Sample Paper-05 (unsolved)
Mathematics
Class – XI

Time allowed: 3 hours Maximum Marks: 1**00**

General Instructions:

a) All questions are compulsory.
b) The question paper consists of 26 questions divided into three sections A, B and C. Section A comprises of 6 questions of one mark each, Section B comprises of 13 questions of four marks each and Section C comprises of 7 questions of six marks each.
c) All questions in Section A are to be answered in one word, one sentence or as per the exact requirement of the question.
d) Use of calculators is not permitted.

Section A

1. List the elements of the following set $B = \{x \in A, 10 + x = 7\}$ where $A = \{1, 2, 3, 4, 5, \cdots\cdots\}$

2. Represent the function $(1+x)^{50}$ as the sum of an even function and an odd function

3. Find the greatest and the least value of the function $f(x) = \cos x^3$

4. Solve for x if $|x| - x = 1 + 2i$

5. Five geometric means are inserted between 8 and 512 Find the fifth term in the series .

6. Find x for which the function $ax^2 + bx + c$, $a > 0$ assumes the least value

Section B

7. If For what values of b the for which the curve $y = x^2 + bx + 25$ touches the x-axis

8. Find the area of the parallelogram bounded by the lines
$x = 3$, $x = 5$, $3x - 2y + 4 = 0$ *and* $3x - 2y + 1 = 0$

9. Solve the inequality $\left|\frac{1}{x} - 2\right| < 5$

10. Determine whether the graphs of the equation $y = |x|$ and $y = x$ is symmetric about x-axis, y –axis, or about the origin

11. Find $f(x)+f(1-x)$ if $f(x)=\dfrac{100^x}{100^x+10}$

12. Evaluate $cos(2\tan^{-1}(-7))$

13. Find the limit $\lim\limits_{h\to 0}\dfrac{f(a+h)}{2h}$ if $f(a)=0$ *and* $f'(a)=6$

14. Find $f^{-1}(x)$ if $f(x)=1+\log_e(x+5)$

15. Find c in the equation $x^2-4x+c=0$ if it is known that the sum of squares of the roots is equal to 16

16. The vertices of a triangle are A (- 6, - 2), B (6, - 5), and C (2, - 8).Find a point inside the triangle which is equidistant from all the sides.

17. Prove that Prove that $\cos(A+B)+\sin(A-B)=2\sin(45+A)\cos(45+A)$

18. Prove by mathematical induction that $2^n>2n+1$ for all values of $n\geq 3$

19. Using properties of set prove that $A-(B-C))=(A-B)\cup(A\cap C)$

Section C

20. Prove that $a_1-3a_2+3a_3-a_4=0$ if $a_1\ a_2\ a_3$ are in AP

21. If four coins are tossed , find the probability that there should be two heads and two tails.

22. Find n if the coefficient of the second term in the expansion of $(x^2-\dfrac{1}{4})^n$ is equal to 31

23. Find $\dfrac{dy}{dx}$ given that $y=(sinx)^{x^2}$

24. Find an AP whose first term is unity and the second , tenth and 34th term form a GP

25. A tangent to the parabola $y^2=12x$ is making an angle 45^0 with the straight line $y=3x+5$.Find its equation and point of contact.

26. Calculate the mean deviation about the median for the distribution given below

Age	10-20	21-31	32-42	43-53	54-64	65-75	76-86
No of persons	15	14	30	20	10	7	4