Sample Paper-02 (unsolved)
Mathematics
Class - XI

Time allowed: 3 hours Maximum Marks: 100

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. Write a trigonometric function that is even, its domain and range.

2. Prove that $f(x) - f(-x)$ is an odd function.

3. Write the equation of tangent to the circle $x^2 + y^2 = 13$ at the point (3, 2)

4. Evaluate i^{62}

5. Write the condition that the ellipse represented by the equation $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ whose major axis coincides with the line $x = 0$

6. In how many ways can 5 students be seated at a (1) round table (2) on a bench

Section B

7. $f(x-1) = 3x^4 - 12x^3 + 13x^2 - 2x + 7$ Find $f(x)$

8. Find the largest term in the expansion of $(3 - 2x)^9$ when $x = 1$

9. Find the condition that the equations $ax^2 + bx + c = 0$, $px^2 + qx + r = 0$ have a common root

10. Prove by mathematical induction that for all positive integral values of n, $(10^n - 1)$ is divisible by 9

11. Find the domain and range of the function $f(x) = \frac{1}{3 - \sin 3x}$

12. Find the limit $\lim_{x \to 0} \frac{\sin 3x - \sin x}{\sin x}$

13. Solve $\tan\theta + \tan 2\theta - \sqrt{3} \tan\theta \tan 2\theta = \sqrt{3}$

14. If $f(x-1) = x^2 - 2x$ Find $f^{-1}(17)$

15. Prove that if a , b are the intercepts made by a line with x axis and y axis respectively such that $\frac{1}{a}+\frac{1}{b}=k$ where k is a constant then the line passes through a fixed point. Also find the fixed points

16. Find the least positive value of n if $\left(\frac{1+i}{1-i}\right)^n=-1$

17. Find the range of $f(x)$ *when* $f(x)=a\cos x+b\sin x$

18. Find the non-zero solutions of $|1+2i|^x=5$

19. In single throw of two dies find the probability of getting a minimum sum of 9

Section C

20. Prove that A,G,H form a decreasing GP where A, G , H are the AM , GM , HM between two numbers (a,b)

21. A bag contains tickets numbered from 1 to 10. Two tickets are drawn at random .Find the probability that both are prime.

22. One reporter tells lie in 30% cases and the other in 35% cases. Find the probability that both contradict each other on the same report.

23. Differentiate $\cos x$ from the first principle with respect to x

24. Find the sum of n terms of the series $1^3+2^3+3^3\ldots\ldots+n^3$

25. Find the foci and the equation to the directrix of the ellipse represented by the equation $\frac{x^2}{16}+\frac{y^2}{25}=1$

26. Calculate the mean deviation from the median for the following data

Weight in Kg	58	59	60	61	62	63	64	65	66
No of men	10	8	15	20	35	35	22	20	15