UNIVERSITY OF CALICUT
SCHOOL OF DISTANCE EDUCATION

BSc Mathematics
(2011 Admn. onwards)

III Semester
Complementary Course

Mathematical Economics

Question Bank & Answer Key

Choose the correct Answer from the bracket.

1. Equations involving a single independent variable is called

a. Differential equation   c. Ordinary differential equations
b. Ordinary equations   d. None of these

2. When Y''(t) =10, Y(t) will be
a.1   c. $5t^2$
b.0   d.$5t^2$ +t c_1 + C

3. What is the order of $\frac{d^2y}{dt^2} + \left(\frac{d^4y}{dt^3}\right)^5 + \frac{d^3y}{dt^3}$ = 100y
a.4   c.2
b.3   d.1

4. In the production function Q=A$K^\alpha L^\beta$, the variable L denotes

  a. Leisure   c. Labour
  b. Less   d. Loss

5. What is the degree of $\left(\frac{dy}{dx^2}\right)^6$

  a. 2   c. 4
  b. 3   d. 6

6. Curve that is also known as equal product curve is

  a. Indifference curve   c. Demand Curve
  b. Isoquants   d. None of the above

7. Given Q_d= 6-2P Q_s = 4+4P equilibrium $\bar{p}$ will be
  a. 6   c.10
  b. 4   d. $^1/_3$

8. Law of variable proportion corresponds to

    a. Short period   c. Both A & B
    b. Long period   d. Either A or B

9. The order of $I_t = a(y_{t-1} - y_{t-2})$ is

    a. 1   c. 2
    b. -1   d. -2

10. Law of returns to scale is a theory pertaining to
    a. Market period   c. Long period
    b. Short period   d. None of the above

11. Select the odd one
    a. Cobweb   c. Haried model
    b. Lagged income   d. Slutsky equation

12. When $\sigma = 0$, substitution will be
    a. Possible   c. Impossible
    b. Sometimes possible   d. Cannot say

13. If $\frac{dy}{dt} = 15$, the value of $Y_{(t)}$ is
    a. 15   c. 15t+A
    b. 0   d. None of the above

14. The order of $\Delta Y_t = 5Y_t$ is
    a. 0   c. 2
    b. 1   d. 5

15. In the function $Q = r[\delta C^{-\alpha} + (1 - \delta)N^{-\alpha}]^{\frac{-v}{\alpha}}$, Q denotes
    a. Output   c. Profit
    b. Input   d. Loss

16. The third stage in the law of variable proportion is called
    a. Increasing returns   c. Negative returns
    b. Diminishing returns   d. Proportional return

