

**Model Question Paper**  
Applications of matrices and determinants - Part II

12th Standard

**Business Maths**

Reg.No. : 

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- I. Answer all the questions.  
II. Use Blue pen only.  
III. Question No 15 is compulsory

Time : 01:15:00 Hrs

Total Marks : 85

5 x 1 = 5

**Section-A**

- 1) The inverse of  $\begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix}$  is  
(a)  $\begin{pmatrix} 0 & \frac{1}{2} \\ 2 & 0 \end{pmatrix}$  (b)  $\begin{pmatrix} 0 & \frac{1}{2} \\ \frac{1}{2} & 0 \end{pmatrix}$  (c)  $\begin{pmatrix} 0 & -\frac{1}{2} \\ \frac{1}{2} & 1 \end{pmatrix}$  (d)  $\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$
- 2) If  $A = \begin{pmatrix} 0.8 & 0.6 \\ -0.6 & 0.8 \end{pmatrix}$  then  $A^{-1}$  is  
(a)  $\begin{pmatrix} -0.8 & 0.6 \\ -0.6 & 0.8 \end{pmatrix}$  (b)  $\begin{pmatrix} 0.8 & -0.6 \\ 0.6 & 0.8 \end{pmatrix}$  (c)  $\begin{pmatrix} 0.8 & 0.6 \\ 0.6 & 0.8 \end{pmatrix}$  (d)  $\begin{pmatrix} 0.2 & 0.4 \\ -0.4 & 0.2 \end{pmatrix}$
- 3) For what value of k the matrix A, where  $A = \begin{pmatrix} 2 & k \\ 3 & 5 \end{pmatrix}$  has no inverse?  
(a)  $\frac{3}{10}$  (b)  $\frac{10}{3}$  (c) 3 (d) 10
- 4) If  $A = \begin{bmatrix} 2 & 3 & 1 \\ 3 & 4 & 1 \\ 3 & 7 & 2 \end{bmatrix}$  then  $A^{-1}A$  is  
(a) 0 (b) A (c) I (d)  $A^2$
- 5) The rank of an  $n \times n$  matrix each of whose elements is 1 is  
(a) 1 (b) 2 (c) n (d)  $n^2$

**Section-B**

- 6) Write the inverse of  $A = \begin{pmatrix} 2 & 4 \\ -3 & 2 \end{pmatrix}$
- 7) Write the inverse of  $A = \begin{bmatrix} 1 & 0 & 2 \\ 3 & 1 & 1 \\ 2 & 1 & 2 \end{bmatrix}$
- 8) Find the inverse of  $A = \begin{bmatrix} 1 & 0 & a \\ 0 & 1 & b \\ 0 & 0 & 1 \end{bmatrix}$  and verify that  $AA^{-1} = I$ .
- 9) If  $A = \begin{bmatrix} a_1 & 0 & 0 \\ 0 & a_2 & 0 \\ 0 & 0 & a_3 \end{bmatrix}$  and none of the a's are zero, find  $A^{-1}$ .
- 10) If  $A = \begin{bmatrix} -1 & 2 & -2 \\ 4 & -3 & 4 \\ 4 & -4 & 5 \end{bmatrix}$  show that the inverse of A is itself.

5 x 6 = 30

**Section-C**

5 x 10 = 50

- 11) There are three commodities X, Y and Z which are bought and sold by three dealers A, B and C. Dealer A purchases 2 units of X and 5 units of Z and sells 3 units of Y, dealer B purchases 5 units of X, 2 units of Y and sells 7 units of Z and dealer C purchases 3 units of Y, 1 unit of Z and sells 4 units of X. In the process A earns Rs.11 and C Rs.5 but B loses Rs.12. Find the price of each of the commodities X, Y and Z, by using determinants.
- 12) A company produces three products everyday. The total production on a certain day is 45 tons. It is found that the production of the third product exceeds the production of the first product by 8 tons while the total production of the first and third product is twice the production of second product. Determine the production level of each product by using Cramer's rule.
- 13) The data below are about an economy of two industries P and Q. The values are in millions of rupees.

Producer	User		Final Demand	Total Output
	P	Q		
P	14	6	8	28
Q	7	18	11	36

Determine the outputs if the final demand changes to 20 for P and 30 for Q.

- 14) Suppose the inter-relationship between the production of two industries P and Q in a year (in lakhs of rupees) is

Producer	User		Final Demand	Total Output
	P	Q		
P	15	10	10	35
Q	20	30	15	65

Find the outputs when the final demand changes to (i) 12 for P and 18 for Q (ii) 8 for P and 12 for Q.

15) a) In an economy of two industries P and Q the following table gives the supply and demand positions in millions of rupees.

Producer	User		Final Demand	Total Output
	P	Q		
P	16	20	4	40
Q	8	40	32	80

Find the outputs when the final demand changes to 18 for P and 44 for Q.

(OR)

b) The data below are about an economy of two industries P and Q. The values are in crores of rupees.

Producer	User		Final Demand	Total Output
	P	Q		
P	50	75	75	200
Q	100	50	50	200

Find the outputs when the final demand changes to 300 for P and 600 for Q.

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