# Model Question Paper <br> Applications of matrices and determinants - Part III 

12th Standard

## Business Maths

Reg.No. $\square$
I.Answer all the questions.
II.Use Blue pen only.

Time : 01:20:00 Hrs

## Section-A

1) The rank of a zero matrix is
$\begin{array}{llll}\text { (a) } 0 & \text { (b) } 1 & \text { (c) }-1 & \text { (d) } \infty\end{array}$
2) The rank of a non singular matrix of order $n \times n$ is
(a) $n$ (b) $n^{2}$
(c) 0
d) 1
3) A system of linear homogeneous equations has at least
(a) one solution
(b) two solutions
(c) three solutions
d) four solutions
4) The equations $A X=B$ can be solved by Cramer's rule only when
(a) $|\mathrm{A}|=0$
(b) $|A| \neq 0$
(c) $A=B$
(d) $A \neq B$
5) The number of Hawkins - Simon conditions for the viability of an input - output model is
(a) 1 (b)
(b) 3 (c) 4
(d) 2

## Section-B

6) If $A^{-1}=\left[\begin{array}{lll}1 & 3 & 4 \\ 3 & 2 & 2 \\ 1 & 1 & 1\end{array}\right]$ find A
7) 

Show that $A=\left[\begin{array}{lll}2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2\end{array}\right]$ and $B=\left[\begin{array}{ccc}\frac{1}{18} & -\frac{5}{18} & \frac{7}{18} \\ \frac{7}{18} & \frac{1}{18} & -\frac{5}{18} \\ -\frac{5}{18} & \frac{7}{18} & \frac{1}{18}\end{array}\right]$ are inverse of each other
8) If $A=\left(\begin{array}{cc}2 & -3 \\ -4 & 8\end{array}\right)$, compute $A^{-1}$ and show that $4 A^{-1}=10 I-A$
9) If $A=\left(\begin{array}{cc}4 & 3 \\ -2 & -1\end{array}\right)$ verify that $\left(A^{-1}\right)^{-1}=A$
10) Verify $(A B)^{-1}=B^{-1} A^{-1}$, when $A=\left(\begin{array}{cc}3 & 1 \\ 2 & -1\end{array}\right)$ and $B=\left(\begin{array}{cc}-6 & 0 \\ 0 & 9\end{array}\right)$

## Section-C

11) The subscription department of a magazine sends out a letter to a large mailing list inviting subscriptions for the magazine. Some of the people receiving this letter already subscribe to the magazine while others do not. From this mailing list, $60 \%$ of those who already subscribe will subscribe again while $25 \%$ of those who do not now subscribe will subscribe. On the last letter it was found that $40 \%$ of those receiving it ordered a subscription. What percent of those receiving the current letter can be expected to order a subscription?
12) Two newspapers $A$ and $B$ are published in a city. Their present market shares are $15 \%$ for $A$ and $85 \%$ for $B$. Of those who bought $A$ the previous year, $65 \%$ continue to buy it again while $35 \%$ switch over to B. Of those who bought B the previous year, $55 \%$ buy it again and $45 \%$ switch over to A. Find their market shares after two years.
13) Solve the equations $2 x+8 y+5 z=5, x+y+z=-2, x+2 y-z=2$ by using matrix method.
14) A woman invested different amounts at $8 \%, 8 \frac{3}{4} \%$ and $9 \%$ all at simple interest. Althogether she invested Rs. 40,000 and earns Rs. 3,455 per year. How much does she have invested at each rate if she has Rs. 4,000 more invested at $9 \%$ than at $8 \%$ ? Solve by using matrices.
15) a) Find $\lambda$ if the matrix $\left[\begin{array}{ccc}6 & 7 & -1 \\ 3 & \lambda & 5 \\ 9 & 11 & \lambda\end{array}\right]$ has no inverse.
b)

$$
\text { If } X=\left[\begin{array}{ccc}
1 & 2 & 3 \\
2 & 4 & 5 \\
3 & 5 & 6
\end{array}\right] \text { and } Y=\left[\begin{array}{ccc}
1 & -3 & 2 \\
-3 & 3 & -1 \\
2 & p & q
\end{array}\right] \text { find } \mathrm{p} \text {, } \mathrm{q} \text { such that } Y=X^{-1}
$$

16) a) If $\left(\begin{array}{cc}4 & -3 \\ 5 & 2\end{array}\right) \quad X=\left[\begin{array}{l}14 \\ 29\end{array}\right]$ find the matrix $x$.
b) Find the rank of the matrix $\left(\begin{array}{lll}1 & 2 & 3 \\ 3 & 2 & 1 \\ 4 & 2 & 5\end{array}\right)$
