SEMESTER 1

COURSE CODE: EC010105

COURSE TITLE: MATHEMATICAL METHODS FOR ECONOMIC ANALYSIS

1. If A is a square matrix, then A – A' is a
   (a) diagonal matrix
   (b) skew-symmetric matrix
   (c) symmetric matrix

2. If a matrix A is both symmetric and skew-symmetric, then
   (a) A is a diagonal matrix
   (b) A is a zero matrix
   (c) A is a square matrix

3. If $A= [a_{ij}]_{m \times n}$ is a square matrix , if:

a) $m < n$

b) $m > n$

c) $m = n$

4. If A is a matrix of order 3×4 , then number of rows are

(a) 3

(b) 4

(c) 2

5. If B is a matrix of order 5 x 4 , then number of columns are

   a) 4

   b) 5

   c) 9

6. State whether true or false: A+ B = B+ A.

    a) True

    b) False

    c) Maybe

7. For any two matrices A and B , we have
    a) AB = BA
    b) AB≠BA
    c) AB =0
8. a rectangular array or table of numbers, symbols, or expressions, arranged in rows and columns is called as:
    a) Matrix
    b) Scalar unit
    c) Equation
9. Cramer's rule cannot be applied when value of determinant is
    a) 0
    b) 1
    c) < 1
10. A matrix with only one column is called:
    a) A Null matrix
    b) A row matrix
    c) A column matrix
11. Order of matrix with 6 columns and 4 rows is:
    a) 6x4
    b) 6+4
    c) 4x6
12. Transpose of a rectangular matrix is a:
    a) Rectangular matrix
    b) Diagonal matrix
    c) Square matrix
13. If |A|=0, then A is:
    a) Zero matrix.

b) Singular matrix.

c) Non-singular matrix

14. Rule which provides method of solving determinants is classified as:

a) Cramer's rule.

b) Determinant rule.

c) Solving rule

15. If (a,b,c) + (x,y,z) = (x,y,z), then (a,b,c) must be the zero vector:

a) False.

b) True.

