

**PSG COLLEGE OF ARTS & SCIENCE**  
(AUTONOMOUS)  
**BA DEGREE EXAMINATION DECEMBER 2019**  
(First Semester)

Branch – ECONOMICS

**MATHEMATICAL METHODS - I**

Time: Three Hours

Maximum: 75 Marks

**SECTION-A (10 Marks)**

Answer ALL questions

ALL questions carry EQUAL marks (10 x 1 = 10)

- 1 The slope of the equation  $y=mx+c$  is  
(i)  $y$  (ii)  $x$  (iii)  $m$  (iv)  $c$
- 2 The sections cut by a plane on a right circular cone are called  
(i) Parabolic section (ii) Conic sections  
(iii) Elliptical sections (iv) Hyperbolic sections
- 3 Example of Linear equation involving two variables is  
(i)  $7x+3y+4z=20$  (ii)  $6x+2y=10$  (iii)  $8x=2+10$  (iv)  $7a+8b+9c=10+5$
- 4 Graph of quadratic function is classified as  
(i) Composite graph (ii) Parabolas (iii) Quarter graph (iv) Annual graph
- 5 Two matrices A and B are added if  
(i) Both are rectangular  
(ii) Both have same order  
(iii) No of columns of A is equal to columns of B  
(iv) No of rows of A is equal to no of columns of B
- 6 Matrices obtained by changing rows and columns is called  
(i) Rectangular matrix (ii) Transpose  
(iii) Symmetric (iv) None of above
- 7 Rule which provides method of solving determinants is classified as  
(i) Cramer's rule (ii) Determinant rule (iii) Solving rule (iv) Thumb rule
- 8 According to determinant properties, when two rows are interchanged then signs of determinant  
(i) Must changes (ii) remains same (iii) multiplied (iv) divided
- 9 Matrix of coefficients either have no solution or have infinite solutions is system of equations are  
(i) Linearly Dependent (ii) Linearly Independent  
(iii) Quadratic and Independent (iv) Quadratic and Dependent
- 10 Input – Output analysis is a technique which was invented by  
(i) Hawkins (ii) W.Leontief (iii) Both (i) and (ii) (iv) Neither (i) nor (ii)

**SECTION - B (25 Marks)**

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 5 = 25)

- 11 a Explain the importance of Mathematical Economics.  
OR  
b Find the intersection of line  $2x+3y=3$ ,  $x+2y=2$ .
- 12 a Solve the equations:  $3x-2y=5$ .....1  
 $5x-y=3$  .....2  
OR  
b A market demand curve is given by  $D=50-5p$ . Find the maximum price anybody can pay for the commodity and the amount demanded when the

13 a State the properties of Determinants.

OR

b  $A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \\ 4 & 7 & 6 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$  find AB.

14 a Find co-factor of the matrix  $A = \begin{vmatrix} 2 & 3 & 4 \\ -1 & 5 & 1 \\ 5 & 0 & 3 \end{vmatrix}$

OR

b Solve the following system of equations:

$$x-2y+3z=1$$

$$3x-y+4z=3$$

$$2x+y-2z=-1$$

15 a Verify the Hawkins-Simon conditions for  $[A] = \begin{bmatrix} 0.8 & 0.2 \\ 0.9 & 0.7 \end{bmatrix}$

OR

b Explain the limitations of Input-Output analysis.

### SECTION -C (40 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 8 = 40)

16 a Find the equation of the straight line through the point (3,-4) which is parallel to the line  $2x-4y=3$ .

OR

b Discuss merits and demerits of mathematical economics.

17 a Solve  $x^2+17x+60=0$  by using Quadratic equation.

OR

b If the production function is  $Y=10L^{1.5}K^{0.5}$  and K be fixed at 100. Find the total product curve.

18 a Explain the properties of Determinant.

OR

b If  $A = \begin{vmatrix} 1 & 2 & 3 \\ 3 & 4 & 1 \\ 7 & 2 & 5 \end{vmatrix}$  and  $B = \begin{vmatrix} 1 & 0 & 4 \\ 4 & 3 & 2 \\ 6 & 5 & 3 \end{vmatrix}$  prove that  $(A+B)^T = A^T + B^T$ .

19 a Solve the following by Cramer's rule.

$$x-2y+3z=1$$

$$3x-y+4z=3$$

$$2x+y-2z=-1$$

OR

b Find the inverse of  $A = \begin{vmatrix} 3 & 1 & 1 \\ 2 & 0 & 2 \\ 5 & 1 & 2 \end{vmatrix}$ .

20 a Describe the Technological Co-efficient matrix.

OR

b An economy produces only coal and steel. The two commodities serve as intermediate inputs in each other's production, 0.4 tone of steel and 0.7 tone of coal are needed to produces a tone of steel similarly 0.1 tone of steel and 0.6 tone of coal are required to produce a tone of coal. No capital inputs are needed. Do you think that the system is viable?

2 and 5 labour days are required to produce a tone of coal and steel, respectively. If the economy needs 100 tones of coal and 50 tones of steel, calculate the gross output of the two commodities and the total labour