SR. INTER MATHEMATICS-IIA

SECTION - I

I) **Answer the following questions:-** 10 x 2 = 20M

1) Find the square root of -8-6i

2) If $|z+ai|=|z-ai|$, find the locus of z

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

4) If the equation $x^2 - (15-m)2x - 8 = 0$ has equal roots find the value of m

5) If -1,2 and α are the roots of $2x^3 + x^2 - 7x - 6 = 0$, then find α

6) Find the number of ways of selecting 3 vowels and 2 consonants from the letter of the word EQUATION.

7) If $^n p_r = 5040$; $^n c_r = 210$ then find 'n' and 'r'

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

9) Find the variance for the discrete data 6, 7, 10, 12, 13, 4, 8, 12

10) In a binomial distribution random variable x has mean $\frac{15}{2}$ and variable $\frac{15}{4}$ find the distribution and parameters

SECTION - II

II) **Answer any five of the following questions:-** 5 x 4 = 20M

11) If $x+iy = \dfrac{1}{1+\cos\theta + i\sin\theta}$ then show that $4x^2 - 1 = 0$

12) If 'x' is real, prove that $\dfrac{x}{x^2-5x+9}$ lies between $\dfrac{-1}{11}$ and 1

13) Prove that $\dfrac{4n_{c_{2n}}}{2n_{c_n}} = \dfrac{1.3.5......(4n-1)}{\left[1.3.5.....(2n-1)\right]^2}$

14) The letters of the word EAMCET are arranged in all possible ways and if the words thus obtained are arranged as in dictionary. Find the rank of the word EAMCET.

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

16) 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
    (i) The sum of three coins is maximum.
    (ii) The sum of three coins is minimum.

17) If one ticket is randomly selected from tickets numbered 1 to 30, then find probability that the number on the ticket is a multiple of 5 or 7.

SECTION – III

III) Answer any five of the following questions: **5 x 7 = 35 M**

18) If $n \in N$, then show that $\left(1+i\right)^{2n} + \left(1-i\right)^{2n} = 2^{n+1}\cos\dfrac{n\pi}{2}$.

19) Solve the equation $2x^5 + x^4 - 12x^3 - 12x^2 + x + 2 = 0$

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

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

21) If $x = \dfrac{1}{5} + \dfrac{1.3}{5.10} + \dfrac{1.3.5}{5.10.15} + \dots + \infty$ then find $3x^2 + 6x$ value

22) Find the mean and variance using step deviation method of the following data.

Age in years x_i	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
No. of members f_i	3	61	132	153	140	51	2

23) State Baye's theorem on probability?

Three urns have the following composition of balls

Urn I: 1 white, 2 black

Urn II: 2 white, 1 black

Urn III: 2 white, 2 black

One of the urns is selected at random and a ball is drawn, It turns out to be white. Find the probability that it Came from Urn III

24) In the experiment of tossing a coin 'n' times, if the variable 'X' denotes the number of heads and P(X = 4), P(X = 5), P(X = 6) are in arithmetic progression then find n.