c) May be

16. For a matrix B to be both symmetric and skew symmetric then matrix B is

(a) a scalar matrix

(b) a diagonal matrix

(c) a zero matrix of order n × n

17. vectors are quantities having

a) magnitude as well as direction

b) magnitude alone

c) direction alone

18. A matrix of order 2 x 3 can be multiplied with a matrix of order :

a) 2 x 3

b) 2 x 2

c) 3 x 3

19. Number of columns in a 6 x 5 are

a) 6

b) 5

c) 30

20. Transpose of a row matrix is

a) Zero matrix

b) Column matrix

c) Row matrix

21. A function from X to Y is denoted as:

a) f: X -> X

b) f: Y -> X

c) f: X- > Y

22. the derivative of e^x

a) e^x

b) x

c) e

23. Find the second derivative of the function:

f (x) = $2x - 5x^2$

a) f "(x)= 2 - 30x

b) f "(x) = $2-30x^5$

c) f "(x) = $-30x^5$

24. power rule of x in differentiation can be given as

a) $n\ x^{n-1}$

b) Log x

c) Nx

25. L'Hospital's rule is used in the case when limits are of

a) indeterminate forms

b) Determinate forms

c) Cant say

26. Implicit functions :

a) Distinguish between dependent and independentvariables

b) Do not distinguish between dependent and independent variables

c) Sometimes distinguishes between dependent and independent variables

27. Sufficient condition of maximum function is :

a) f'(x) or $\frac{d^2y}{dx^2} < 0$

b) f'(x) or $\frac{d^2y}{dx^2} > 0$

c) f'(x) or $\frac{d^2y}{dx^2} = 0$

28. Sufficient condition of minimum function is :

a) f'(x) or $\frac{d^2y}{dx^2} > 0$

b) f'(x) or $\frac{d^2y}{dx^2} < 0$

dx^2

c) f''(x) or $d^2y = 0$

dx^2

29. The slope of the graph of an increasing function is
    a) Negative
    b) Positive
    c) U shaped
30. The slope of the graph of a decreasing function is
    a) Negative
    b) Positive
    c) Inverted u shaped
31. non-polynomial function can never agree with euler's theorem
    a) False
    b) True
    c) Cant say
32. The Necessary condition of euler's theorem is that
    a) z is homogeneous with order n
    b) z is not homogeneous but with order n
    c) z is implicit
33. Marginal cost is estimated by finding the ---------- of the total cost function
    a) first derivative
    b) second derivate
    c) integral
34. marginal cost of the function $C= 60 + 10 X + 15 X^2$ is
    a) 10 + 30 X
    b) 60 + 30 X
    c) 60
35. TOTAL REVENUE , TR =?
    a) P/Q
    b) P * Q
    c) P + Q
36. As demand curve has negative , price elasticity is

a) Negative

b) Positive

c) U shaped

37. The slope of an isoquant is

a) Marginal cost

b) Marginal product

c) Marginal rate of technical substitution

38. An isoquant is defined by:

a) combinations of inputs required to produce a constant quantity of output.

b) combinations of inputs required toearn a constant level of profit

c) amount of output produced by a constant quantity of an innput

39. The production function $y = K^{0.3} L^{0.5}$ exhibits:

a) decreasing returns to scale.

b) constant returns to scale.

c) Increasing reurns to scale

40. If the quantity demanded of an input increases as output increases, it is said to be a(n):

a) normal input

b) Leontief input

c) Inferior input

41. The first principle of cost minimization says that the cost minimizing bundle (z_1^*, z_2^*) for y units of output lies _____ the isoquant.

a) Above

b) On

c) Under

42. An increase in the consumer surplus in the market for carrots may result from a(n) _____ in the _____ of carrots

a) Increase, supply

b) Decrease, demand

c) Increase, price

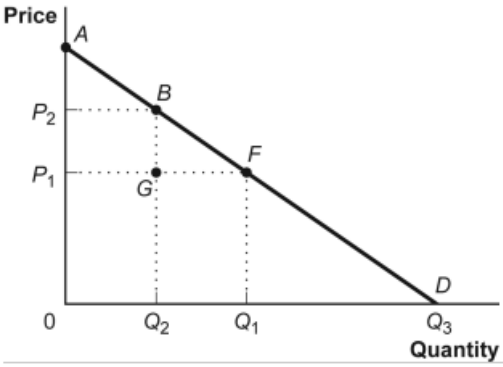
43. All else equal, when the supply curve shifts left, the producer surplus increases.

a) False

b) True

c) May be

44. If there is a decrease in demand, assuming a positively sloped supply curve and a negatively sloped demand curve, total surplus:
    a) Will increase
    b) Willdecrease
    c) Will remain same

45. 

    At price p1, consumer surplus is at area:
    a) AFP1
    b) AQ30
    c) ABP2

46. Market failure refers to a situation in which:

a) markets fail to reach an efficient outcome
b) markets establish a high price for necessities
c) none of the above

47. Identify the model which is concerned with the 'golden age' equilibrium:
    a) Kaldor model
    b) Joan Robinson model
    c) Keynesian model

48. Harrod-Domar model of growth is based on the concepts of and their equality
    a) Productivity growth and investment growth
    b) Actual, warranted and natural growth rate.
    c) Productivity growth and investment growth

49. in an open economy, the value of the multiplier depends on:

