DEPARTMENT OF ECONOMICS

+3 1st YEAR ARTS (1st SEMESTER)

CORE-1

INTRODUCTORY MICRO ECONOMICS

GROUP-A

Each question carries one mark.

1. Economics is a _____ science.
2. Alfred Marshall gave the _____ definition of economics.
3. Who is the father of economics?
4. The book written by Adam Smith is _____.
5. A theory consists of _____.
6. _____ is an economic mode of presenting a theory.
7. Economic model consist of a set of _____.
8. Ceteris paribus is simply known as _____.
9. What is a theory?
10. What is an assumption?
11. Circular representation of data can be shown in _____.
12. _____ is an arrangement of data in chronological order.
13. Price of a good and its quantity demanded are _____ related.
14. The graphical illustration of demand schedule is called _____.
15. Demand curve is ____ sloped.
16. In law of demand Giffen goods are treated as _____ goods.
17. Pen and ink are considered to be ____ goods.

18. The movement along the demand curve causing reduction in demand is called ____.
19. If the demand curve shifts to right, the quantity demanded _____ at any given price.
20. The law of supply shows _____ relationship between price and quantity supplied.
21. The price at which demand for and supply of goods is equal, is called ____.
22. What causes the shift of demand curve to the right?
23. What happens to demand for a good if its demand curve shifts to the left?
24. The measure of responsiveness of quantity demand to change in price is called _____.
25. The value of perfectly elasticity of demand is _____.
26. The value of perfectly inelastic demand is _____.
27. If the total expenditure spent on goods increases with fall in price, the demand is said to be _____.
28. What is shape of perfectly elastic demand?
29. What happens to total expenditure spent on a good if the elasticity of demand for that good is unit elastic?
30. Consumer surplus is closely related to the _____ curve for a product.
31. The difference between the amounts a buyer is willing to pay for a good and amount actually paid is called _____.
32. The consumer surplus _____ with lower prices.
33. The producer surplus is closely related to _____ curve.
34. What happens to producer surplus if the price of the product rises?
35. Budget constraint is applicable to _____ numbers of goods.

36. The shape of budget line is _____.
37. ____ And ____ are given for the construction of a budget constraint.
38. The consumer purchases the combination that lies ____ the budget line.
39. If the income of the consumer increases, the budget line _____.
40. The normal shape of income consumption curve is _____.
41. The shape of the indifference curve for perfect substitute is _____.
42. The shape of the indifference curve in case of perfect complementary goods is _____.
43. Why does price line shift to the right.
44. The shape of total fixed cost curve is _____.
45. The average cost curve is _____ shape.
46. When MC is greater than AC, the AC wills _____.
47. MC equals to AC at _____ of the average cost curve.
48. Which curve is called envelop curve?
49. What is the shape of MC?
50. A firm attains equilibrium when ____.
51. When average cost is less than average revenue ____ profit is earned.
52. The shape of average revenue is _____ in perfectly competitive market.
53. In the long run _____ profit is earned.
54. Equilibrium is a state of _____.
55. The value of marginal product _____ with increase in employment of labour.
56. The value of marginal product _____ with increase in employment of labour.

57.Marginal revenue product = marginal physical product* _____.

58.Higher price ____ the producer surplus.

GROUP-B

Each question carries two marks

Short answer type questions within two to three sentences.

1. What is opportunity cost?
2. What is theory?
3. What is a law?
4. What is production possibility frontier?
5. What is micro economics?
6. What is positive economics?
7. What do you mean by normative science?
8. Why does demand curve shift left or right?
9. What does the slope of demand curve shows us?
10. What is graph?
11. What is the relationship between price and quantity demand?
12. How can you derive market demand curve from individual demand curve?
13. What is market in economics?
14. What is stable equilibrium?
15. What is partial equilibrium?
16. What is supply price?
17. What do you mean by demand?
18. Define elasticity of demand?
19. What elasticity of demand?
20. What does unit elasticity of demand refer to?

