

**Regd.
No.**

6. If ${}^nC_5 = {}^nC_6$, then find ${}^{13}C_n$.

7. Find the number of ways of arranging the letters of the word MATHEMATICS.
8. Find the coefficient of x^{11} in $\left(2x^2 + \frac{3}{x^3}\right)^{13}$.
9. Find the mean deviation about the median for the data :
4, 6, 9, 3, 10, 13, 2.
10. For a binomial distribution with mean 6 and variance 2, find the first two terms of the distribution.

SECTION B

5

II. Short Answer Type Questions.

- i) Attempt **any five** questions.
- ii) Each question carries **four** marks.
11. If $Z = 2 - i\sqrt{7}$ then, show that $3Z^3 - 4Z^2 + Z + 88 = 0$.
12. If $x \in R$ then determine the range of the expression $\frac{x^2 + x + 1}{x^2 - x + 1}$.
13. A round table conference is attended by 3 Indians, 3 Chinese, 3 Canadians and 2 Americans. Find the number of ways of arranging them at the round table so that the delegates belonging to same country sit together.
14. Find the number of ways of selecting a cricket team of 11 players from 7 batsmen and 6 bowlers. Such that there will be atleast 5 bowlers in the team.

15. Resolve $\frac{3x-1}{(1-x+x^2)(x+2)}$ into partial fraction.
16. A problem in calculus is given to two students A and B , whose chances of solving it are $\frac{1}{3}$ and $\frac{1}{4}$ respectively. Find the probability of the problem being solved if both of them try independently.
17. A bag contains 12 two rupee coins, 7 one rupee coins and 4 half a rupee coins. If three coins are selected at random, then find the probability that :
- The sum of three coins is maximum
 - The sum of three coins is minimum
 - Each coin is of different value

SECTION C

5 × 7

Long Answer Type Questions.

- Attempt **any five** questions.
- Each question carries **seven** marks.

18. Show that one value of $\left[\frac{1 + \sin \frac{\pi}{8} + i \cos \frac{\pi}{8}}{1 + \sin \frac{\pi}{8} - i \cos \frac{\pi}{8}} \right]^{\frac{8}{3}}$ is -1 .

19. Solve $18x^3 + 81x^2 + 121x + 60 = 0$ given that one root is equal to half the sum of the remaining roots.

20. If n is a positive integer and x is any non-zero real number, then

prove that $c_0 + c_1 \frac{x}{2} + c_2 \cdot \frac{x^2}{3} + c_3 \cdot \frac{x^3}{4} + \dots + c_n \cdot \frac{x^n}{n+1} = \frac{(1+x)^{n+1} - 1}{(n+1)x}$

21. If $t = \frac{4}{5} + \frac{4.6}{5.10} + \frac{4.6.8}{5.10.15} + \dots \infty$, then prove that $9t = 16$.

22. Find the mean deviation about the mean for the following data :

x_i	2	5	7	8	10	35
f_i	6	8	10	6	8	2

23. A, B, C are 3 newspapers from a city 20% of the population read A , 16% read B , 14% read C , 8% both A and B , 5% both A and C , 4% both B and C and 2% all the three. Find the percentage of the population who read atleast one newspaper.

24. A random variable X has the following probability distribution :

$X = x$	0	1	2	3	4	5	6	7
$P(X = x)$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

Find (i) k (ii) the mean and (iii) $P(0 < X < 5)$.
