



Register Number:

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ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27
B.A. ECONOMICS- V SEMESTER
SEMESTER EXAMINATION: OCTOBER 2019
ECADE 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. Find MP_L and AP_L for the production function $Q = AL^2K^2 - BL^3K^3$
2. Given the $AR = 100 - 2Q$, Obtain MR when $q = 5$
3. If $Y = X^3$, Find $\frac{Ey}{Ex}$, The elasticity of Y with respect to X
4. Given $AC = 100Q + 10$ Find TC when $Q=10$
5. If $Q = 100 L^\alpha K^{1-\alpha}$ find MP_K , Marginal productivity of capital.
6. If $S = 100 + P$, and $D = 150 - 4P$, find equilibrium price and quantity
7. Find MU , marginal utility, $\frac{dy}{dx}$ for the utility function $Y = (2X^3 + 9)(X^2 + 3X)$
8. If Price = 40, elasticity of demand is = 5 find MR , when $MR = AR \left[\frac{\eta - 1}{\eta} \right]$
9. Find AR , average revenue from $MR = AR \left[1 - \frac{1}{\eta} \right]$
10. Following is the utility function, $U = X^3 + Y^3 + Z^3 - 3XYZ$, realised by consumer consuming 3 different commodities X, Y & Z . Prove that, $X \frac{du}{dx} + y \frac{du}{dy} + z \frac{du}{dz} = 3u$
11. Test the homogeneity of Cobb Douglas production function for $Q = AL^\alpha K^\beta$

12. The MPC is $\frac{2}{3}$ of Income, find the consumption function if when Income is Zero, consumption is 10 millions.

PART-B

II Answer any 2 of the following

[2x 5 = 10]

13. Given the Cob Douglas production, $Q = AL^{\frac{3}{4}} K^{\frac{3}{4}}$, prove that there is deficit of 0.5Q
14. $O = 10 + 12L - L^2$, is an expression of output with Labour being the input. Give an algebraic expression for AP and MP. How many labour hours are required to maximise output? What is the value of MP and AP at this point?
15. Suppose the consumer consuming 2 commodities has the utility function $u = f(5xy)$. The price of 1 unit of 'x' 2 Rs/- and that of 'y' is Rs/- 4, the budget is 100. Determine the optimum combination of the 2 commodities which consumer would purchase in order to maximise the satisfaction.

PART-C

III. Answer any 2 of the following

[2 x 15 = 30]

16. A firm has the total cost function $C = \frac{1}{3}q^3 - 7q^2 + 111q + 50$. And the demand function is $Q = 100 - P$. Find the output that maximises profit. What is the maximum profit? TR, MR, TC, AC & MC.?
17. Find the consumer surplus and producer's surplus for the following demand and supply functions. demand function $P = 8 - 2X$ and Supply function is $P = 2 + X$
18. Find the equilibrium solution of price, QD, QS for the following general market equilibrium of $QS_1 = -2 + 4P_1$ and $qd_1 = 18 - 3p_1 + p_2$. & $QS_2 = -2 + 3P_2$ and $QD_2 = 12 + P_1 - 2P_2$. By crammers rule.

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