17. Which of the following is used for constrained optimization

    a. Hessian   c. Discriminant
    b. Barclered Hessian   d. Jacobian

18. In the Cobb Douglas production function $AK^{\alpha}L^{\beta}$, A denotes

    a. Inputs   c. Efficiency parameter
    b. Output   d. None of the above

19. Producer is in equilibrium when he maximizes

    a. Input   c. Cost

    b. Profit   d. Loss

20. A homogeneous production function with degree one corresponds

    a. Constant returns   c. Increasing returns

    b. Diminishing returns   d. Negative returns

21. Euler's theorem is also called

    a. Production function   b. Product exhaustion theorem

    c. Input function   d. Output function

22. When factors of production are perfect substitutes, σ will assign

    a. 0   c. infinity

    b. -1   d. cannot say

23. The value of Y when $\frac{dy}{dt} = Y^2 t$ is

    a. $\dfrac{2}{t+c}$ c. $\dfrac{1}{t^2+c}$

    b. $\dfrac{-2}{t+c}$ d. $\dfrac{-2}{t^2+c}$

24. Given $\frac{\partial Q}{\partial x_1}$, where x_1 is input represents

    a. $AP x_1$ c. MRTS

    b. $MP x_1$ d. MRS

25. Production function shows technological relationship between input and ………

    a. Output   c. Both of the above

    b. factors of production   d. None of the above

26. When the total product is maximum, marginal product will be

    a. minimum   c. maximum

    b. zero   d. Negative

27. Marginal product equals.

    a. $\dfrac{TP}{P}$ c. slope of TP curve

    b. $\dfrac{AP}{P}$ d. Slope of AP curve

28. When demand for a good is give by Q = 40-P, the maximum amount that would be demanded at nil price is

    a. 1   c. 40

    b. 0.   d. 400

29. When $e^x = 1$, the value of x is

    a. 0   c. 1

    b. -1   d. cannot say

30. Combinations of two inputs resulting in equal total output is

    a. Isoquant   c. Indifference curve

    b. Isocost   d. Priceline

31. The order of $\frac{d^2Y}{dt^2} + \left(\frac{dy}{dt}\right)^4 = 50t$ is

    a. First   c. Third

    b. Second   d. None of the above

32. Which of the following shows constant returns to scale

    a. Cobb Douglas production function   c. Both A & B

    b. CES production function   d. None of the above

33. Slope of ISo-quant is called

    a. MRS   c. MP

    b. MRTS   d. AP

34. $\frac{Q}{x_2}$, where x_2 denotes inputs corresponds to

    a. MPx_2 c. APx_2

    b. MPx_1 d. APx_1

35. State two of production begins where average product begins to decline

    a. always   c. sometimes

    b. never   d. often

36. Slope of price line is

    a. MRS   c. MRTS

    b. $\frac{P1}{P2}$ d. $\frac{MPx_1}{MPx_2}$

37. IN the CES production function Q $[\delta C^{-\alpha} + (1 - \delta)N^{-\alpha}]^{\frac{-v}{\alpha}}$ the term C denotes

    a. Constant   c. Capital

    b. Output   d. Population

38. Euler's theorem is valid only for …………. function.

    a. Nonlinear   c. Quadratic

    b. Linear   d. Exponential

39. MRTS can be calculated as

    a. $\dfrac{-MPx_1}{MPx_2}$ c. $\dfrac{x_1}{x_2}$

    b. $\dfrac{K}{L}$ d. $\dfrac{-APx_1}{APx_2}$

40. Technical relationship between input and output is called.

    a. elasticity   c. input function
    b. production function   d. None of the above

41. Law of diminishing returns is also known as

    a. Variable proportion   c. Isoquant
    b. returns to scale   d. Price line

42. Higher isoquants represents higher

    a. profit   c. Cost
    b. Output   d. None of the above

43. For the production function $Q = AL^{0-4}L^{0.5}$, which of the following is true?

    a. Increasing returns to scale   c. Constant returns to scale

    b. Diminishing returns to scale   d. Variable returns to scale

44. What is the order of $\left(\dfrac{d^3y}{dx^3}\right)^4 + \left(\dfrac{d^2y}{dx^2}\right)^6 = 10 - Y$

    a. First order   c. Third order

    b. Second order   d. Fourth order

45. What is the degree of $\left(\dfrac{d^3y}{dx^3}\right)^4 + \left(\dfrac{d^2y}{dx^2}\right)^6 = 10 - Y$

    a. 3   c. 2

    b. 4   d. 6

46. The function $Q = f \, C K_1 L)$ represents

    a. Isocline   c. Isoquant
    b. Isoprofit   d. Isocost

47. What is the order of differential equation $\dfrac{dy}{dt} = 10x + 5$

    a. first   c. third
    b. Second   d. Fourth

48. Demand function Q = f(P), the variable P denotes

    a. Product   c. Price
    b. Production   d. Profit

49. Given the demand curve P = 10 – 0.2Q, total revenue curve

    a. $1 - 0.2Q$ c. $10Q - 0.2Q$
    b. $10Q^2 - 0.2Q$ d. $10Q - 0.2Q^2$

50. In the production function $Q = AK^{\propto}L^{\beta}$, if $\propto + \beta = 1$ implies

    a. Increasing returns   c. Constant returns
    b. Diminishing returns   d. Cannot say

