

## Chapter 1 Matrices

Answer the following questions. These questions are designed in accordance to the subsections as sequentially presented in Ayers. Try to identify the questions below with the corresponding subsection from which these questions are based on as it will definitely help while answering these questions.

1. Give an example of a  $3 \times 2$  matrix. Call it A.
2. Identify the element  $a_{13}$  and  $a_{23}$  in A defined in (1).
3. Give any example of a square matrix of order 3. Call it S.
4. List down all the diagonal elements in (3).
5. Calculate the trace of S as defined in 3.
6. Give an example of a pair of equal matrices.
7. Give an example of a zero matrices or order  $2 \times 4$ .
8. Consider a square matrix of order 3,  $A = [a_{ij}]$ , where  $a_{ij}=1$  for all  $i,j = 1,2,3$ , and a square matrix of the same order,  $B = [b_{ij}]$ , where  $b_{ij}=2$  if  $i=j$ ,  $b_{ij}=0$  if  $i \neq j$ . Calculate the matrix  $C = A + B$ .
9. What is the negative of B, with B defined in (8).
10. If there exist a matrix D such that  $A + D = B$ , determine D.

11. Given  $X = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ ,  $Y = [1 \ 1 \ 1]$ , find, if possible,

(i) the product  $XY$ , (ii) the product  $YX$ .

12. If  $K$  is a matrix of order 3 by 2,  $M$  a matrix of order 2 by 3, what is the order of the product (i)  $KM$ ? (ii)  $MK$ ?

13. Give an example of a pair of 3-square matrices  $A, B$  such that (i)  $AB \neq BA$ , (ii)  $AB = BA$ .

14. Give an example of a pair of 3-square matrices  $A, B$  such that (i)  $AB = 0$  but  $A \neq 0$  (ii)  $AB = 0$  but  $B \neq 0$ , (iii)  $AB = 0$  with  $A=0, B=0$ .

15. Give an example of a set of 3-square matrices  $A, B, C$  such that (i)  $AB=AC$  with  $B \neq C$ , (ii)  $AB=AC$  with  $B=C$ .