Sample Paper-01
Mathematics
Class – XI

Time allowed: 3 hours **M. M: 100**

General Instructions:

(i) All questions are compulsory.
(ii) This question paper contains 29 questions.
(iii) Question 1- 4 in Section A are very short-answer type questions carrying 1 mark each.
(iv) Question 5-12 in Section B are short-answer type questions carrying 2 marks each.
(v) Question 13-23 in Section C are long-answer-I type questions carrying 4 marks each.
(vi) Question 24-29 in Section D are long-answer-II type questions carrying 6 marks each.

Section – A

1. Compute $(1+2i)i-\frac{3+2i}{1-i}$

2. Write the domain and range of the function $\cos^{-1}x$

3. Find the sign of y if $y=\sin(\cos^{-1}x)$

4. Find $\sin^{-1}\left(sin\left(\frac{6\pi}{7}\right)\right)$

Section B

5. Write the coordinates of the point of intersections of the parabola represented by $y^2=4ax$ and its latus rectum

6. Find x and y if $(x+7,8)=(10,x+y)$

7. Find the inverse of the function $f(x)=x^2-x+1, x>\frac{1}{2}$

8. Find the vertex, axis , Focus , Directrix and latus rectum of the parabola $8y^2+24x-40y+134=0$

9. Express $\frac{7-4i}{3+2i}$ in the form $a+ib$

10. Solve the inequality $(x-2)((x-3)>0$

11. Find the general value of x if $\tan 5x=\frac{1}{\tan 2x}$

12. In a single throw of 2 dies what is the probability of getting a prime number on each die.

Section C

13. If $f(x)=x^3-x;\phi(x)=\sin 2x$ Find the value $f[\phi(\frac{\pi}{12})]$

14. If $\tan A=\frac{m}{m+1}$ *and* $\tan B=\frac{1}{2m+1}$ prove that $\tan A+\tan B+\tan A\tan B=1$

15. If $f:R\to R$ is defined as follows: $f(x)=\begin{cases}1 & if\ x\in Q\\ -1 & if\ x\notin Q\end{cases}$ Find $f(\sqrt{3}, f(3), f(\sqrt{3+1})$

16. Prove that the equation

$sin\theta=x+\frac{1}{x}$ is impossible if x is real

17. Find the domain of the function for which $f(x)=\phi(x);, if\ f(x)=3x^2+1, and \phi(x)=7x-1$

18. Find the limit $\lim_{x\to 0}\frac{1-\cos x}{x}$

19. Solve $2\sin^2 x+14\sin x\cos x+50\cos^2 x=26$

20. Find $\frac{dy}{dx}$ given that $y=(\sin^n x\cos nx)$

21. If $(5a),(a-b),b$ are in GP prove that $\log\left(\frac{1}{3}(a+b)\right)=\frac{1}{2}(\log a+\log b)$

22. If the nth term of a series is denoted by $\frac{7^{n-1}}{10^n}$. Find the sum to infinity of the series.

23. Calculate the variance and standard deviation of the following data $8,12,13,15,22,14$

Section D

24. $f(x)=(1+x)^{\frac{1}{x}}, x\neq 0$. Find $f(1+\frac{a}{y})^{by}$

25. The probability of A hitting a target is $\frac{4}{5}$; the probability of B hitting the target is $\frac{3}{4}$ and the probability of C missing the target is $\frac{1}{3}$.What is the probability of the target being hit at least twice.

26. Find the term independent of x in the expansion $\left(ax^2-\frac{b}{x}\right)^9$