21.Describe arc elasticity of demand?

22.Define cross elasticity of demand?

23.What is elasticity of supply?

24.What is consumer surplus?

25.What is producer surplus?

26.How is consumer surplus measured?

27.What is budget constraint?

28.Why does the budget line slops downward?

29.What do you mean by trade-off?

30.Why does a budget line shift?

31.What is income effect?

32.What is price consumption curve?

33.What is substitution effect?

34.What does the indifference shows?

35.What is cost function?

36.What is short run?

37.Distinguished between short-run and long-run?

38.Distinguished between fixed factor and variable factor?

39.What is the relation between average cost and marginal cost?

40.What is social cost?

41.What do you mean by accounting cost?

42.What do you mean by real cost?

43.What is implicit cost?

44.Define marginal cost?

45.What is market period?

46.What is normal profit?

47.Define perfect competition?

48.What do you mean by homogeneous goods?

49.What is marginal physical product?

50.What is equilibrium wage rate?

GROUP-C

Each question carries three marks.

1. Write a short note on how people make decision.
2. Write a short note on the scientific method.
3. Write a short note on economist as scientist.
4. Write a short note on observation.
5. Write a short note on role of assumptions.
6. Write a short note on Economic model.
7. Write a short note on why economists disagree.
8. Write a short note on uses of graphs n economics.
9. How can you derive market demand curve from individual demand curve?
10. How is consumer surplus measured?
11. What is producer surplus?
12. What are the types of income elasticity of demand?
13. What is cross elasticity?
14. Distinguish between relatively elastic and relatively inelastic demand?
15.
16. Distinguished between short-run and long-run?
17. State the properties of Indifference curve?
18. State two extreme example of indifference curves with diagrams?
19. What is price effect?

20.What is income effect?
21.Distinguished between fixed factor and variable factor?
22.What is the relation between average cost and marginal cost?
23.What is the use of mathematics in economics?
24.Distinguish between contraction of demand and decrease in demand?
25.Why does supply curve shift to the right?
26.What is substitution effect?
27.Distinguish between perfectly elastic and perfectly inelastic demand?
28.What is producer surplus?
29.How is consumer surplus measured through demand curve?
30.How is consumer surplus measured?
31.What is budget constraint?
32.Why does the budget line slops downward?
33.What do you mean by trade-off?
34.Why does a budget line shift?
35.What is deadweight loss?
36.Why does indifference curve slope downward from left to right?
37.What is price effect?
38.What is the effect of change in prices of two goods on budget line?
39.What is marginal rate of substitution?
40.What is an inferior good?
41.What do mean by Giffen's good?
42. Distinguish between budget line and budget constraint?
43.Distinguish between fixed cost and variable cost?
44.Why does average cost take the shape of U shape?
45.State the relation ship between average cost and marginal cost?

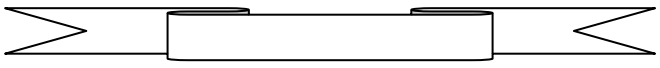
46. Distinguish between fixed and variable cost?
47. What is shutdown point?
48. Show the short run marginal cost curve of a competitive firm?
49. What is the condition for long run equilibrium under perfect competition?
50. What do you mean by external economies?
51. What are the factors responsible for shift in the labour supply curve?
52. What are the factors responsible for shift in the labour demand curve?
53. Why the labour supply curve is backward bending?
54. What do you mean by marginal productivity?

GROUP-D

Each question carries 7 marks

1. How do people make decisions? Describe four principles on decision- making made by the people.
2. Describe the subject matter of economics in detail.
3. What is assumption? What is its role in economic theory?
4. What is demand? What are the factors influencing demand?
5. Why does demand curve slope downward?
6. What is price elasticity of demand? What are the factors influencing elasticity of demand?
7. How can the elasticity of demand be measured by arc elasticity measure?
8. What is consumer surplus? How can it be measured?

