Binomial Theorem - Class XI

Past Year JEE Questions

Questions

Quetion: 01

The sum of the series

$2.{}^{20}C_0 + 5.{}^{20}C_1 + 8.{}^{20}C_2 + 11.{}^{20}C_3 + ... + 62.{}^{20}C_{20}$ is equal to :

A. 2^{25}

B. 2^{24}

C. 2^{26}

D. 2^{23}

Solutions

Solution: 01

Explanation

Here general term = $(3r + 2){}^{20}C_r$

$\therefore$ Sum of the series = $\sum_{r=0}^{20} (3r + 2){}^{20}C_r$

$= 3 \sum_{r=0}^{20} r.{}^{20}C_r + 2 \sum_{r=0}^{20} {}^{20}C_r$

$= 3 \times 20 \times 2^{20 - 1} + 2 \times 2^{20}$

$= 60 \times 2^{19} + 2^{21}$

$= 2^{21}$ [15 + 1]

$= 2^{21} \times 16$

$= 2^{25}$