PRACTICE PAPER
Mathematics (044)
Class XI

[Time Allowed: 3 Hrs] **[Maximum Marks: 100]**

SEC-A [1×4=4 Marks]

1. Write down the negation of the statement "every square is a rhombus".

2. Find the general solution of $\sin x = -\frac{\sqrt{3}}{2}$.

3. Write the first 2terms of the sequence . whose nth term is $a_n = \frac{n}{n+1}$.

4. Find the equation of line passing through the points $(-1,1)$ and $(2,-4)$.

OR

Find the slope of line $3x-4y=1$

SEC-B [2×8=16 Marks]

5. If $A=\{x : x \text{ is a natural number } <10\}$

$B=\{x : x \text{ is an even natural number } <12\}$ .Find $(A-B)\cap(B-A)$

6. Find the domain and range of the real function $f(x)=\sqrt{9-x^2}$

7. Solve $x^2+\frac{x}{\sqrt{2}}=-1$. **OR**

Find the argument of $\frac{1}{1-i}$.

8. If the coefficient of $(r-5)th$ and $(2r-1)th$ terms in the expansion of $(1+x)^{34}$ are equal. Find r.

9. Write the contra positive and converse of "if rain will come than I will not play football."

10. If ${}^{18}C_r = {}^{18}C_{r+2}$ find r_{C_5}.

OR

In how many ways can a team of 3 boys and 3 girls be selected from 5 boys and 4 girls?

11. Find the centre and radius of the circle $x^2+y^2-2x+6y-1=0$.

12. A bag contains 5 green and 7 red balls. Two balls are drawn. What is the probability that are different colour .

OR

A book contains 100 pages. A page is chosen at random . What is the probability that the sum of the digit on the page is equal to 10.

SEC-C [4×11=44 Marks]

13. Let $A=\{1,2,3,4,5,6\}$. Define a relation R from A to A by $R=\{(x,y) : y=x+1, x,y\in A\}$. Write down its domain, co domain and range.

OR

Let $A=\{1,2,3,4,5,6\}$. Let R be the relation on A defined by

$R=\{(a,b):a,b\in A, b \text{ is actual devisible by a}\}$.

i) Write R in roster form
ii) Find the domain of R
iii) Find the range of R

14. Find the general solution of $\cos 3x+\cos x-\cos 2x=0$.

15. Let $f(x)=x^2$ and $g(x)=2x+1$ be two real function find $(f+g)(x)\,(f-g)(x)$, $fg(x)$, $\frac{f}{g}(x)$

16. If $(x+iy)^3=\mu+i\theta$ than show that $\frac{\mu}{x}+\frac{\theta}{y}=4(x^2-y^2)$.

17. Find the number of arrangement of the word INDEPENDENCE. In how many of these arrangements i. all the vowels always occur together.
ii. Vowels never occur together.

OR

The letters of the word 'RANDOM' are written in all possible orders and these words are written out as in a dictionary. Find the rank of the word 'RANDOM'.

18. Find the co-ordinate of the point which is three fifth of the way from (3,-4,5) and (2,-1,4).

19. Find the equation if circle passing through the points $(4,1)$ and $(6,5)$ and whose centre is on the line $4x+y=16$.

20. Using binomial theorem, prove that 6^n-5n-1 is always divisible by 25.

OR

Find n, if the ration of the fifth term from the beginning to the fifth term form the end in the $\left(2^{\frac{1}{4}}+\frac{1}{3^{\frac{1}{4}}}\right)^n$ is $\sqrt{6}:1$.

21. Evaluate $\lim_{x\to 0} f(x)$, when $f(x)=\begin{cases}\frac{|x|}{x} & x\neq 0\\ 0 & x=0\end{cases}$.

22. A five digit number is formed at random by using the digits 1,2,3,4,5,6 and 7. Find the probability that the number formed has non of its digit repeated.

23. Find the derivative of the function $f(x)=\frac{1}{x}$ from first Principles.

SEC-D [6× 6=36 Marks]

24. In a survecy of 60 people, it was found that 25 people like to drink tea, 26 like to drink coffee, 26 like to drink milk, a like both Tea and milk, 11 like both Tea and coffee, 8 like both coffee and milk, 3 like all three drinks. Find

a) The number of people who like at least one of the drinks.
b) The number of people likes exactly one drink.

25. Using PMI, prove that $4^n+15n-1$ is divisible by 9, for all $n\in N$.

OR

Using PMI prove that $1.3+3.5+5.7+.....+(2n-1)(2n+1)$

$$= \frac{n(4n^2+6n-1)}{3}$$

26. If $\tan x = \frac{3}{4}$ x lies in IIIrd quadrant, find the value of $\sin\frac{x}{2}, \cos\frac{x}{2}$ and $\frac{x}{2}$.

27. Solve the equation graphically $x+2y \le 10, x+y \ge 1, x-y \le 0,\ x \ge 0, y \ge 0$.

OR

How many liters of water will have to be added to 1125 liters of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

28. Find the mean, variance and standard deviation for the following frequency distributions.

Classes	0-30	30-60	60-90	90-120	120-150	150-180	180-210
Frequency	2	3	5	10	3	5	2

29. If $\frac{a^n+b^n}{a^{n-1}+b^{n-1}}$ is the A.M. between a and b, than find the value of n; if $a \ne b$.

OR

The sum of two numbers is 6 times their geometric means, show that the numbers are in the ratio $(3+2\sqrt{2}):(3-2\sqrt{2})$.

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