9. What is producer surplus? How can it be measured?
10. Describe the application of consumer surplus and producer surplus on the efficiency of the cost of a tax?
11. What do you mean by indifference curve? Describe its properties?
12. Describe the consumer's equilibrium through indifference curve?
13. Describe the Slutsky's method of substitution effect.
14. What is income effect? Discuss nature and properties for normal and inferior goods.
15. How can you describe work-leisure relationship through indifference curve?
16. Show that price effect is the combination of income effect and substitution effect?
17. Why long run average cost curve is U shaped?
18. Make an analysis of worker choice between leisure and money income.
19. Describe the Neo-classical version of marginal productivity theory.
20. Show the shut down point of the firm. Explain why firms shut down?



DEPARTMENT OF ECONOMICS

+3 1st YEAR ARTS (1st SEMESTER)

QUESTIONS BANK (2024)
DEPARTMENT OF ECONOMICS, PATTAMUNDAI COLLEGE, PATTAMUNDAI

CORE-2

METHEMETICAL METHODS FOR ECONOMICS-I

GROUP-A

Fill in the blanks. (Each question carries one mark)

1. A null set is denoted by_____.
2. A void set is denoted by_____.
3. A ∪ $B = B$_____A.
4. If $A \subset B, then\ A \cap B =$_____.
5. If $A \subset B, then\ A \cup B =$_____.
6. A ∪ $U =$ _____.
7. _____ is regarded as the father of set theory.
8. The Venn diagram was introduced by_____.
9. Relation sets are obtained from_____.
10. Y +=5 is a_____ function.
11. Y= x^a is a _____ function.
12. Y= $3x^2 + 2x + 4\ is\ a$_____$function.$
13. A function is said to be_____ function when two or more elements of its domain are related to one elements of its codomain.
14. A function is said to be_____ function when no elements of its codomain is related with more than one element of its domain.
15. A function is said to be_____ function when all the elements of its domain are associated with a single element of its codomain.
16. A function that is obtained by interchanging the order pairs of a one-one onto function is called an inverse function.

17. A function that is directly expressed in terms of independent variable is called _____ function.
18. A function in which each elements of its domain corresponds to itself is called _____ function.
19. $\frac{lim}{x\to\infty}\frac{1}{x}$ = _____.
20. $\frac{lim}{x\to 0}e^x$= _____.
21. Differentiation of a constant function is_____.
22. Differential coefficient of e^x=_____.
23. Differential coefficient of a^x=_____.
24. Differential coefficient of $log e^x$=_____.
25. Differential coefficient of $x^4 + 4x$=_____.
26. If total cost is $C = x^2 - 5x^2 + 31x$, then marginal cost will be_____.
27. If total cost is $C = x^3 - 2x^2 + 43x$, then average cost will be_____.
28. The first order partial derivates of the function $2x^2 + 5xy - y^3$ w.r.t X is_____.
29. The first order partial derivates of the function $2x^2 + 5xy - y^3$ w.r.t Y is_____.
30. In case of substitute commodity, the value of cross elasticity of demand will be_____.
31. In case of complementary commodity, the value of cross elasticity of demand will be_____.
32. A matrix consists of one element only is called _____ matrix.
33. A matrix that appears with equal number of rows and columns is called_____ matrix.

34. A diagonal matrix in which all the leading diagonal elements are equal is called_____ matrix.
35. A square matrix in which all the leading diagonal elements are unity and all other elements are zeroes is called a_____ matrix.
36. If AXA'=I, then a is _____ matrix.
37. _____ is a numerical value or expression associated with a square matrix.
38. The determinant of a matrix is same as the determinant of its_____.
39. If any row or column of the determinant consist of zeroes only the value of the determinant becomes_____.
40. If any two row or column of the determinant are identical then the value of the determinant becomes_____.
41. A square matrix with a non-zero matrix is called _____ matrix.
42. A square matrix A is said to be _____ if $|A|$=0.
43. Determinant of the matrix $\begin{bmatrix} 8 & 5 \\ 1 & 6 \end{bmatrix}$ is_____.
44. Rank of the matrix $\begin{bmatrix} 6 & 9 \\ 2 & 3 \end{bmatrix}$ is_____.
45. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ is an example of _____ matrix.
46. _____ is the M_{21} of $\begin{bmatrix} 9 & 8 \\ 12 & 5 \end{bmatrix}$.
47. C_{12} of $\begin{bmatrix} -5 & -8 \\ -4 & -12 \end{bmatrix}$ is_____.
48. The matrix A is idempotent if: $A \times A =$_____.
49. An adjoint matrix is the …… of the cofactor matrix

