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۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کاٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پنسل کا استعمال ممنوع ہے۔

Fill the relevant bubble against each question:

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

1. If a,b,c are real numbers such that $a<b$, $c<0$, $a\neq 0$, $b\neq 0$, then which of the following inequalities holds:
   ○ $ac>bc$ ○ $ac^2>bc^2$ ○ $\frac{c}{a}>\frac{c}{b}$ ○ $ac<bc$

2. What is the converse of $p\to q$?
   ○ $\sim p\to\sim q$ ○ $q\to p$ ○ $\sim q\to\sim p$ ○ $p\leftrightarrow q$

3. The set of non-zero rational numbers is a group under the operation of:
   ○ Addition ○ Subtraction ○ Multiplication ○ Division

4. For what value of λ is the matrix $\begin{bmatrix}1&0&0\\2&\lambda&0\\1&2&3\end{bmatrix}$ singular?
   ○ 1 ○ 0 ○ 3 ○ –4

5. If A is a skew-symmetric matrix then:
   ○ $A=A^t$ ○ $A=-A^t$ ○ $A=(\bar{A})^t$ ○ $A=-(\bar{A})^t$

6. If the polynomial $f(x)$ is divided by $x+2$, the quotient is $x-2$ and the remainder is 2, then $f(x)$ will be:
   ○ x^2-4 ○ x^2+4 ○ x^2-2 ○ x^2+2

7. If w is a cube root of unity, then which of the following equations is true?
   ○ $1+w=0$ ○ $1+w^2=0$ ○ $w+w^2=0$ ○ $1+w+w^2=0$

8. What is the partial fractions of $\frac{x^2+2x-1}{x^2-1}$?
   ○ $1+\frac{1}{x+1}-\frac{1}{x-1}$ ○ $1+\frac{1}{x-1}-\frac{1}{x+1}$ ○ $1-\frac{1}{x+1}-\frac{1}{x-1}$ ○ $1+\frac{1}{x-1}+\frac{1}{x+1}$

9. Find the second term of the sequence whose general term is $a_n=2n^2-3$
   ○ -1 ○ 13 ○ 5 ○ 11

10. If $s_\infty=\frac{2}{3}$ and $a=\frac{2}{7}$ in an infinite geometric progression, then the common ratio is:
    ○ $-\frac{4}{7}$ ○ $\frac{4}{7}$ ○ $\frac{2}{7}$ ○ $-\frac{2}{7}$

11. For what values of x, the binomial expansion of $\left(1-\frac{x}{2}\right)^{-1}$ is convergent (valid)?
    ○ $x>2$ ○ $|x|>2$ ○ $|x|<2$ ○ $x<1$

12. What is radius of the circle whose part of arc-length of measure 4 is with central angle $\frac{\pi}{2}$?
    ○ $\frac{8}{\pi}$ ○ $\frac{4}{\pi}$ ○ $\frac{2}{\pi}$ ○ $\frac{\pi}{2}$

13. If $D\left(-5,5\sqrt{2}\right)$ lies on the terminal side of θ, then find the value of $\tan\theta$
    ○ $-\frac{1}{\sqrt{2}}$ ○ $\frac{1}{\sqrt{2}}$ ○ $\sqrt{2}$ ○ $-\sqrt{2}$

14. If $^nC_4={^nC_{10}}$, then $n=$...
    ○ 4 ○ 10 ○ 14 ○ 6

15. How many distinct three-digit numbers can be formed from the integers $1,2,3,4,5,6$ if each digit is used at most once?
    ○ 360 ○ 120 ○ 20 ○ 10

16. What is the middle term in the expansion of $\left(x+x^{-1}\right)^{14}$
    ○ $6th$ term ○ $7th$ term ○ $8th$ term ○ $9th$ term

17. $\sin\left(\frac{3\pi}{2}-\alpha\right)=$
    ○ $\sin\alpha$ ○ $\cos\alpha$ ○ $-\sin\alpha$ ○ $-\cos\alpha$

18. What is the primary period of $\frac{\sin 2x}{1+\cos 2x}$
    ○ 2π ○ π ○ $\frac{\pi}{2}$ ○ 4π

19. A ladder makes angle 30° with the wall of height $8m$. What is the length of the ladder?
    ○ $16m$ ○ $8m$ ○ $4m$ ○ $12m$

20. What is the value of $\sin^{-1}\left(-\frac{1}{2}\right)$?
    ○ $-\frac{\pi}{6}$ ○ $\frac{\pi}{6}$ ○ $-\frac{\pi}{3}$ ○ $\frac{\pi}{3}$