    A. The marginal propensity to save
    B. The marginal propensity to import

C. Both A and B

50. For demand function $P = 15\text{-}2X - X^2$, what is consumer's surplus at $X = 2$?
    a) 6
    b) 28/3
    c) 11/3
51. Given the demand function as $P = 20\text{-}2Q$, the average and marginal revenue at $q= 3$ are respectively:
    a) 8 and 14
    b) 6 and 12
    c) 11 and 15
52. Given the production function, $Q= 2.K^{1/3}.L^{2/3}$. find the output level when 8 units of capital and 27 units of labour is used :
    a) 36
    b) 54
    c) 18
53. Given the saving function , $S= -20 +0.2\ Y$ and autonomous investment (I) = Rs 100 million,the equilibrium of level of consumption will be
    a) 400
    b) 500
    c) 600
54. Given total cost function , $C = 5Q^2 +20Q + 5$, at price = 5 , marginal cost is :
    a) 70
    b) 85
    c) 75
55. Accelerator model predicts that changes in investment are determined by changes in :
    a) Output
    b) Inventory
    c) Capital
56. Accelerator is most closely related to:
    a) Investment
    b) Interest rate
    c) Idle capacity
57. Interaction of multiplier and accelerator is called as:

a) Dynamic multiplier

b) Super multiplier

c) Employment multiplier

58. In $\int_a^b f(y)\,dy$, what is 'a' called as?

a) Integration

b) Upper limit

c) Lower limit

59. $\int_0^1 2x\,dx$

a) 2

b) ½

c) 1

60. Gamma function is said to be as Euler's integral of second kind.

a) True

b) False

c)cannot be determined

61. Objective of linear programming problem is to ---------- profit or ---------- cost

a) Maximise , minimse

b) Minimise , maximise

c) Minimise, minimise

62. Minimum ratio is the ---------- non negative ratio in the replacing ratio column

a) Highest

b) Lowest

c) Decimal

63. Dual of the dual is

a) Primal

b) Dual

c) None of these

64. An LPP is defined as Minimise $z = 30\ x_1 + 24\ x_2$

s.t.c $x_1 + 2x_2 \leq 3$

$2x_1 - 4x_2 \leq 5$

$x_1 , x_2 \geq 0$

the objective function of the dual of this LPP is

a) Maximize $w = y 1 + y2$
b) Maximize $w = 2y1 – 4 y2$
c) Maximize $w = 3 y1 + 5 y2$

65. Multiple solutions in LPP indicate that
    a) More than one solution is available for the same objective function value
    b) No solution is available satisfying all constraint
    c) Two solutions are available satisfying all constraints
66. In linear programming , dual prices represent
    a) Minimum and mean price
    b) Unit worth of a resource
    c) Minimum and maximum price
67. The feasible region for the inequlailty constraints with respect to equality constraints
    a) increases
    b) decreases
    c) does not change
68. Kuhn–Tucker conditions, are ---------- for a solution in nonlinear programming to be optimal,
    a) first derivative tests
    b) Second derivative test
    c) None of the above
69. The dual problem statement is formulated with the help of information available in another statement called
    a) Primal problem
    b) Prime problem
    c) Primal constants
70. in primal dual solutions, the dual problem solution can be obtained by solving other problems classified as

a) double problem

b) original problem

c) restricted problem

71. Improper integrals are said to be convergent if the limit is
    a) Finite
    b) Infinite
    c) None of the above

72. If the limit fails to exist or is infinite, the integral
    a) Diverges
    b) Converges
    c) None of the above
73. Simplex method of solving linear programming problem is
    a) All the points in the feasible region
    b) Only the cornerpoints of the feasible region
    c) Only the interior points in the feasible region
74. Which of the following is true in case of simplex method of linear programming?
    a) It cannot be used for two variable problems
    b) The simplex algorithm is an iterative procedure
    c) Inequalities are not converted into equations
75. In converting a less-than-or-equal constraint for use in a simplex table, we must add
    a) Surplus variable
    b) Slack variable
    c) An artificial variable
76. The C_j row in a simplex table for maximization represent
    a) Profit per unit
    b) Gross profit
    c) Net profit
77. In a Simplex table, the pivot row is computed by
    a) dividing every number in the profit row by the pivot number.