GROUP-B

QUESTIONS BANK (2024)
DEPARTMENT OF ECONOMICS, PATTAMUNDAI COLLEGE, PATTAMUNDAI

Each question carries 2 marks

1. What do you mean by cardinality of a set?
2. What is void set?
3. What is valid set?
4. What is finite set?
5. What is infinite set?
6. What is singleton set?
7. What is multitone set?
8. What is equal set?
9. What is equivalent set?
10. What is disjoint set?
11. Set of all colleges of Odisha, explain this set by descriptive method?
12. Set of odd numbers between 5 and 50, explain this set by descriptive method?
13. Set of even numbers between 1 and 45, explain this set by descriptive method?
14. Set of natural numbers between 1 and 100, explain this set by descriptive method?
15. By using suitable example prove that A-(BUC)=(A-B)∩ $(A - C)$
16. By using suitable example prove that $A - (B \cap C) = (A - B) \cup (A - C)$
17. What is reflexive relation?
18. What is symmetric relation?
19. What is order relation?
20. What is binary relation?
21. What is inverse relation?
22. Represent the function $f(x) = 3 + 2x$ by means of the appropriate graph?

23. Represent the function $f(x) = x^2 + 5$ by means of the appropriate graph?
24. Represent the function $f(x) = \frac{3+2x}{2}$ by means of the appropriate graph?
25. Find inverse of the function $f(x) = 3x - 1$
26. Find inverse of the function $y = 5x^3$
27. What is function?
28. What is image?
29. What is pre-image?
30. Write short note on Radix?
31. Write short note on Normalisation?
32. Write short note on fractional number?
33. Write short note on mixed number?
34. Write short note on floating point representation?
35. Convert the binary no. $(111)_2$ into decimal equivalent?
36. Convert the binary no. $(1101)_2$ into decimal equivalent?
37. Convert 54 into its binary equivalent?
38. Convert 5455 into its binary equivalent?
39. Convert 550 into its binary equivalent?
40. Convert 3565 into its binary equivalent?
41. What is onto function?
42. What is into function?
43. What is one one function?
44. What is many one function?
45. What is constant function?
46. What is discontinuous function?
47. What is even function?
48. What is odd function?

49.What is composite function?

50.What is exponential function?

51.What is polynomial function?

52.What is rational function?

53.What is irrational function?

54.What is monotonic function?

55.What is parametric function?

56.Define limit of a function?

57.Evaluate $\frac{lim}{x\to 2}\frac{x^2-5x+6}{x^2-4}$

58.Define continuity of afunction?

59.Find if the function $\frac{x^2-9}{x-3}$ is discontinuous at x = 3

60.What is differential coefficient?

61.What is differentiation?

62.State the product rule of differentiation?

63.State the quotient rule of differentiation?

64.State the chain rule of differentiation?

65.Find the differential coefficients of $\frac{1}{x^3}$ with respect to x?

66.Find the differential coefficients of $\frac{1}{\sqrt{x}}$ with respect to x?

67.Find the differential coefficients of log5x with respect to x?

68.Find the differential coefficients of e^{-x} with respect to x?

69.Find the differential coefficients of $x^3e^x$with respect to x?

70.Find the differential coefficients of $2x + 3^2$ with respect to x?

71.Find the differential coefficients of $\frac{1}{log_x 7}$ with respect to x?

