Binomial Theorem Test Paper

Class XI **Marks: 55**

1. Find the number of terms in the expansion of $(1 + 2x + x^2)^{20}$. [1]

2. Find the coefficient of x^{10} in the binomial expansion of $\left(2x^2 - \frac{3}{x}\right)^{11}$, where $x \neq 0$. [1]

3. Find coefficient of $x^9 y^{-3}$ in the expansion of $\left[\frac{2x^2}{y} + \frac{y}{3x}\right]^{12}$. [1]

4. Prove that there is no term involving x^6 in the expansion of $\left(2x^2 - \frac{3}{x}\right)^{11}$, where $x \neq 0$. [1]

5. Find 11^{th} term from end in expansion of $\left[2x - \frac{1}{x^2}\right]^{25}$. [1]

6. Find the middle terms in the expansion of $\left[3x - \frac{x^3}{6}\right]^7$. [1]

7. Find the middle term in expansion of: i) $\left[\frac{2x^2}{3} - \frac{3}{2x}\right]^{12}$ ii) $\left[2x - \frac{x^2}{4}\right]^9$. [2]

8. Which number is larger: $(1.2)^{4000}$ or 800? [1]

9. Evaluate the following: $\left[2 + \sqrt{3}\right]^7 - \left[2 - \sqrt{3}\right]^7$. [4]

10. Show that $9^{n+1} - 8n - 9$ is divisible by 64, where n is a positive integer. [4]

11. Find the term independent of x in the expansion of $\left[\sqrt[3]{x} + \frac{1}{2 \cdot \sqrt[3]{x}}\right]^{18}$, $x > 0$. [4]

12. Find the coefficient of x^5 in the product $(1 + 2x)^6(1 - x)^7$ using binomial theorem. [4]

13. Find n, if the ratio of the fifth term from the beginning to the fifth term from the end in the expansion of $\left[\sqrt[4]{2} + \frac{1}{\sqrt[4]{3}}\right]^{18}$ is $\sqrt{6} : 1$. [4]

14. If x and y are distinct integers, prove that $x - y$ is a factor of $x^n - y^n$, whenever n is a positive integer. [4]

15. Show that the middle term in the expansion of $(1 + x)^{2n}$ is $\frac{1.3.5.....(2n-1)}{n!} 2^n x^n$. [4]

16. The 3^{rd}, 4^{th} and 5^{th} terms in the expansion of $(x + a)^n$ are respectively 84, 280 and 560. Find the values of x, a and n. [6]

17. If three successive coefficients in the expansion of $(1 + x)^n$ are 220, 495 and 792, find n. [6]

18. If the coefficient of a^{r-1}, a^r and a^{r+1} in the expansion of $(1 + a)^n$ are in arithmetic progression, prove that $n^2 - n(4r + 1) + 4r^2 - 2 = 0$. [6]