b) dividing every number in the pivot row by the corresponding number in the profit row

c) none of the above

78. a feasible solution requires that all artificial variables is
    a) greater than zero
    b) equal to zero
    c) less than zero
79. in simplex method basic solution set as (n – m) , all the variables other rthan the basic are classified as :
    a) basic variables
    b) non basic variables
    c) non positive variables
80. Which of the following is first order derivative ?
    a) f'(x)
    b) f (x)
    c) $f^{''}$ (x)
81. a square matrix is non singular if its determinant is
    a) zero
    b) non zero
    c) one
82. if any two rows or columns of a determinant are interchanged , then sign of determinant
    a) changes
    b) same
    c) none of the above
83. when there are Multiple solutions in LPP , it means that
    a) No solution is available
    b) Two solutions are available satisfying all constraints
    c) More than one solution is available for the same objective function value
84. If the quantity demanded of an input increases as output increases, then :
    a) Leontief input
    b) normal input

c) none of the above

85. If B is a matrix of order 3 x 8 , then number of columns are

a) 4

b) 8

c) 9

86. A matrix of the form 5 x 5 is

a) Rectangle matrix
b) Square matrix
c) Null matrix

87. matrix B to be both symmetric and skew symmetric then matrix B is

(a) a scalar matrix
(b) a diagonal matrix

c)a zero matrix of order n × n

88. In linear programming , dual prices represent

a) Minimum , mean price
b) Unit worth of a resource
c) Minimum , maximum price

89. State whether true or false: A+ B = B+ A.

a) True

b) False

c) Maybe

90. method of solving determinants can be classified as :

a) Cramer's rule.
b) Determinant rule.
c) Solving rule

91. The slope of the graph of an increasing function is positive
    a) True
    b) False
    c) Cant say
92. A matrix of order 2 x 3 can be multiplied with a matrix of order :
    a) 2 x 3
    b) 2 x 2
    c) 3 x 3
93. All else equal, when the supply curve shifts left, the producer surplus
    a) increases.
    b) decreases
    c) constant

94. The slope of the graph of an increasing function is
    a) Negative
    b) Positive
    c) U shaped
95. Cramer's rule cannot be applied when value of determinant is
    a) 0
    b) Infinity
    c) Negative

96. The production function $y = K^{0.3} L^{0.5}$ exhibits:
    a) decreasing returns to scale.
    b) constant returns to scale.
    c) None of the above

97. Evaluate as limit of sum $\int_0^2 x dx$

(a) 2

(b) -2/3

(c) 4

98. The order of the equation $\frac{d^2y}{dx^2} + y = 0$ is

(a) 1

(b) 4

(c) 2

99. The minor M_{ij} of an element a_{ij} of a determinant is defined as the value of the determinant obtained after deleting the

(a) jth row of the determinant

(b) ith column and jth row of the determinant

(c) ith row and jth column of the determinant

100. A system of linear equations AX = B is said to be inconsistent, if the system of equations has

(a) Trivial Solution

(b) Infinite Solutions

(c) No Solution

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ANSWER KEY

1.	B
2.	B
3.	C
4.	A
5.	B
6.	A
7.	B
8.	A
9.	A
10.	C
11.	C
12.	A
13.	B
14.	A
15.	B
16.	C
17.	A
18.	C
19.	B
20.	B
21.	C
22.	A
23.	B
24.	A
25.	A
26.	B
27.	A
28.	A
29.	B
30.	A
31.	A
32.	A
33.	A
34.	A
35.	B
36.	A
37.	C
38.	A
39.	A
40.	A
41.	B
42.	A
43.	A
44.	B
45.	A
46.	A
47.	B
48.	B
49.	C
50.	B

51.	A
52.	A
53.	C
54.	A
55.	A
56.	A
57.	B
58.	C
59.	B
60.	A
61.	A
62.	B
63.	A
64.	C
65.	A
66.	B
67.	A
68.	A
69.	A
70.	B
71.	A
72.	A
73.	B
74.	B
75.	B
76.	A
77.	A
78.	B
79.	B
80.	A
81.	B
82.	A
83.	C
84.	B
85.	B
86.	B
87.	C
88.	B
89.	A
90.	A
91.	A
92.	C
93.	B
94.	B
95.	A
96.	A
97.	A
98.	C
99.	C
100.	C