72.Find average and marginal cost from the total cost function $C = x^2 - 5x^2 + 31x$

73.What is homogeneous function?

74. Find the first order partial derivates of the function $2x^2 + 5xy - y^3$-
75. Find the first order partial derivates of the function $\log(x^2 + y^2)$
76. Find the first order partial derivates of the function $\frac{x^2+y^2}{x^2+y}$
77. Find the first order partial derivates of the function$(5x + 4y)^3$
78. Find the first order partial derivates of the function $\sqrt{xy}$
79. Find the first order partial derivates of the function e^{xy}
80. Find the four second order partial derivatives of the function f(x,y)= $2x^2y^3$
81. Find the four second order partial derivatives of the function f(x,y)= $2x^3$-$5xy+y^3$
82. Find the partial elasticities $Z = x^2e^y$
83. Determine the price elasticity of demand for the function $x = 32 - 4p - p^2$ where p=3.
84. Determine the price elasticity of demand for the function $p = \frac{k}{x}$ where k>0.
85. What is null matrix?
86. What is singleton matrix?
87. What is scalar matrix?
88. What is identity matrix?
89. What is triangular matrix?
90. What is diagonal matrix?
91. What is minor?
92. What is cofactor?
93. What is orthogonal matrix?
94. What is symmetric matrix?
95. What is singular matrix?
96. What is non-singular matrix?

97.Define determinant of a matrix?

98.State any three properties of determinant?

99.What is rank of a matrix?

100.Find determinant of A= $\begin{bmatrix} 12 & -6 \\ 7 & 9 \end{bmatrix}$

GROUP-C

Each question carries 3 marks

1. What is subset?
2. What is super set?
3. What is proper set?
4. What is power set?
5. What is Universal set?
6. What is complementary set?
7. What is overlapping set?
8. What is cartesian set?
9. What is proper subset?

10.By using suitable example prove that $A - (A - B) = A \cap B$

11.By using suitable example prove that $A' - B' = B - A$

12.By using suitable example prove that $A \cap (B - C) = (A \cap B) - (A \cap C)$

13.By using suitable example prove that $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$

14.What is anti-symmetric relation?

15.What is transitive relation?

16.What is equivalence relation?

17. Represent the function $f(x) = x^2 + 5$ by means of the appropriate graph?
18. Represent the function $f(x) = \frac{3+2x}{2}$ by means of the appropriate graph?
19. Find inverse of the function $f(x) = 3x - 1$
20. Find inverse of the function $y = 5x^3$
21. Define domain of a function?
22. Define co-domain of a function?
23. Define range of a function?
24. Convert the binary no. $(10111)_2$ into decimal equivalent?
25. Convert the binary no. $(101010)_2$ into decimal equivalent?
26. What is inverse function?
27. What is explicit function?
28. What is implicit function?
29. What is continuous function?
30. Evaluate $\lim_{x\to 1} \frac{x^4-81}{x-3}$
31. Evaluate $\lim_{x\to \infty} \frac{x-2}{x+1}$
32. Find if the function $\frac{x^2-9}{x-3}$ is discontinuous at x = 3
33. Find if the function $\frac{x^2-4}{x-2}$ is continuous at x = 2
34. Show that $f(x) = (x^2 + 3x + 4) is\ continuous\ at\ x = 1$
35. State the chain rule of differentiation?
36. Find the differential coefficients of e^{ax+b} with respect to x?
37. Find the differential coefficients of $e^x log x$ with respect to x?
38. Find the differential coefficients of $\frac{x^3}{x^3+2}$ with respect to x?
39. Find the differential coefficients of $x.e^x$ with respect to x?
40. Find the differential coefficients of $\frac{13}{1-5x}$ with respect to x?

