

CLASS XI SAMPLE PAPER MATHEMATICS

Time:3 Hours

Maximum Marks-100

General instructions:

- (i) All the questions are compulsory.
- (ii) Question Nos. 1 to 10 contain 1 mark each, Question Nos. 11 to 22 contain 4 marks each and Question Nos. 23 to 29 contain 7 marks each.

SECTION-A (1 X 10 =10)

1. If $A = \{\phi\}$ find $n(P(A))$
2. Find the value of $\tan\left(\frac{19\pi}{3}\right)$
3. If $n(A) = 3$ $n(B) = 3$, find the total number of possible relations.
- 4 Express $(5-i) + (4i-1)$ in the form of $a + ib$.
- 5 Find the 10th term of 2,8,16,.....
- 6 Find the equation of straight line passing through (1,5) and having slope 3.
- 7 Solve : $4x + 2 \geq 14$
- 8 Find the length of latus rectum of $\frac{x^2}{16} - \frac{y^2}{9} = 1$
- 9 If ${}^n C_8 = {}^n C_9$, find the value of n .
- 10 Find the probability of getting at least one tail on tossing two coins.

SECTION-B (4 X12 =48)

- 11 If $X = \{1,2,3,4, \dots, 15\}$ and $A = \{2,4\}$, $B = \{3,4,6,10,12,15\}$. Verify that
 - (i) $(A \cup B)' = A' \cap B'$
 - (ii) $A' \cup B' = (A \cap B)'$
- 12 Prove the following by using the principle of mathematical induction:

$$\frac{1}{1 \times 3} + \frac{1}{3 \times 5} + \frac{1}{5 \times 7} + \dots + \frac{1}{(2n-1)(2n+1)} = \frac{n}{2n+1}, \forall n \in N$$
- 13 Prove that $\frac{1 - \sin \theta - \cos \theta}{1 + \sin \theta + \cos \theta} = \tan \frac{\theta}{2}$

14 Convert the complex number $z = \frac{i-1}{\cos(\frac{\pi}{3}) + i \sin(\frac{\pi}{3})}$ in polar form

Hence find the general argument of z.

15 Find the ratio in which the line segment joining the points (4,8, 10), (10, 6, -8) is divided by YZ plane.

16 A committee of 8 has to be formed from 10 boys and 5 girls. In how many ways this can be done when the committee consists of

- (a) exactly 4 girls
- (b) at least 4 girls

17 The coefficient of 5th, 6th, 7th terms in the expansion of (1+x)ⁿ are in A.P find n.

18 Find the equation of a line passing through the point (-2,3) and parallel to the 4x-3y + 7 = 0.

19 Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos x}{2x^2}$

OR

Find the derivative of cos x by first principle

20 (a) Change the following statement into contra positive and converse

“If it is hot outside then you feel thirsty.

(b) State whether the “OR” used in the following statement is “exclusive “ or “inclusive”. Give reasons for your answer

- (i) You will get a Pepsi or a CocoCola in Rs10
- (ii) To apply for a driving license you should have a ration card or a passport .

21 Solve $\sin 2x - \sin 4x + \sin 6x = 0$

22 If a,b,c are in A.P ; b,c,d are in G.P and 1/c, 1/d, 1/e are in A.P ,prove that a,c,e are in G.P.

SECTION-C (6 X 7= 42)

23 Calculate Mean, Variance and Standard Deviation for the following distribution

| | | | | | | | | |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|
| classes | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
| frequenc | 3 | 7 | 12 | 15 | 8 | 3 | 4 | 10 |

24 Graphically solve the following system of linear inequations

$$3x + y \leq 66000$$

$$x + y \leq 45000$$

$$x \leq 20000$$

$$y \leq 40000$$

$$\text{and } x \geq 0 \quad y \geq 0$$

25 Find the image of the point (3,8) with respect to the line $x + 3y = 7$ assuming the line to be a plane mirror.

26 Prove the following by using Principle of Mathematical Induction

$$3^{2n+2} - 8n - 9 \text{ is divisible by } 64 \text{ for every natural number } n.$$

27 If $\sin x = 1/4$, x in 2nd quadrant, find the value of $\sin(x/2)$ $\cos(x/2)$ $\tan(x/2)$.

28 In a class of 60 students, 30 opted for NCC and 24 opted for both NCC and NSS. If one of these students is selected at random find the probability that

(i) the student opted for NSS or NCC

(ii) the student has opted neither NCC or NSS

(iii) the student has opted NSS but not NCC.

29 Find the term independent of x and middle term in the expansion of $(9x - \frac{1}{3\sqrt{x}})^{18}$
