Reg. No. : ..............................

Name : ..................................

**K20U 3134**

**I Semester B.A. Degree (CBCSS – Supplementary) Examination, November 2020**
**(2014-2018 Admissions)**
**COMPLEMENTARY COURSE IN ECONOMICS**
**1C 01 ECO : Mathematics for Economic Analysis – I**

Time : 3 Hours

Max. Marks : 40

PART – A

Answer **all** questions (**Each** question carries **1** mark).

1. Find the elasticity of supply for the function $Q = 25 - 4p + p^2$, when price is 5 units.
2. Define partial derivative.
3. Find $\frac{dy}{dx}$, if $y = \frac{5}{x^2}$.
4. If the cost function is $C=a+bq+cq^2$, find MC.

**(4×1=4)**

PART – B

Answer **any seven** questions (**Each** question carries **2** marks).

5. Differentiate between continuity of a function at a point and continuity of a function in an interval.
6. If $y = x^2 + 2x + 9$, determine whether this function has a maximum or a minimum value and find the maximum/minimum value of y.
7. Derive marginal cost and marginal revenue and give their equations.
8. Define limit of a function.
9. State the Euler's theorem for homogenous function.
10. Explain the quotient and product rule of differentiation.
11. Define price elasticity of demand.

P.T.O.

12. If $y = x^2 \log x$, prove that $x^2 \frac{d^2y}{dx^2} - x\frac{dy}{dx} = 2x^2$.

13. If the demand for the commodity is $D = 44 - 7p$ and supply of the commodity is $S = 2p - 10$, find the equilibrium price and quantity if at market equilibrium, $D = S$.

14. What is constrained optimization ?

(7×2=14)

PART – C

Answer **any four** questions (**Each** question carries **3** marks).

15. Draw the graphs of constant function, linear function, expansion function, logarithmic function.

16. Differentiate $x^{\log x}$.

17. Explain the rules of differentiation.

18. If $Z = 2x^2 - 3xy + 4y^2$, find $\frac{\partial Z}{\partial x}$ and $\frac{\partial Z}{\partial y}$ at $x = 2$ and $y = 3$.

19. Using L'Hospitals Rule,evaluate $\lim_{x \to 3} (x^2 - 5x + 6) / (2x^2 - 5x - 3)$.

20. Given Revenue function $R = 3000 - (3 - x)^2$, when is R maximum. Find the maximum value of R.

(4×3=12)

PART – D

Answer **any two** questions (**Each** question carries **5** marks).

21. Explain the application of derivatives in economic analysis.

22. Verify Euler's theorem for the function $Z = aL + 2hL^{1/2}K^{1/2} + bK$.

23. Find the first and second order partial derivatives for the function $U = 3x^2 + 8xy + 7y^2 + 10$.

24. Optimize the cost function $Z = 4x^2 + 3xy + 6y^2$ subject to the constraint $x + y = 56$ and find the minimum cost.

(2×5=10)