The value of $({}^{21}C_1 - {}^{10}C_1) + ({}^{21}C_2 - {}^{10}C_2) + ({}^{21}C_3 - {}^{10}C_3) + ({}^{21}C_4 - {}^{10}C_4) + \ldots + ({}^{21}C_{10} - {}^{10}C_{10})$ is:

(1) $2^{20} - 2^{10}$

(2) $2^{21} - 2^{11}$

(3) $2^{21} - 2^{10}$

(4) $2^{20} - 2^{9}$

Ans. (1)

Solution.

$${}^{21}C_1 + {}^{21}C_2 + \ldots + {}^{21}C_{10} = 1/2\ \{{}^{21}C_0 + {}^{21}C_1 + \ldots + {}^{21}C_{21}\} - 1$$

$$= 2^{20} - 1$$

$$({}^{10}C_1 + {}^{10}C_2 + \ldots + {}^{10}C_{10}) = 2^{10} - 1$$

$\therefore$ Required sum $= (2^{20} - 1) - (2^{10} - 1)$

$$= 2^{20} - 2^{10}$$