51. Which of the following is called product exhaustion theorem.

    a. Eulers's theorem   c. CES
    b. Cobb Douglas function   d. Translog

52. What is the degree of $\left(\frac{dy}{dt}\right)^4 - 6t^5$

    a. First degree   c. Third degree
    b. Second degree   d. Fourth degree

53. TR – TC is also known as
    a. Revenue   c. Cost
    b. Profit   d. None of the above

54. Demand function Q = f(P) if point elasticity $\in = -1$ for all P> 0 will be
    a. CP   c. P
    b. $\frac{C}{P}$ d. None of the above

55. In Cobb Douglas function $AK^{\propto}L^{\beta}$ if $\propto + \beta < 1$ implies
    a. Increasing returns   c. Constant returns
    b. Diminishing returns   d. Cannot say

56. Slope of Total product Curve is called
    a. MP   c. TP
    b. AP   d. MC

57. What is the order of $\left(\frac{d^2y}{dt^2}\right)^7 + \left(\frac{d^3y}{dt^3}\right)^5 = 100$ y
    a. 2   c. 5
    b. 3   d. 7

58. Marginal rate of technical substitution is the ratio of
    a. Price to income   c. Marginal products
    b. Marginal utility   d. Marginal revenue

59. In CES production function, the elasticity of substitution is
    a. Unity
    b. Zero
    c. Negative
    d. Constant

60. The highest power to which the derivative of highest order is raised in differential equation is called.
    a. Trace
    b. Order
    c. Degree
    d. Transpose

61. The producer will be in equilibrium when
    a. MRTS = $\frac{Px}{Py}$
    b. MRTS > $\frac{Px}{Py}$
    c. MRTS < $\frac{Px}{Py}$
    d. None of the above

62. Returns to scale in the Cobb Douglas production function $Y = AK^\alpha L^\beta$ is
    a. α
    b. β
    c. $\alpha + \beta$
    d. $\alpha - \beta$

63. The longrun theory of output behavior is known as
    a. Diminishing returns
    b. Law of variable proportions
    c. Diminishing Marginal products
    d. Law of returns to scale

64. Harred model explains _____ growth of the economy
    a. Static
    b. Dynamic
    c. Equilibrium
    d. Balanced

65. Select the odd one among land, capital , organization, profit
    a. Land
    b. Capital
    c. Organisation
    d. Profit

66. The degree of $\frac{d^2y}{dt^2} + \left(\frac{dy}{dt}\right)^3 + 25 = 0$ is
    a. First
    b. Second
    c. Third
    d. Fourth

67. A line that connects various equilibrium points of producer is
    a. Isocost line
    b. Isoquants
    c. Expansion path
    d. Price line

68. Law of variable proportion explains for
    a. Shortrun
    b. Long run
    c. Medium
    d. None of the above.

69. In the production function $Q = r[\delta C^{-\alpha} + (1 - \delta)N^{-\alpha}]^{\frac{-v}{\alpha}}$, efficient is measured with
    a. δ
    b. r
    c. N
    d. C

70. Change in output dQ, along same isoquant is
    a. increases
    b. decreases
    c. zero
    d. constant

71. A line for linear equation should begin from
    a. Origin
    b. X axis
    c. Y axis
    d. Any of the above

72. Production behavior in which some inputs are fixed corresponds
    a. Shortrun
    b. long run
    c. Medium run
    d. None of above

73. The order of $\left(\frac{d^2y}{dt^2}\right)^7 + \left(\frac{d^3y}{dt^3}\right)^5 = 100$ y is
    a. first
    b. second
    c. Third
    d. fifth

74. In the Cobb Douglas production function $AK^\alpha L^\beta$, α denotes
    a. Labour share
    b. Capital share
    c. Output
    d. Input

75. Euler's theorem is valid only if factors are paid reward on the basis of value of
    a. Average product
    b. Total Product
    c. Marginal product
    d. None of the above

76. Producers equilibrium can be given as
    a. $\frac{P_1}{P_2}$
    b. $\frac{P1}{P2} > \frac{f1}{f2}$
    c. $\frac{P_1}{P_2} = \frac{f1}{f2}$
    d. $\frac{P_1}{P_2} < \frac{f1}{f2}$

77. If both factors X_1 and X_2 are perfect substitutes, then the value of elasticity of substitution is
    a. 1
    b. 0
    c. $0 < \sigma < 1$
    d. infinity

