ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27
B.A. ECONOMICS– V SEMESTER
SEMESTER EXAMINATION: OCTOBER 2019
ECA 5318: MATHEMATICAL METHODS FOR ECONOMICS

Time- 2 ½ hrs.   **Max Marks-70**

This paper contains 2 printed pages and 3 parts

Part – A

I   Answer any 10 of the following   [10 x 3 = 30]

1. Compute marginal productivity of labour at K = 1 and L = 2 for the production function **X = 3KL^2+4K^{2}L+2L+2K**

2. Find marginal Utilities of X and Y for the Utility function **U = 5XY –Y^2**

3. Determine Marginal Costs of X and Y for the total cost function $U = \dfrac{x3 - y3}{x2 + y2}$

4. Find out $\dfrac{dQ}{dL}\, and\, \dfrac{dQ}{dK}$ for the production function Q = 18 L^2 − 9K^2+18 KL

5. Find E, elasticity of demand, when P= 40, MR = 60.

6.   If MR is 50 and the price elasticity of demand is 2, find AR

7. Find the simple interest for Rs 7500 at 13 % for 5 years.

8. A monopolist is facing a linear demand function P = 100- 4Q. The linear cost function is given by C = 50 + 20Q, calculate the Baumol sales maximisation output.

9. Find elasticity of total cost when total cost function is TC= 2X^2+4X+3

10. The MC or $\dfrac{dy}{dx}$ of a certain firm as a function of units, the produce x is given by

    y= 1.064 – 0.005x, find the TC and AC functions, if FC = 16.

11. If the demand function is P= 25D -20 and supply function is P = 5D +60 find producers surplus.

12. Find the value of X$_1$ and X$_2$, by crammers' rule for the following behavioural equation of economics   6X$_1$ + 5X$_2$ = 49 & 3X$_1$ + 4X$_2$ =32

PART-B

II   Answer any 2 of the following   [2x 5 = 10]

13. A firm producing an output of 'x' quantity of a certain product at a Total cost TC given
π = ax³ – bx² +cx. Show that the AC is a parabola. Find the output for least AC
14. Calculate the compound interest for Rs 15000 at 4% per annum for 2 years.

15. When demand function $Q = \dfrac{20}{P+1}$ and Price , P = 3, Find the Elasticity of Demand ,

PART-C

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

16. Optimize the following cob-Douglas production function subject to the given
constraints by forming the Lagrangian function & finding critica values   for

[a] U = $X^{0.8}$ $Y^{0.2}$ subject to 5X + 3Y = 75

[b] Q = $10K^{0.7}$ $L^{0.1,}$ Given P_K= 28, P_L= 10 & B= 4000

18. Given the demand and Average cost function of a monopolistic firm P = 32-3Q

And AC = Q + 8 + $\dfrac{5}{Q}$, Find the level of output that maximises π, what are

The   corresponding values of TR, AR, MR and TC

19. A consumer consuming 2 commodities has a utility function U f (x, y), the price of 1
unit of X is Rs 1/- and that of Y is Rs 2. The budget of the consumer is Rs 100.
Determine the optimum number of 2 commodities which consumer would prefer in
order to maximise the consumer utility.

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