Model guess paper -1 - March - 2019
INTERMEDIATE II -YEAR **Telengana**
MATHEMATICS - IIA

Time: 3hours   Max.Marks:75

INSTRUCTIONS:
1.   Q.Nos: 1 - 10 are Very Short Answer Type. Each question carries 2 marks.
2.   Q. Nos: 11 - 17 are Short Answer Type. Each question carries 4 marks.
3.   Q.Nos: 18 - 24 are Long Answer Type. Each question carries 7 marks

I.   Very Short Type Questions: Answer ALL.   **[10 x 2 = 20]**

1.   If $z_1 = (6,3)$, $z_2 = (2, -1)$ find $\dfrac{z_1}{z_2}$.

2.   Express $(1 - i)^3 (1 + i)$ in the form of $a + ib$.

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

4.   Solve $15x^2 + 4x - 4 \le 0$.

5.   Form the polynomial equation with rational coefficients where one of the roots is $i-\sqrt{5}$.

6.   Find the number of 5 letter words that can be formed using the letters of the word MIXTURE which begin with an vowel when repetitions are allowed.

7.   If $^nP_r = 5040$ and $^nC_r = 210$, find n and r.

8.   Find the middle term(s) in the expansion of $(3a - 5b)^6$.

9.   The variance of 20 observations is 5. If each observation is multiplied by 2, then find the new variance of the resulting observations.

10.   A poisson variable satisfies $P(X = 1) = P(X = 2)$. Find $P(X = 5)$.

II.   Short Type Questions: Answer any FIVE.   **[5 x 4 = 20]**

11.   If the point P denotes the complex number $z = x + iy$ in the argand plane and if $\dfrac{z-i}{z-1}$ is a purely imaginary number, find the locus of P.

12.   Determine the range of the expression $\dfrac{2x^2 - 6x + 5}{x^2 - 3x + 2}$.

13.   If the letters 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 $\dfrac{^{4n}C_{2n}}{^{2n}C_n} = \dfrac{1.3.5..................(4n-1)}{\{1.3.5........(2n-1)\}^2}$.

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

16.   A speaks truth in 75% of the cases and B in 80% of the cases. What is the probability that their statements about an incident do not match.

17.   If A and B are independent events with $P(A) = 0.6$, $P(B) = 0.7$ then compute

i) $P(A \cap B)$ ii) $P(A \cup B)$ iii) $P\left(\dfrac{B}{A}\right)$ iv) $P\left(\overline{A} \cap \overline{B}\right)$

III. Essay Type Questions. Answer any FIVE: **[7 x 5 = 35]**

18. If n is an integer then show that $(1 + i)^{2n} + (1 - i)^{2n} = 2^{n+1} \cos \dfrac{n\pi}{2}$.

19. Solve the equation $x^3 - 7x^2 + 14x - 8 = 0$, given that the roots are in geometric progression.

20. If the coefficients of rth, $(r + 1)^{th}$, $(r + 2)^{nd}$ terms in the expansion of $(1 + x)^n$ are in A.P, then show that $n^2 - (4r + 1) n + 4r^2 - 2 = 0$.

21. If $x = \dfrac{5}{(2!)3} + \dfrac{5.7}{(3!)3^2} + \dfrac{5.7.9}{(4!)3^3} + \dots\dots\dots\dots \infty$, then find the value of $x^2 + 4x$.

22. Find the mean deviation about the mean for the following data using step deviation method.

Marks	0-10	10-20	20-30	30-40	40-50	50 - 60	60 - 70
No. of students	6	5	8	15	7	6	3

23. Three boxes B_1, B_2, B_3 contain balls with different colours as shown:

	White	Black	Red
B_1	2	1	2
B_2	3	2	4
B_3	4	3	2

A die is thrown. B_1 is chosen if either 1 or 2 turns up. B_2 is chosen if 3 or 4 turns up and B_3 is chosen if 5 or 6 turns up. Having chosen a ball in this way, a ball is chosen at random from the box. If the ball drawn is found to be red, find the probability that it is drawn from box B_2.

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

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

Find (i) k   (ii) The mean   (iii) $P(0 < X < 5)$

All the Best