266

Total No. of Questions: 24

Total No. of Printed Pages: 3

Regd. No.



Part - III

MATHEMATICS - PAPER - II(A)

(English Version)

Time: 3 Hours

Max. Marks: 75

This question paper consists of Three Sections - A, B and C. Note:



SECTION - A

Very Short Answer Type Questions. I.

10x2=20

- Answer all the questions.
- Each question carries two marks. (ii)
- Write the complex number $\frac{4+3i}{(2+3i)(4-3i)}$ in the form a+ib. 1.
- Write $z = -\sqrt{7} + i\sqrt{21}$ in the polar form. 2.
- If 1, ω , ω^2 are the cube roots of unity, then find the value of З. $(1-\omega+\omega^2)^5+(1+\omega-\omega^2)^5$.



- Form quadratic equation whose roots are $\frac{p-q}{p+q}$, $-\frac{(p+q)}{p-q}$ $(p \neq \pm q)$. 4.
- 5. Find the algebraic equation whose roots are 2 times the roots of $x^5 - 2x^4 + 3x^3 - 2x^2 + 4x + 3 = 0$.
- Find the number of (i) 6 (ii) 7 letter palindromes that can be formed using 6. the letters of the word EQUATION.
- (7) If ${}^{n}P_{r} = 5040$ and ${}^{n}C_{r} = 210$, find n and r.
 - Find the number of terms with non-zero coefficients in $(4x-7y)^{49}+(4x+7y)^{49}$ 8.
 - Find the mean deviation about the median for the following data 9. 4, 6, 9, 3, 10, 13, 2.
 - 10. A poisson variable satisfies P(X=1) = P(X=2). Find P(X=5).





SECTION - B

Η. Short Answer Type Questions.

5x4=20

- Answer any five questions.
- (ii) Each question carries four marks.
- 11. If $x + iy = \frac{1}{1 + \cos\theta + i\sin\theta}$ then, show that $4x^2 1 = 0$.



- 12. Determine the range of the expression $\frac{x+2}{2x^2+3x+6}$.
- 13. If the letter of the word PRISON are permuted in all possible ways and the words thus formed are arranged in dictionary order, find the rank of the word PRISON
- **14.** Prove that $\frac{^{4n}C_{2n}}{^{2n}C_n} = \frac{1.3.5...(4n-1)}{\{1.3.5...(2n-1)\}^2}$



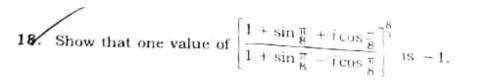
- **15.** Resolve $\frac{x^2}{(x-1)(x-2)}$ into partial fractions.
- 16. If two numbers are selected randomly from 20 consecutive natural numbers, find the probability that the sum of the two numbers is (i) an even number (ii) an odd number.
- 17. Let A and B be independent events with P(A) = 0.2, P(B) = 0.5. Find: (i) P(A | B) P(B|A)(ii) (iii) $P(A \cap B)$ and (iv) $P(A \cup B)$

SECTION - C

III. Long Answer Type Questions.

5x7=35

- Answer any five questions
- (ii) Each question carries seven marks.





19. Solve the equation $x^4 + 2x^3 - 5x^2 + 6x + 2 = 0$ given that 1 + i is one of its roots.



26. If the 2nd, 3rd, 4th terms in the expansion of $(a+x)^n$ are respective 240, 720, 1080, find a, x, n.



21. If
$$x = \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + \frac{1.3.5.7}{3.6.9.12} + \dots$$
, then prove that $9x^2 + 24x = 11$.

22. Find the mean deviation about mean for the following continuous distribution

	5.4	(a)
3	rine.	믉
-	24.5	
1.5	W.	1
	1	~~

Height (in cms)	95 - 105	105 - 115	115 - 125	125 - 135	135 - 145	145 - 155
No. of Boys	9	13	26	30	12	10

23. Three boxes numbered, I, II, III contain the balls as follow:

	White	Black	Red
I	1	2	3
II	2	1	1
III	4	5	3



One box is randomly selected and a ball is drawn from it. If the ball is red, then find the probability that it is from box II.

24. The range of a random variable X is $\{0, 1, 2\}$. Given that $P(X=0) = 3c^3$, $P(X=1) = 4c - 10c^2$, P(X=2) = 5c - 1 (i) Find the value of c (ii) P(X < 1), $P(1 < X \le 2)$ and $P(0 < X \le 3)$.