78. The process of determining present value of a future sum of money is
    a. compounding
    b. Discounting
    c. Adding up
    d. Transfer

79. The order of $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 = 25x$ is
    a. First
    b. Second
    c. Third
    d. None of the above

80. Which of the following is not a feature of Cobb Douglas production factor
    a. Linearity
    b. Homogencity
    c. constant returns
    d. Increasing returns

81. Isoquants intersects each other
    a. Possible
    c. Sometimes
    b. Never
    d. Cannot say

82. The value of Rs 100 at 10% interest for two years.
    a. 110
    c. 121
    b. 111
    d. 130

83. Cobb Douglas production function is of degree
    a. One
    c. Three
    b. Two
    d. Four

84. If bordered Hessian is foun out ot be positive, function is
    a. Maximum
    c. Either A or B
    b. minimum
    b. Neither A and B

85. Warranted growth rate in the Harved model is
    a. $5Yt$
    c. $\frac{s}{a-s}$
    b. $\frac{a}{a-s}$
    d. $\frac{a-s}{a}$

86. Iso quants are downward sloping and ____ to the origin
    a. Convex
    c. Vertical
    b. Concave
    d. Horizontal

87. Functional relationship between input and output is called
    a. Isoquants
    c. Input function
    b. Isocost
    d. Production function

88. Consumer will be at equiliburim when he maximizes
    a. Profit
    c. Satisfaction
    b. Output
    d. Income

89. What is the order of $\frac{d^3Y}{dx^3} + (x^2Y)\frac{d^2Y}{dx^2} - 4Y^4 = 0$
    a. First
    c. Third
    b. Second
    d. Fourth

90. What is the degree of $\frac{d^3Y}{dx^3} + x^2Y\left(\frac{d^2Y}{dx^2}\right) - 4Y^4 = 1$
    a. First
    c. Third
    b. Second
    d. Fourth

91. For the maximum profit, the bordered hessian should be
    a. Negative
    c. Zero
    b. Positive
    d. Infinite

92. Which of the following is non – discounting technique
    a. Profitability index
    b. Internal rate of return
    c. NPV method
    d. Pay back method

93. What is degree of $\frac{dY}{dt} = 10x + 5$
    a. first
    b. Second
    c. Third
    d. Fourth

94. What is order of $\left(\frac{dY}{dt}\right)^4 - 5t^5$
    a. First
    b. Second
    c. Third
    d. Fourth

95. MRTS is the slope of
    a. Production function
    b. Priceline
    c. Isocostline
    d. Isoquant

96. The order of differential equation is the order of …….
    a. Derivative
    b. Highest derivative
    c. exponents
    d. factors

97. Second stage in return to scale is called
    a. Increasing returns
    b. Diminishing returns
    c. Constant returns
    d. Negative returns

98. For producer which is rational stage for producer in law of variable proportion
    a. First
    b. Second
    c. Third
    d. None of the above

99. The degree of $\frac{d^2Y}{dt^2} + \left(\frac{dY}{dt}\right)^3 + x^2 = 0$
    a. First
    b. Second
    c. Third
    d. Fourth

ANSWER KEY

1.C	26.B	51.A	76.C
2.D	27.C	52.D	77.D
3.A	28.C	53.B	78.B
4.C	29.C	54.B	79.B
5.D	30.A	55.B	80.D
6.B	31.B	56.A	81.B
7.D	32.C	57.B	82.C
8.A	33.B	58.C	83.A
9.C	34.C	59.D	84.A
10.C	35.A	60.C	85.C
11.D	36.B	61.A	86.A
12.C	37.C	62.C	87.D
13.C	38.B	63.D	88.C
14.B	39.A	64.B	89.C
15.A	40.B	65.D	90.A
16.C	41.A	66.A	91.B
17.B	42.B	67.C	92.D
18.C	43.B	68.A	93.A
19.B	44.C	69.B	94.A
20.A	45.B	70.C	95.D
21.B	46.C	71.D	96.B
22.C	47.A	72.A	97.C
23.D	48.C	73.C	98.B
24.B	49.D	74.B	99.A
25.A	50.C	75.C	