CLASS XI
MATHS

TOPIC- BINOMIAL THEOREM

Q.1 Prove that there is no term involving x^6 in the expansion of $\left(2x^2-\frac{3}{x}\right)^{11}$.

Q.2 Find the coefficient of x^5 in the expansion of the product $(1+2x)^5(1-x)^7$.

Q3. If the coefficient of '4'th and '13'th terms in the expansion of $[x^2 + (1/x)]^n$ be equal, then find the term which independent of 'x'.

Q.4 Show that the ratio of the coefficient of x^{10} in $(1-x^2)^{10}$ and the term independent of x in $\left(x-\frac{2}{x}\right)^{10}$ is (1:32).

Q.5 Using binomial theorem prove that $(3^{2n+2}-8n+9)$ is divisible by 64,where n is a positive integer.

Q 6. Let 'n' be a positive integer. If the coefficients of second, third and fourth terms in $(1+x)^2$ are in arithmetic progression, then find the value of 'n'.

Q 7. The 3rd, 4th and 5th terms in the expansion of $(x+a)^n$ are respectively '84', '280' and '560', find the value of 'x', 'a' and 'n'.

Q 8. Find the coefficient of x^{50} in $(1+x)^{41}(1-x+x^2)^{40}$.

Q .9 Find The term independent of x in the expansion of:

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

Q 10. Find the coefficient of x^r in the expansion of $[x + (1/x)]^n$, if it occurs.

Q 11. If the coefficients of (2r + 1)th term and (r + 2)th term in the expansion of $(1 + x)^{43}$ are equal, find 'r'.

Q.12 If in the expansion of $(1+x)^m$ $(1-x)^n$, the coefficients of 'x' and 'x^2' are '3' and '-6' res. Find the value of 'm'.

Q.13 If third term in the expansion of $(x + x^{\log x})^5$ is 10,00,000. Find the value of 'x'.

Q.14 Prove that the ration of the coefficient of x^{10} in $(1-x^2)^{10}$ and the term independent of 'x' in $[x - (2/x)]^{10}$ is 1 : 32.

Q.15 Find the coefficient of 'x' in the expansion of $(1-2x^3 + x^5)[1 + (1/x)]^8$

Q.16 Show that the middle – term in the expansion of $(1+x)^{2n}$ is

1. 3. 5 ------- (2n-1) / (n!) . $2^n x^n$, 'n' being a positive integer.

Q.17 If P be the sum of odd terms and Q that of even terms in the expansion of $(x+a)^n$,Prove that

(i) $(P^2 - Q^2) = (x^2 - a^2)^n$;

(ii) $4PQ = \left[(x+a)^{2n} - (x-a)^{2n}\right]$;

(iii) $2(P^2 + Q^2) = \left[(x+a)^{2n} - (x-a)^{2n}\right]$;

Q18.: Show that that the term independent of 'x' in the expansion of

$[x + (1/x)]^{2n}$ is $[1. 3. 5. ---- (2n-1) / (n!)] 2^n$

Q19. The 6^{th} term in the expansion of $[(1/ x^{8/3}) + x^{2 \log_{10} x}]^8$ is 5600. Prove that x =10.

= (4n!) /[(4/3)n-r]! x [(4/3)(2n+r)]!

Q 20.: Prove that the coefficient of the term independent of 'y' in the expansion of

$$[(y + 1)/(y^{2/3} - y^{1/3} + 1) - (y - 1) / (y - y^{1/2})]^{10} \text{ is } 210.$$

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