

**BAL BHARATI PUBLIC SCHOOL**  
**Ganga Ram Hospital Marg, New Delhi-60**

**CLASS –XI**  
**ASSIGNMENT- 10**

**SUBJECT – MATHEMATICS**  
**TOPIC-BINOMIAL THEOREM**

Q1. Using binomial theorem, write down the expansion of the following:-

(i)  $\left(x + 1 - \frac{1}{x}\right)^3$                       (ii)  $(\sqrt[3]{x} - \sqrt[3]{a})^6$                       (iii)  $(2x + 3y)^4$

Q2. Evaluate the following :-

(i)  $(\sqrt{3} + 1)^5 - (\sqrt{3} - 1)^5$     (ii)  $(3 + \sqrt{2})^4 + (3 - \sqrt{2})^4$                       (iii)  $(.99)^3 + (1.01)^3$

Q3. Using binomial theorem, prove that  $2^{3n} - 7n - 1$  is divisible by 49, where  $n \in \mathbb{N}$ .

Q4. Using binomial theorem determine which number is larger  $(1.2)^{4000}$  or 800?

Q5. Find the coefficient of  $x^{10}$  in the expansion of  $\left(2x - \frac{1}{x^2}\right)^{25}$

Q6. Find the fourth term from the end in the expansion of  $\left(2x - \frac{1}{x^2}\right)^{25}$

Q7. Find the middle term / terms in the expansion of :-

(i)  $\left(2x - \frac{3}{2x}\right)^{20}$                       (ii)  $\left(x^4 - \frac{1}{x^3}\right)^{11}$

Q8. Find the term independent of x in the expansion of :-

(i)  $\left(2x - \frac{1}{x^2}\right)^{10}$                       (ii)  $\left(3x^2 - \frac{1}{2x}\right)^9$

Q9. If the fourth term in the expansion of  $\left(ax + \frac{1}{x}\right)^n$  is  $\frac{5}{2}$ , then find the value of 'a' and 'n'.

Q10. Find the value of a so that the term independent of x in  $\left(\sqrt{x} + \frac{a}{x^2}\right)^{10}$  is 405.

- Q11. In the binomial expansion of  $(1 + x)^n$ , the coefficient of the fifth, sixth and seventh terms are in A.P. Find all values of  $n$  for which this can happen.
- Q12. The 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> terms in the expansion of  $(x + a)^n$  are respectively 84, 280 and 560, find the values of  $x$ ,  $a$  and  $n$ .
- Q13. If the coefficient of  $(2r + 4)^{\text{th}}$  and  $(r - 2)^{\text{th}}$  terms in the expansion of  $(1 + x)^{18}$  are equal, find  $r$ .
- Q14. Find the coefficient of  $a^4$  in the product  $(1 + 2a)^4 (2 - a)^5$  using binomial theorem.
- Q15. The coefficients of three consecutive terms in the expansion of  $(1 + x)^n$  be 76, 95 and 76, find  $n$ .
- Q16. Using binomial theorem, prove that  $3^{2n+2} - 8n - 9$  is divisible by 64, for all natural numbers.