



Register Number:
DATE: 23-11-2020

St Josephs College [Autonomous] Bangalore -27
B.A – V Semester Exam: November- 2020
ECA DE 5318-Mathematical methods for Economics

Time: 2.30 hrs.

Max Marks -70

This paper has 2 printed pages and 3 sections :

Section A

I. Answer any 10 of the following:

[10 x 3 = 30]

- 1) Calculate $\frac{dq}{dL}$ for the production function $Q = L^3 - 2L^2K + 3LK^2 + K^3$
- 2) Compute Marginal Utility for the total Utility function $U = 9X^3 - 7X^2 - 3X + 3$
- 3) If MR is ₹ 50 and price elasticity of demand is 2, find the AR.
- 4) If $P = ₹ 15$ and the elasticity is 3, find MR.
- 5) If $Y = \frac{x^3}{x-2}$ is the production function, find the Marginal Production function
- 6) Compute Total cost for the Marginal Cost function $C = 2 + 6x - 4x^2$, if Total fixed cost is 50
- 7) If Marginal revenue function $MR = 100 - 4Q$, find the total revenue function.
- 8) Calculate the simple Interest for ₹ 7500 @ 13% for 5 years.
- 9) If demand function is $P = 25 - 3x - 3x^2$ and the demand $x' = 2$, what will be the consumer surplus?
- 10) If Nominal interest rate is 6% and real Interest rate is 4%, what is inflation rate?
- 11) If AR. is ₹ 18 & MR is ₹ 12, find elasticity of demand.
- 12) Find compound interest after 2 years for principal amount of Rs 100 @ interest of 4% per year

Section : B

II. Answer any 2 of the following :

[2 x 5 = 10]

- 13) Compute Marginal productivity of Labour at $K = 1$ and $L = 2$ for the production function $X = 3KL^2 + 4K^2L + 2L + 2K$.
- 14) Verify Euler's theorem, $x \cdot \frac{df}{dx} + y \cdot \frac{df}{dy} = 3f$, For the function $f(x, y) = x^3 + 3Y^3 - X^2Y$

- 15) Solve the following behavioural equations of a market , by using Cramers rule .[to find values of X_1 and x_2]
- $$2x_1 + 3x_2 = 13$$
- $$X_1 + 7x_2 = 23$$

Section C.

III. Answer any 2 of the following :[2 x 15 = 30]

- 16) For the utility function $U = f(x, y)$. The price of $x = 5$ and also the price $y = 5$, the budget or income is ₹ 50 . Find the equilibrium level of consumption of x and y .
- 17) State the conditions for firms equilibrium and derive level of output , price, Total revenue , total cost and profit for $R = 12x - 4x^2$ and $AC = 8 - x$.
- 18) A firm has the Total cost function $C = \frac{1}{3}q^3 - 7q^2 + 111q + 50$ And demand function. $Q = 100 - P$. Find the output that maximises profit . What is the maximum profit , total Revenue , Average revenue , marginal revenue , total cost , Average cost and Marginal cost?

