

KVIT campus, Chennai

XI Mathematics

Sample paper

HOLIDAY HOMEWORK

mem marks: 100

Time: 3 hrs

Section A

1x6=6

- 1) write in roster form:-
{ $x: x \in \mathbb{N}$; The roots to the eqn. $x^2 - 7x + 10 = 0$ }
- 2) what is the least positive integer n such that
 $\left(\frac{2i}{1+i}\right)^n$ is a positive integer. (Ans: 8)
- 3) what is the value of y so that the line through $(3, y)$
and $(2, 7)$ is parallel to the line through $(-1, 4)$ and $(0, 6)$?
(Ans: $y=9$)
- 4) Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x}$ (Ans: 0)
- 5) Differentiate: $(a x^2 + \sin x)(p + q \cos x)$
- 6) If A and B are two events associated with a random
experiment such that $P(A \cup B) = 0.8$, $P(A \cap B) = 0.3$
and $P(\bar{A}) = 0.5$ find $P(B)$ (Ans: 0.6)

Section B

4x13=52

- 7) If $A = \{1, 3, 5\}$ $B = \{2, 4\}$ list the elements of R ,
if $R = \{(x, y) : x, y \in A \times B \text{ and } x > y\}$
- 8) If A, B and C are any three sets, then prove that
 $A - (B \cap C) = (A - B) \cup (A - C)$
- 9) P.T. $(\cos \alpha + \cos \beta)^2 + (\sin \alpha + \sin \beta)^2 = 4 \cos^2 \left(\frac{\alpha + \beta}{2} \right)$
or
P.T. $\cos \left(\frac{3\pi}{4} + \pi \right) - \cos \left(\frac{3\pi}{4} - \pi \right) = -\sqrt{2} \sin \pi$
- 10) In any ΔABC , P.T. $a \sin(B-C) + b \sin(C-A) + c \sin(A-B) = 0$

11) Using the principle of mathematical induction p.T.

$$1 + \frac{1}{1+2} + \frac{1}{1+2+3} + \dots + \frac{1}{1+2+3+\dots+n} = \frac{2n}{n+1} \text{ for all } n \in \mathbb{N}$$

12) Find the square root of $5+12i$
or

write $-1+i\sqrt{3}$ in polar form

13) Find the sum to infinity $\therefore \frac{1}{2} + \frac{1}{3^2} + \frac{1}{2^3} + \frac{1}{3^4} + \frac{1}{2^5} + \frac{1}{3^6} + \dots$
(Ans: $\frac{19}{24}$)

14) Find the equation of the line parallel to Y axis and drawn through the point of intersection of the lines $x-7y+5=0$ and $3x+y=0$
(Ans: $22x+5=0$)

15) Find the equation of the circle whose centre is $(4,2)$ and which passes through the point $(4,6)$
($x^2+y^2-2x-4y-20=0$)

16) Using section formula, p.T the three pts $A(-2,3,5)$, $B(1,2,3)$ and $C(7,0,-1)$ are collinear

17) Find the derivative of $f(x) = \frac{1}{x^2}$ from the first principle.

18) Find the component statement of the following and check whether they are true or not:

(a) $\sqrt{2}$ is a rational number or an irrational number.

(b) All primes are either even or odd.

19) An urn contains 9 red, 7 white and 4 black balls. If two balls are drawn at random find the probability

(a) both the balls are red, (b) one ball is white

(c) the balls are of the same colour $(\frac{18}{95}, \frac{9}{190}, \frac{63}{190})$

20)

20) In a survey it was found that 21 persons liked product P_1 , 26 liked product P_2 and 29 liked product P_3 . If 14 persons liked products P_1 and P_2 , 12 persons liked product P_3 and P_1 ; 14 persons liked products P_2 & P_3 and 8 liked all the three products. Find how many liked product P_3 only. [Ans: 11]

21) a) P.T $\sin 2x + 2\sin 4x + \sin 6x = 4\cos^2 x \sin 4x$

b) Write the value of $\frac{\sin A + \sin 3A}{\cos A + \cos 3A}$

22) Solve graphically

$$x + y \leq 5, \quad 4x + y \geq 4, \quad x + 5y \geq 5, \quad x \leq 4, \quad y \leq 3$$

23) a) How many four digit numbers are there with distinct digits? [4536]

b) How many numbers lying between 100 and 1000 can be formed with the digits 1, 2, 3, 4, 5 if the repetition of digits is not allowed? [60]

or

a) In how many ways can 5 girls and 3 boys be seated in a row so that no two boys are together? (14400)

b) How many words with or without meaning, each 2 of vowels and 3 consonants can be formed from the letters of the word DAUGHTER? (3600)

24) The coefficients of three consecutive terms in the expansion of $(1+x)^n$ are in the ratio 1:7:42 find n
 or (21=55)

The 3rd, 4th and 5th terms in the expansion of $(1+ax)^n$ are respectively 84, 280 and 560, find the values of x , a and n .

25) If the sum of first m terms of an A.P is the same as the sum of its first n terms, show that the sum of its $(m+n)$ terms is zero.

26) The mean and variance of 7 observations are 8 and 16 resp. If 5 of the observations are 2, 4, 10, 12, 14, find the remaining two observations. (6, 8)

or

The following table gives the distribution of income of 100 families in a village. Calculate the Standard deviation.

Income	0-1000	1000-2000	2000-3000	3000-4000
No. of families	18	26	30	12
	4000-5000	5000-6000		
	10	4		

(Ans: 135, 88)