability that the top is an even number?
    ○ $\frac{1}{2}$ ○ $\frac{1}{3}$ ○ $\frac{1}{6}$ ○ 1

13. Which of the following expressions is sum of the series $1-x+x^2-x^3+\ldots$
    ○ $\frac{1}{1+x}$ ○ $\frac{1}{1-x}$ ○ $\sqrt{1+x}$ ○ $\frac{1}{\sqrt{1-x}}$

14. What is the length of the arc that subtends an angle of measure 60° at the centre of a circle with radius 6?
    ○ 3π ○ 2π ○ 6π ○ π

15. $\sin\left(\frac{7\pi}{6}\right) =$
    ○ $-\frac{\sqrt{3}}{2}$ ○ $-\frac{1}{2}$ ○ $\frac{1}{2}$ ○ $\frac{\sqrt{3}}{2}$

16. Which of the following trigonometric expressions is identically equal to $1-\cos2\theta$
    ○ $2\cos^2\theta$ ○ $2\sin^2\theta$ ○ $2\sin^2 2\theta$ ○ $2\cos^2 2\theta$

17. What is the primary period of $\tan\left(\frac{x}{3}\right)$?
    ○ 3π ○ $\frac{\pi}{3}$ ○ $\frac{\pi}{2}$ ○ π

18. The circumradius R of a triangle with sides a,b,c is equal to:
    ○ $\frac{abc}{\Delta}$ ○ $\frac{abc}{4\Delta}$ ○ $\frac{4abc}{\Delta}$ ○ $\frac{4\Delta}{abc}$

19. For what value of x, $\tan(x-30°) = \cot x$
    ○ 90° ○ 60° ○ 120° ○ 150°

20. What is the solution of $\sec x = 2$ in the interval $[0,\pi]$?
    ○ $\left\{-\frac{\pi}{6}\right\}$ ○ $\left\{-\frac{\pi}{3}\right\}$ ○ $\left\{\frac{\pi}{3}\right\}$ ○ $\left\{\frac{\pi}{6}\right\}$