

Given 5 matrices with dimensions, 12×5 , 5×10 , 10×2 , 2×5 and 5×4 , what is the minimum number of scalar multiplications to multiply these 5 matrices

(1) How many digits does the answer have?

- (A)2 (B)3 (C)4 (D)5 (E)6

(2) The most significant two digits are:

- (A)10 (B)11 (C)32 (D)35 (E)36

(3) The last digit of the answer is:

- (A)5 (B)6 (C)7 (D)8 (E)9

【99 年交大資工】

Ans.

$$P_0 = 12$$

$$P_1 = 5$$

$$P_2 = 10$$

$$P_3 = 2$$

$$P_4 = 5$$

$$P_5 = 4$$

m	1	2	3	4	5
1	0	600	220	340	356
2		0	100	150	180
3			0	100	120
4				0	40
5					0

2022, 4.5
11/9/21

$$12 \times 5 \times 10 = 600$$

$$5 \times 10 \times 2 = 100$$

$$10 \times 2 \times 5 = 100$$

$$2 \times 5 \times 4 = 40$$

$$[1.3]$$

$$\checkmark [1.1] + [2.3] + 12 \times 2 \times 5 = 220$$

$$[1.2] + [3.3] + 12 \times 2 \times 10$$

$$[2.4]$$

$$[2.2] + [3.4] + 5 \times 5 \times 10$$

$$\checkmark [2.3] + [4.4] + " 2 = 150$$

$$[1.4]$$

$$[1.1] + [2.4] + 12 \times 5 \times 5$$

$$[1.2] + [3.4] + " 10$$

$$\checkmark [1.3] + [4.4] + " 2 = 340$$

$$[2.5]$$

$$[2.2] + [3.5] + 5 \times 4 \times 10$$

$$\checkmark [2.3] + [4.5] + " 2 = 180$$

$$[2.4] + [5.5] + " 5$$

$$[3.5]$$

$$\checkmark [3.3] + [4.5] + 10 \times 4 \times 2 = 170$$

$$[3.4] + [5.5] + " 5$$

$$[1.5]$$

$$[1.1] + [2.5] + 12 \times 4 \times 5$$

$$[1.2] + [3.5] + " 10$$

$$\checkmark [1.3] + [4.5] + " 2 = 356$$

$$[1.4] + [5.5] + " 5$$

(a) B

(b) 356

D

(c) 356

B