MATHEMATICS HSSC–I
SECTION – A (Marks 20)

Time allowed: 25 Minutes | **Version Number** | 3 | 1 | 1 | 3 |

Note: Section – A is compulsory. All parts of this section are to be answered on the separately provided OMR Answer Sheet which should be completed in the first 25 minutes and handed over to the Centre Superintendent. 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. Each part carries one mark.

1) What is the range of $y = \sin^{-1} x$?

   A. $\dfrac{-\pi}{4} < y < \dfrac{\pi}{2}$
   B. $0 < y < \pi$
   C. $\dfrac{-\pi}{2} \le y \le \dfrac{\pi}{2}$
   D. $0 \le y \le \pi$

2) What is the general solution of $\sin x = 0$ in $\mathbb{R}$?

   A. $\left\{ \pm \dfrac{n\pi}{2} : n \in \mathbb{Z} \right\}$
   B. $\left\{ \pm \dfrac{3n\pi}{2} : n \in \mathbb{Z} \right\}$
   C. $\{ \pm n\pi : n \in \mathbb{Z} \}$
   D. $\{ \pm 2n\pi : n \in \mathbb{Z} \}$

3) Under which of the following operations, the set $S = \{-1, 0, 1\}$ is closed?

   A. Multiplication
   B. Division
   C. Addition
   D. Subtraction

4) Which of the following sets is equal to $\{ x \in \mathbb{Q} : x^2 = 2 \}$

   A. $\{\ \}$
   B. $\mathbb{Q}$
   C. $\{ \pm \sqrt{2} \}$
   D. $\{ \pm 1 \}$

5) Which of the following binary relations from $A = \{1, 2, 3\}$ to $B = \{a, b, c\}$ is a function?

   A. $\{(1, a), (2, c), (2, b)\}$
   B. $\{(1, a), (2, b), (1, c)\}$
   C. $\{(1, a), (1, b), (2, c), (3, c)\}$
   D. $\{(1, a), (2, a), (3, c)\}$

6) Let A and B be the square matrices of the same order. Which of the following is true about A and B?

   A. $\det(A) = \det(B)$
   B. $\det(AB) = \det((AB)^t)$
   C. $\det(A + B) = \det A + \det B$
   D. $\det(AB) = \det(BA)$

7) If two roots of a cubic equation are 0 and i, then the cubic equation is:

   A. $x^3 - x = 0$
   B. $x^3 - 1 = 0$
   C. $x^3 + 1 = 0$
   D. $x^3 + x = 0$

8) What could be the partial fractions of $\dfrac{x^2 + 2x + 4}{(x-2)(x^3 - 8)}$?

   A. $\dfrac{A}{x+2} + \dfrac{B}{(x-2)^2} + \dfrac{C}{x^2 - 2x + 4}$
   B. $\dfrac{A}{x+2} + \dfrac{B}{(x-2)^2} + \dfrac{Cx+D}{x^2 + 2x + 4}$
   C. $\dfrac{A}{x-2} + \dfrac{B}{(x-2)^2} + \dfrac{Cx+D}{x^2 - 2x + 4}$
   D. $\dfrac{A}{x-2} + \dfrac{B}{(x-2)^2} + \dfrac{Cx+D}{x^2 + 2x + 4}$

9) What is the sum of n terms of the sequence with n^{th} term $a_n = 4n + 1$?

   A. $2n(2n+3)$
   B. $n(2n+3)$
   C. $2n + 3$
   D. $4n + 6$

10) What is the sum of the series $1 + \dfrac{1}{3} + \dfrac{1}{9} + \ldots\ldots$?

   A. $\dfrac{3}{4}$
   B. $\dfrac{3}{2}$
   C. 3
   D. $\dfrac{4}{3}$

11) If a fair die is rolled, then what is the probability that the top is a prime number?

   A. $\dfrac{2}{5}$
   B. $\dfrac{3}{2}$
   C. $\dfrac{1}{2}$
   D. $\dfrac{2}{3}$

12) For what values of x, the binomial expansion of $\left(2 - \dfrac{x}{2}\right)^{-1}$ is valid?

   A. $|x| > 4$
   B. $|x| > 2$
   C. $|x| < 4$
   D. $|x| < 2$

13) How many lines can be drawn between the five points in a plane?

   A. 120
   B. 60
   C. 20
   D. 10

14) Which term is the middle term in the expansion of $\left(x - \dfrac{2}{x}\right)^{2n}$?

   A. $(n-1)^{th}$ term
   B. $\left(\dfrac{n}{2} - 1\right)^{th}$ term
   C. $\left(\dfrac{n}{2} + 1\right)^{th}$ term
   D. $(n+1)^{th}$ term

15) The radian measurement of the central angle of a circle of radius $6 cm$ which cuts off an arc of $12 cm$ long is:

   A. 3
   B. 4
   C. 1
   D. 2

16) Which of the following indentities is TRUE?

   A. $\sin 3\theta = 3\sin\theta + 4\sin^3\theta$
   B. $\sin 3\theta = 4\sin\theta + 3\sin^3\theta$
   C. $\cos 3\theta = 4\cos^3\theta + 3\cos\theta$
   D. $\cos 3\theta = 4\cos^3\theta - 3\cos\theta$

17) Which of the following is equal to $\cos\left(\dfrac{3\pi}{2} - x\right)$?

   A. $\sin x$
   B. $\cos x$
   C. $-\cos x$
   D. $-\sin x$

18) What is primary period of $\dfrac{1}{2}\sin 2x$?

   A. 2π
   B. $\dfrac{\pi}{2}$
   C. 4π
   D. π

19) In a right angle triangle ABC, if the lengths of two non-perpendicular sides are 5 and 3, then what will be the length of the third side?

   A. 4
   B. $\sqrt{34}$
   C. 3
   D. 4.5

20) If R is circumradius of a triangle ABC, Then $R =$

   A. $\dfrac{abc}{4\Delta}$
   B. $\dfrac{4\Delta}{abc}$
   C. $\dfrac{abc}{\Delta}$
   D. $\dfrac{abc}{4}$