ASSIGNMENT 1

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January 12, 2021

Assume X,Y,Z,W and P are matrices of orders $2\times n$,$3\times k$, $2\times p$,$n\times 3$ and $p\times k$,respectively.
The restriction on n,k and p so that PY+WY will be defined are:
(A)k=3,p=n
(B)k is arbitrary,p=2
(C)p is arbitrary,k=3
(D)k=2,p=3

Solution:
Concept 1 :The product of two matrices is defined only if the number of columns in the first matrix is equal to the number of rows in the second matrix and the resulting matrix will have the same number of rows as the first matrix and the same number of columns as the second matrix.

Concept 2 :To add two matrices,the dimensions of both must be same,that is, they must have same number of rows and columns.

Now getting back to question,

Matrices P and Y are of the order $p\times k$ and $3\times k$ respectively.

PY=[P] $_{p\times k}$ [Y] $_{3\times k}$.

By concept 1,it is possible only if

$k=3$. (1)

and its order will be $p\times k$,So PY $_{p\times k}$

Simlarly,
Matrices W and Y are of the order n×3 and 3×k respectively.

WY=[W] $_{n\times 3}$ [Y] $_{3\times k}$.

By concept 1,it is possible beacause no. of colums of first matrix equals to number of rows of second matrix.

and its order will be $n\times k$,So WY $_{n\times k}$

Now adding,

PY $_{p\times k}$ $+WY$ $_{n\times k}$

By concept 2,it is possible only if

$p\times k = n\times k$

i,e $p=n$ (2)

Therefore from eqn(1) and (2) **Option A is correct**