23104806

**QP CODE: 23104806**

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

**Name :** .....

# B.A DEGREE (CBCS) REGULAR/IMPROVEMENT/REAPPEARANCE EXAMINATIONS, FEBRUARY 2023

## First Semester

B.A Economics Model I

## Complementary Course - MM1CMT04 - MATHEMATICS - GRAPHING FUNCTIONS, EQUATIONS, DIFFERENTIAL CALCULUS AND LOGARITHMIC AND EXPONENTIAL FUNCTIONS

2017 Admission Onwards

908A7EE5

Time: 3 Hours Max. Marks : 80

### Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Perform the indicated operation $(2x + 7)(4x - 5)$
2. Find the x intercept of the equation $y = 9x - 72$
3. Estimate the current value after 3 years of a printing press purchased for the Rs. 265000 and depreciating linearly by Rs.32000 a year
4. Write the formula for finding the vertex of the parabla $y = ax^2 + bx + c$.
5. Find the value of $f(2)$ if $f(x) = x^2 - 3x + 5$
6. Define equilibrium price and equilibrium quantity.
7. Find $lim_{x->2} x^2$.
8. What is the derivative of $\frac{1}{x}$
9. Give an example of an increasing function
10. Convert $y = \ln\left(\frac{x^2 y^3}{z^3}\right)$ into sums, differences or products.
11. Write the formula for finding the effectective rate of interset for multiple compoundings when t >1

12. Define natural logarithm,

(10×2=20)

**Part B**

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Find the equation of the straight line passing through the point (1,2) and parallel to the line having equation $2y = 4x - 10$.
14. Determine the equation for the line passing through (6,4) and perpendicular to the line having the equation $y = 2x + 15$
15. Solve the quadratic equation $3x^2 - 5x + 1 = 0$
16. Find the equilibrium price and quantity if
    Supply : $Q = \frac{2}{3}P + 150$ ; Demand : $Q = -\frac{1}{3}P + 450$
17. Differentiate y = $7x^4(4x^2 - 10)$.
18. Find the first and second derivatives of $x^3(2x + 1)^2$ .
19. Find the total cost of producing 20 units of output for a firm that has fixed cost of $ 3500 and marginal cost $ 400 per unit
20. solve for a :$(i)\ \log_a 125 = 3$ (ii)$\log_a 32 = \frac{5}{3}$
21. Find the derivativ of $y = e^{1-x^2}\ln(x^2 + 3x)$

(6×5=30)

**Part C**

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. (a)Reduce the following fractions to the lowest term $\frac{x^2-8x+12}{x^2-11x+18}$
    (b)Simplify the radical $\sqrt{81x^2y^4z^6}$
    (c)Simplify $12x^3y^2 \cdot 5y^4z^5$
23. Solve the following system of equations by (a) elimination method and (b) substitution method.
    2x + 5y = 52
    3x - 4y = -14

24. (a) Find the relative extrema and optimise the function $f(x) = x^3 + 6x^2 - 96x + 23$.
(b) Find the successive derivatives of the function
$f(x) = 5x^4 - 3x^3 + 2x^2 + 5x - 3 \text{ at } x = 0.$

25. Find the value A of a principal P = $100 set out at an interest rate 12% for time t = 1 year when compounded (a) annually (b) semiannually (c) quarterly (d) continuously (e) Distinguish between the nominal and the effective rate of interest.

(2×15=30)