Reg. No. : ....

Name : ....

I Semester B.A. Degree (CBCSS-OBE – Regular/Supplementary/Improvement) Examination, November 2021
(2019 Admission Onwards)
COMPLEMENTARY ELECTIVE COURSE IN ECONOMICS/DEVELOPMENT ECONOMICS
1C01ECO/DEVECO : Mathematics for Economic Analysis – I

Time : 3 Hours   Max. Marks : 40

PART – A

Answer **all** questions. **Each** carries **one** mark.

1. Define the following :
   Convex and Concave function.

2. Derive the slope of the function $8y - 2x + 16 = 0$.

3. Find the shape of the graph of the equation $x = 4$.

4. What is an increasing function ?

5. What is an inflection point ?

6. Find the Marginal Revenue and Average Revenue from Total Revenue function
   $TR = 12Q - Q^2$. **(1×6=6)**

PART – B

Answer **any six** questions. **Each** carries **two** marks.

7. Find the marginal productivity of different inputs of the following function
   $Q = 6x^2 + 3xy + 2y^2$.

8. Is the following equation a function or not. Why ? $y^2 = x$

9. Find the limits for the following function $\lim_{n \to 4}[3x^3 + 7x - 12]$.

10. State continuity.

11. Differentiate $f(x) = 18\sqrt{x}$.

12. What is Logarithmic function ?

13. State the applications of constraint optimisation in economics.

14. What is meant by Homogenous production ? **(6×2=12)**

PART – C

Answer **any four** questions. **Each** carries **three** marks.

15. Discuss the application of derivatives in economics.

16. Briefly explain different types of functions in economics.

17. What is a linear function ? Draw the graph of $y = -\dfrac{1}{4}x + 3$.

18. What is higher order derivative ? Find the second order derivative of the function $y = 7x^3 + 5x^2 + 12$. Evaluate it at $x = 2$.

19. Find the second order direct partial derivatives Z_{xx} and Z_{yy} of the following function $Z = (x^2 + 2y)^4$.

20. Use Lagrange multiplier to optimise the following functions subject to the given constraint $f(x, y) = 26x - 3x^2 + 5xy - 6y^2 + 12y$ subject to the constraint $3x + y = 170$. **(4×3=12)**

PART – D

Answer **any two** questions. **Each** carries **five** marks.

21. A firm producing two goods x and y has the profit function $\pi = 64x - 2x^2 + 4xy - 4y^2 + 32y - 14$. Find out the profit maximising level of output for each two goods. Conduct the test to ensure that the profit is at maximum.

22. Briefly explain different types of functions.

23. Define Lagrange multiplier. Optimize the following Cobb-Douglas production functions subject to the given constraint by (1) Forming the Lagrange function (2) finding the critical values $q = K^{0.3} K^{0.5}$ subject to $6k + 2L = 384$.

24. Given the demand for beef $Q_b = 4850 - 5P_b + 1.5P_P + 0.1Y$ with $Y = 10000$, $P_b = 200$ and the price of $P_p = 100$. Find (1) Income elasticity and (2) the cross price elasticity of demand for beef. **(2×5=10)**

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