

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

Branch - **ECONOMICS**

MATHEMATICAL METHODS - II

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 x 1 = 10)

- 1 If $y=e^{2x}$, $\frac{d}{dx}$
- (i) 2 (ii) 0 (iii) e^{2x} (iv) $2e^{2x}$
- 2 Formula to find the MR, is elasticity of demand and AR are given.
- (i) $AR=MR^{\frac{1}{n}}$ (ii) $AR=MR-3$ (iii) $AR=MR^{\frac{1}{n-1}}$ (iv) $AR=MR-\frac{1}{n}$ T+1
- 3 If $u=x^r + y^2$, $\frac{du}{dx}$
- (i) $2x+y^2$ (ii) $x+y$ (iii) $2x$ (iv) $2y$
- 4 If $u=5x^3y^2+6x^2y-K2x$, is $\frac{du}{dy}$ -
- (i) $15x^2y^2+12xy+2$ (ii) $10x^3y+6x^2$ (iii) $10x^3y+6x^2+2$ (iv) $10x^2y^2+6x^2$
- 5 The total differential of the function is
- (i) the sum of all the partial differentials
(ii) the second order partial differentials
(iii) the cross partial differentials
(iv) a applied differentiation techniques
- 6 In the linearly homogenous Cobb-Douglas production function with two inputs, the elasticity of substitution between the inputs is
- (i) zero (ii) greater than one (iii) one (iv) less than one
- 7 $\int x^5 dx =$
- (i) x^6+C (ii) $\frac{x^6}{6}+c$ (iii) $6x^6+C$ (iv) $5x^6+c$
- 8 $\int x^n dx =$ ' *.
- (i) $\frac{x^{n+1}}{n+1}$ (ii) x^{n+1} (iii) $(x^{n+1})(n+1)$ (iv) 1
- 9 LP theory states that the optimal solution to any problem will lie at
- (i) the origin
(ii) a corner point of the feasible region
(iii) the highest point of the feasible region
(iv) the lowest point in the feasible region
- 10 Each player should follow the same strategy regardless of the other player's strategy in which of the following games?
- (i) Constant strategy (ii) Mixed strategy
(iii) Pure strategy (iv) Dominance Strategy

SECTION - B (25 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 5 = 25)

11 a Find the $\frac{d}{dx}$ for the function $y=(x^2-2x-1)^J$.

OR

b Find the $\frac{dy}{dx}$ for the function $y=(x+1)(x-1)$.

12 a Explain the optimism rules in partial derivatives.

OR

b If $u=5x^3y+2x^2y^2+3xy^3$, prove that $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$

13 a Find the total differentiation for $z=2x^2y^3+3x^3y^2$.

OR

b State the properties of Cobb Douglas production function.

14 a Integrate $\int x^5(8x^6 + 7)^{15} dx$.

OR

b If the demand function is $P=25-3x-3x^2$ and the demand x_0 is 2, what will be the Consumer's Surplus?

15 a State the uses of Linear Programming.

OR

b Solve the following game:

$$A \begin{matrix} 1 & 2 \end{matrix} \begin{matrix} 1 \\ 2 \end{matrix}$$

$$A = \begin{matrix} 6 & 2 & 7 \\ 5 & 1 & 6 \end{matrix}$$

$$\begin{matrix} 5 & 1 & 6 \end{matrix}$$

SECTION -C (40 Marks)

Answer ALL questions

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

16 a Determine the maxima and minima of the function $y=x^3-10x^2+28x+50$.

OR

b Discuss the relation between average and marginal cost curves.

17 a Find first and second order partial derivatives of the following function

$$Z=3x^2+5x^2y+xy^2+y^3 \text{ and also verify that } \frac{d^2 z}{dx dy} = \frac{d^2 z}{dy dx}$$

OR

b Explain the optimization process in partial derivatives.

18 a State and prove Euler's theorem for homogenous functions.

OR

b Describe the properties of linear homogenous production function.

19 a Discuss the rules of integration.

OR

b If the demand and supply functions are given: $P_d=20-5x$ and $P_s=4x+8$, obtain the producer's surplus.

20 a Solve graphically

$$\text{Maximize } Z=300x+200y$$

$$\text{Subject to } 5x+2y < 180$$

$$x+y < 45$$

$$x > 0, y > 0$$