G1 (1 point possible)

Positive integer n is partitioned into several positive integers (1,2,3，...). If repetition is not allowed and does not consider the partition ordering, then the partition number is equaled to which of the followings?

- (•) The solution number for putting n identical balls into n identical boxes (allow empty box) ✗
- ( ) The number of partitions to partition positive integer n into even numbers (2,4,6，...) without consideration of ordering and the repetition is allowed.
- ( ) The number of partitions to partition positive integer n into odd numbers (1,3,5，...) without consideration of ordering and the repetition is allowed. ✓
- ( ) The solution number of putting n identical balls into n distinct boxes (allow empty box)

[EXPLANATION]

Simple way: Pick a smaller n to calculate and compare

Method 2：

p(n) is the coefficient of x^k in g(x):

$$\begin{aligned} g(x) &= (1+x)(1+x^2)(1+x^3)\dots \\ &= \frac{1-x^2}{1-x}\,\frac{1-x^4}{1-x^2}\,\frac{1-x^6}{1-x^3}\cdots \\ &= \frac{1}{1-x}\,\frac{1}{1-x^3}\,\frac{1}{1-x^5}\cdots \\ &= (1+x+x^2+\dots)(1+x^3+x^6+\dots)(1+x^5+x^{10}+\dots)\dots \end{aligned}$$

Only the terms with the power of odd numbers are left.

A's answer is equaled to the partition of integer n which allows repetition

B's answer can be represented as $(1+x^2+x^4+\cdots)(1+x^4+x^8+..)\dots$

D's answer can be represented by C(2n-1,n)

[explanation]

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