0266

B

Total No. of Questions - 24
Total No. of Printed Pages - 4

Regd. No.

Part - III

MATHEMATICS, Paper - II (A)

(Algebra and Probability)

(English Version)

Time : 3 Hours ***Max. Marks : 75***

Note : This question paper consists of **three** Sections *A, B* and *C*.

SECTION A

$10 \times 2 = 20$

I. Very Short Answer Type Questions.

i) Answer **all** questions.

ii) Each question carries **two** marks.

1. Write the complex number $(2-3i)(3+4i)$ in the form $A+iB$.

2. Express the complex number $-1-i\sqrt{3}$ in modulus amplitude form.

3. Find the value of $(1-i)^8$.

4. Find the maximum of the expression $2x+5-3x^2$ as x varies over R.

5. If $1, 1, \alpha$ are the roots of $x^3-6x^2+9x-4=0$, then find α.

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 : https://www.telanganaboard.com

i) The sum of three coins is maximum

ii) The sum of three coins is minimum

iii) Each coin is of different value

SECTION C

5 × 7

Long Answer Type Questions.

i) Attempt **any five** questions.

ii) Each question carries **seven** marks.

18. Show that one value of $\left[\frac{1+Sin\frac{\pi}{8}+iCos\frac{\pi}{8}}{1+Sin\frac{\pi}{8}-iCos\frac{\pi}{8}}\right]^{\frac{8}{3}}$ 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 $c_0+c_1\frac{x}{2}+c_2\cdot\frac{x^2}{3}+c_3\cdot\frac{x^3}{4}+\ldots\ldots+c_n\cdot\frac{x^n}{n+1}=\frac{(1+x)^{n+1}-1}{(n+1)x}$

21. If $t = \frac{4}{5} + \frac{4.6}{5.10} + \frac{4.6.8}{5.10.15} + \ldots\ldots\ldots \infty$, 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) $P(0 < X < 5)$.