MS JUNIOR COLLEGE
Hyderabad

GUESS PAPER - 1
INTERMEDIATE 2nd YEAR

Time: 3hours MATHEMATICS- IIA **Max.Marks:75**

I. i) Very Short Answer Type Questions. **(10 x 2 = 20)**
ii) Answer **ALL** questions.
iii) Each question carriers **TWO** marks.

1. Find the real of θ in order that $\frac{3+2i\sin\theta}{1-2i\sin\theta}$ is purily imaginary.

2. If $\left(\sqrt{3}+i\right)^{100} = 2^{99}(a+ib)$, then show that $a^2+b^2=4$.

3. If α, β are the roots of the equation $x^2 + x + 1 = 0$, then prove that $\alpha^4 + \beta^4 + \alpha^{-1}\beta^{-1} = 0$.

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

5. If α, β, γ are the roots of the equation $x^3 + 2x^2 - 4x - 3 = 0$, find the equation whose roots are $\frac{\alpha}{3}, \frac{\beta}{3}, \frac{\gamma}{3}$.

6. If ${}^{n+1}P_5 : {}^nP_5 = 3 : 2$, find n.

7. Find the number of diagonals of a polygon with 12 sides.

8. If C_r denote ${}^nC_r$, then prove that $a\,C_0 + (a+d)\,C_1 + (a+2d)\,C_2 + \ldots\ldots + (a+nd)\,C_n = (2a + nd)\,2^{n-1}$.

9. The coefficient of variation of two distributions are 60 and 70 and their standard deviations are 21 and 16 respectively. Find their arithmetic means.

10. If the mean and variance of a binomial variable X are 2.4 and 1.44 respectively, find n.

II. i) Short Answer Type Questions. **(5 x 4 = 20)**
ii) Answer any **FIVE** questions.
iii) Each question carriers **FOUR** marks.

11. If $z = 3 - 5i$, then show that $z^3 - 10z^2 + 58z - 136 = 0$.

12. If x is real, find the maximum value of the expression $\frac{x^2+14x+9}{x^2+2x+3}$.

13. Find the rank of the word "P R I S O N".

14. Prove that for $3 \le r \le n$, ${}^{n-3}C_r + 3\,{}^{n-3}C_{r-1} + 3\,{}^{n-3}C_{r-2} + {}^{n-3}C_{r-3} = {}^nC_r$.

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

16. Two persons A and B are rolling a die on the condition that the person who gets 3 will win the game. If A starts the game, then find the probabilities of A and B respectively to win the game.

17. A bag B_1 contains 4 white and 2 black balls. Bag B_2 contains 3 white and 4 black balls. A bag is drawn at random and a ball is chosen at random from it. Then what is the probability that the ball is white?

III. i) Long Answer Type Questions. **(5 x 7 = 35)**

ii) Answer any **FIVE** questions.

iii) Each question carriers **SEVEN** marks.

18. If α, β are the roots of the equation $x^2 - 2x + 4 = 0$ then for any $n \in N$ show that $\alpha^n + \beta^n = 2^{n+1} \cos\left(\frac{n\pi}{3}\right)$

19. Solve the equation $x^4 + 4x^3 - 2x^2 - 12x + 9 = 0$, if it has a pair of equal roots.

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

21. If $x = \frac{1}{5} + \frac{1.3}{5.10} + \frac{1.3.5}{5.10.15} + \ldots\ldots\ldots\ldots\infty$, then find the value of $3x^2 + 6x$.

22. The scores of two cricketers A and B in 10 innings are given below. Find who is a better run getter and who is a more consistent player

Scores of A :	x_i	40	25	19	80	38	8	67	121	66	76
Scores of B :	y_i	28	70	31	0	14	111	66	31	25	4

23. If E_1, E_2, E_3 are three independent events such that $P(E_1 \cap \overline{E_2} \cap \overline{E_3}) = \frac{1}{4}$, $P(\overline{E_1} \cap E_2 \cap \overline{E_3}) = \frac{1}{8}$, $P(\overline{E_1} \cap \overline{E_2} \cap \overline{E_3}) = \frac{1}{4}$, then find $P(E_1)$, $P(E_2)$, $P(E_3)$.

24.

X = x	-2	-1	0	1	2	3
P(X = x)	0.1	k	0.2	2k	0.3	k

is the probability of a random variable of X. Find the value of k and the variance of X.

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