Senior Inter Mathematics Model Paper- (IIA)

MATHEMATICS
Paper - II (A)

(English Version)

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

Section - A

I. Very Short Answer Type Questions. Answer all questions.

10×2=20M

1. $\text{Arg}(\bar{z}_1), \text{Arg}(z_2)$ are $\frac{\pi}{5}, \frac{\pi}{3}$ then value of $\text{Arg}(z_1)+\text{Arg}(z_2)$

2. If x = cis θ then find the value of $x^6+\frac{1}{x^6}$

3. Find the value of $\left(1+\sqrt{3}\right)^{\frac{1}{3}}$

4. If $x^2-6x+5=0$ and $x^2-12x+p=0$ have a common root, then find p.

5. Form an equation whose roots are $1+\sqrt{3}, 1-\sqrt{3}$, 2 and 5

6. Find the number of 6 letter Palindromes possible by using letters of 'EQUATION'

7. If ${}^9C_3+{}^9C_5={}^{10}C_r$ then find r.

8. Find the number of terms in the expansion of $(2x+3y+z)^7$

9. Find the mean deviation about the mean for the following data 3, 6, 10, 4, 9, 10

10. A Poisson variable satisfies
P(X= 1) = P (X = 2), find P(X=5)

Section-B

II. Short Answer Type Questions. Answer any 'FIVE' Questions.

5×4=20M

11. The quadratic equation $ax^2 + bx + c = 0$ and a will have same sign if roots are complex and imaginary. (For all $x \in R$)

12. The points P, Q denote the complex numbers z_1, z_2 in the Argand diagram. O is the origin prove that ∠POQ=90° if $z_1\bar{z}_2+\bar{z}_1z_2=0$

13. Find the sum of four digit numbers formed by digits 1, 3, 5, 7, 9

14. Simplify ${}^{34}C_5+\sum_{r=0}^{4}{}^{(38-r)}C_4$

15. Resolve into partial fractions of $\frac{x^2-3}{(x+2)(x^2+1)}$

16. A, B, C are three horses in a race. The probability of A to win the race is twice that of B, and probability of B is twice that of C. What are the probabilities of A, B and C to win the race?

17. A Bag contains 12two rupee coins, 7one rupee coins, 4half rupee coins, if three coins are selected at random the find probability that
i) The sum of three coins is maximum
ii) Each coin is of different value.

Section-C

III. Long Answer Type Questions. Answer any 'FIVE' Question.

5×7=35M

18. If $\cos\alpha + \cos\beta + \cos\gamma = 0$
$= \sin\alpha + \sin\beta + \sin\gamma$ then S.T
i) $\cos3\alpha + \cos3\beta + \cos3\gamma$
$= 3\cos(\alpha+\beta+\gamma)$
ii) $\sin3\alpha + \sin3\beta + \cos3\gamma$
$= 3\sin(\alpha+\beta+\gamma)$

19. Solve the equation
$x^5-5x^4+9x^3-9x^2+5x-1=0$

20. If $n \in N$, and 'x' is any non zero real number then prove that

$$C_0+C_1\frac{x}{2}+C_2\frac{x^2}{3}+C_3\frac{x^3}{4}+\ldots\ldots+C_n\frac{x^n}{n+1}=\frac{(1+x)^{n+1}-1}{(n+1)x}$$

21. If I and n are positive integers,
0<f<1 and $(7+4\sqrt{3})^n = I + f$
and then show that

i) I is odd integer

ii) (I + f) (1 – f) = 1

22. Calculate the variance and standard deviation of the following continuous frequency distribution.

Class interval	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

23. In a shooting test the probability of A, B, C hitting the targets are $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}$ respectively. If all of them fire at the same target, Find the probability that (i) only one of them hits the target, (ii) at least one of them hits the target.

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

Find (i) k

(ii) mean and

(iii) P (0 < X < 5).

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