**CLASS –XI** **SUBJECT – MATHEMATICS**
**ASSIGNMENT- 2** **TOPIC-BIONOMIAL THEORUM**

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 € 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 $3^{rd}$, $4^{th}$ 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.

Q13. If the coefficient of $(2r + 4)^{th}$ and $(r – 2)^{th}$ 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.