TB141330 **Reg No……**

Name……...

B A DEGREE (CBCSS) EXAMINATION, NOVEMBER – 2014

FIRST SEMESTER COMPLEMENTARY COURSE (MATHEMATICS)

MAT1GFELA – GRAPHING FUNCTIONS, EQUATIONS AND LINEAR ALGEBRA

(For B A ECONOMICS)

Time : Three Hours Maximum: 80 Marks

Part A

(Short answer questions)

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

1. Find $\frac{x}{x^4}$.
2. If y + 15x = 30. Then the slope of the line is -----.
3. What are the linear factors of $x^2 + 5x + 4$?
4. If $f(x) = 3x^2 + 2x + 4$, $f(1)$ = ---.
5. Give an example for a polynomial function.
6. Find the equilibrium price for the following markets

$$Q_s = -20 + 3p, Q_d = 200 - 5p$$

7. Define Diagonal matrix.
8. Let A = [1 2 3], B= $\begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$. Then order of BA is ----.
9. When a matrix *A* is multiplied with an identity matrix, the resultant matrix is ----.
10. $y = x + 7$ intersects with *y*-axis at the point ---------

(10x1=10 marks)

(P.T.O)

Part B

(Brief answer questions)

Answer any **eight** questions. Each question carries 2 marks.

11. Define L M Schedule.
12. Solve the quadratic equation $x^2 - 11x + 28 = 0$.
13. Define isocost line.
14. Find the equilibrium price and quantity for the following functions.

$$Q_s = -45 + 8p, \qquad Q_d = 125 - 2p$$

15. Use the elimination method to find the equilibrium price and quantity when the demand function is $3P + Q^2 + 5Q - 102 = 0$ and the supply function is $P - 2Q^2 + 3Q + 71 = 0$.
16. Let x =4. Is it a function? Why?
17. Define explicit function. Give an example.
18. Let A = $\begin{bmatrix} 3 & 3 \\ 3 & 5 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. Find AB and BA.
19. Using Cramer's Rule, solve $x - y = 0$ and $x + y = 4$.
20. Define non singular matrix. Give an example.
21. Convert the inequality constraints into equations by adding slack and surplus variables.

Maximize $Z = 5x_1 + 7x_2$

Subject to $x_1 + x_2 \leq 4$

$3x_1 + 8x_2 \leq 24$

$10x_1 + 7x_2 \leq 35$

and $x_1, x_2 \geq 0$.

22. Define extreme point theorem.

(8x2=16 marks)

Part C

Descriptive (short essay questions)

Answer any **six** questions. Each question carries 4 marks.

23. Solve the equation $\frac{5}{x} + \frac{3}{x+4} = \frac{7}{x}$

24. Give examples for rational functions and quadratic functions?

25. Graph the function $f(x) = x^2 - 1$.

26. If $f(x) = 2x^3 - 5x^2 + 8x - 20$ *and* $g(x) = 3x^2 + 1$. Find $f(5) - g(1)$ and $f(-4) + g(1)$.

27. Solve $9(3x + 4) - 2x = 11 + 5(4x-1)$.

28. Use Cramer's rule to solve $x + y = 2$, $x - y = 0$.

29. Find the determinant of $A = \begin{bmatrix} 3 & -2 & 4 \\ -1 & 2 & 1 \\ 6 & 9 & -5 \end{bmatrix}$.

30. Prove that $(AB)C = A(BC)$ if $A = \begin{bmatrix} 4 & 8 \\ 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$, $C = \begin{bmatrix} -2 & 1 \\ 4 & 2 \end{bmatrix}$.

31. Shade the feasible region of

Maximize $Z = 6x_1 + 11x_2$

Subject to $2x_1 + x_2 \leq 104$
$x_1 + 2x_2 \leq 76$
and $x_1, x_2 \geq 0$.

(6x4=24 marks)

Part D

(Essay type questions)

Answer any **two** questions. Each question carries 15 marks.

32. Form the augmented matrix and find the inverse of the matrix using Gaussian method

$A = \begin{bmatrix} 2 & 8 \\ 3 & 5 \end{bmatrix}$.

33. Use matrix inversion to solve $5x - 2y + 3z = 16$

$2x + 3y - 5z = 2$

$4x - 5y + 6z = 7$

(P .T.O)

34. Solve graphically, the linear programming problem

Maximize $Z = 3x_1 + 2x_2$

Subject to $x_1 + x_2 \leq 4$

$x_1 - x_2 \leq 2$

and $x_1 , x_2 \geq 0$.

35. Solve graphically, the linear programming problem

Maximize $Z = 3x_1 + 2x_2$

Subject to $4x_1 + 3x_2 \leq 12$

$4x_1 + x_2 \leq 8$

$4x_1 - x_2 \leq 8$

and $x_1 , x_2 \geq 0$.

(2x15=30 marks)