THINK ACADEMY
MATH CLASSES By O.P. GUPTA

Class XI - Mathematics (041)
Topics - Binomial Theorem

VISHWAS TEST SERIES - 7
(For Academic session 2024-25)

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Max. Marks - 30
Time - 60 Minutes

Followings are of 2 Marks each (Q01-05).

Q01. Using binomial theorem, expand $\left(x-\frac{2}{x}\right)^4$.

Q02. If the coefficients of $(2r+4)^{th}$ and $(r-2)^{th}$ terms in the expansion of $(1+x)^{18}$ are equal then, find the value of r.

Q03. Find ninth term from end in the binomial expansion of $(3x+y)^{17}$.

Q04. What is the sum of all the binomial coefficients in the expansion of $(x+y)^{10}$?

Q05. Write the coefficient of y^{-2} in $(y+m^3y^{-2})^{10}$.

OR

Prove that : $\sum_{r=0}^{n} 8^r\, {}^nC_r = 3^{2n}$. [2×5 = 10

Followings are of 3 Marks each (Q06-07).

Q06. If n is any positive integer, prove that $2^{3n+3}-7n-7$ always leaves remainder 1 when divided by 49.

Q07. Find the coefficient of x^4 in the product $(2-x)^5.(1+2x)^4$.

OR

Find $(x+y)^4-(x-y)^4$. Hence, evaluate $(\sqrt{2}+\sqrt{3})^4-(\sqrt{2}-\sqrt{3})^4$. [3×2 = 6

Following is of 4 Marks (Q08).

Q08. **PASSAGE BASED QUESTION :** For a binomial $(a+b)^n$, the expansion is given by

$$(a+b)^n = {}^nC_0a^n + {}^nC_1a^{n-1}b + {}^nC_2a^{n-2}b^2 + ... + {}^nC_nb^n = \sum_{r=0}^{n} {}^nC_r a^{n-r}b^r;$$

where ${}^nC_r\, a^{n-r}\, b^r$ is the general term i.e., $(r+1)^{th}$ term in the expansion.

Based on the above information, answer the following questions.

(a) Find the binomial coefficient of 16^{th} term in the binomial $(24x+35y)^{63}$.

(b) In the binomial $(a+b)^6$, find the fourth term.

(c) In the binomial expansion of $(a+b)^7$, which term is $35a^4b^3$?

(d) Find the coefficient of x^{40} in the expansion of $(1+2x+x^2)^{27}$. [1×4 = 4

Followings are of 5 Marks each (Q09-10).

Q09. Find n, if the ratio of seventh term from the beginning to the seventh term from the end in the binomial expansion of $\left(\sqrt[3]{2}+\frac{1}{\sqrt[3]{3}}\right)^n$ is 1 : 6.

Q10. If the first three terms in the expansion of $(1+ax)^n$ are 1, 12x, $64x^2$, find n and a.

OR

Suppose the coefficients of a^{r-1}, a^r and a^{r+1} in the binomial expansion of $(1+a)^n$ are in arithmetic progression. Then prove that $n^2 - n(4r+1) + 4r^2 - 2 = 0$. [5×2 =10

With a lot of Blessings!

O.P. GUPTA
Author & Math Mentor
Indira Award Winner

The O.P. Gupta Advanced Math Classes
@ **Think Academy**, Near Dhansa Bus Stand
Metro Station Gate No.3, Najafgarh, Delhi

Telegram / WhatsApp : +919650350480

YouTube.com/@theopgupta

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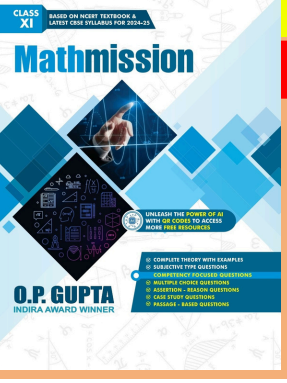

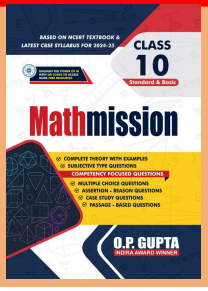

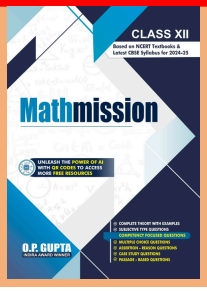

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