41. Find the differential coefficients of $(5-2x)^6$ with respect to x?
42. Find the differential coefficients of $\sqrt{5-2x}$ with respect to x?
43. Find the differential coefficients of 2^{x^3} with respect to x?
44. Find the differential coefficients of 3^{e^x} with respect to x?
45. Find the differential coefficients of x^x with respect to x?
46. Find the differential coefficients of x^{e^x} with respect to x?
47. Determine the price elasticity of demand for the function $x = 32 - 4p - p^2$ where p=3.
48. Determine the price elasticity of demand for the function $p = \frac{k}{x}$ where k>0.
49. Determine the price elasticity of demand for the function $x = \frac{27}{p^3}$.
50. Determine the price elasticity of demand for the function p=$\frac{10}{(x+1)^2}$.
51. Find average and marginal cost from the total cost function $C = x^3 - 3x^2 + 15x$.
52. Find the four second order partial derivatives of the function f(x,y)= $2x^3$-5xy+y^3
53. Find the four second order partial derivatives of the function f(x,y)= log(x^2y^3)
54. Find the four second order partial derivatives of the function f(x,y)=xe^{xy}-y^2
55. What is scalar matrix?
56. What is identity matrix?
57. What is singular matrix?
58. State any three properties of determinant?
59. What is rank of a matrix?

60.Find inverse of the matrix $\begin{bmatrix}3 & 4\\1 & 2\end{bmatrix}$

61.Find the product of BA where, A=$\begin{bmatrix}-2 & 1 & 3\\2 & -4 & 5\end{bmatrix}$ B=$\begin{bmatrix}3 & 1\\0 & -1\\2 & 4\end{bmatrix}$

62.Find adjoint of the matrix $\begin{bmatrix}2 & 5\\1 & 3\end{bmatrix}$

63.Solve the following linear equations by the method of matrix 3x+11y=7 and 6x+22y=5.

64.Determine rank of the following matrix A=$\begin{bmatrix}3 & 2 & 1\\0 & 4 & 5\\3 & 6 & 6\end{bmatrix}$

65.Solve the following linear equations by using Cramer's rule 4x+3y=8 and 6x+7y=17.

GROUP-D

Each question carries 7 marks

1. If A and B are two sets then Prove that $(A \cup B) = (B \cup A)$
2. If A, B and C are three sets then Prove that $(A \cup B) \cup C = A \cup (B \cup C)$
3. If A, B and C are three sets then Prove that $(A \cap B) \cap C = A \cap (B \cap C)$
4. If A and B are two sets then Prove that $(A \cap B) = (B \cap A)$
5. If A, B and C are three sets then Prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
6. If A, B and C are three sets then Prove that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
7. If A and B are two sets then Prove that$(A \cup B)' = A' \cap B'$ (De Morgan's law-I)

8. If A and B are two sets then Prove that $(A \cap B)' = A' \cup B'$ (De Morgan's law-II
9. If A, B and C are three sets then Prove that $A - (B \cap C) = (A - B) \cup (A - C)$
10. Write down the limit theorems involving two functions?
11. Find the domain and range of the functions (I) $Y = \frac{1}{X}$ (II) $Y = \sqrt{4 - X}$, Y≥ 0 (III) $Y = \frac{1}{X-1}$
12. Prove that $Y = 7X^6 + 3X^4 - 2X^2 + 4$ IS an even function.
13. A Publishing house finds that the cost of production directly attributed to each book is Rs.30 and that the fixed cost are Rs.15000. If eac book can be sold for Rs.45, then determine ;(I) the cost function (II) the revenue function (III) the profit function (IV) the break even point.
14. Prove that $\frac{lim}{X \to a} \frac{X^n - a^n}{X - a} = na^{n-1}$ where $a > 0$
15. Prove that $\frac{lim}{X \to 0} e^x = 1$
16. Evaluate $\frac{lim}{x \to 0} \frac{5x^3 - 6}{\sqrt{9 + 4x^2}}$
17. Determine whether the function is continuous or not at X=2, $f(X) = x^2 - 4x + 3$
18. Show that the $f(x) = 3x^2 = 4x - 5$ is continuous at x=3. Also prove that f(x) is continuous for all value of X.
19. Find the differential coefficient of the following functions (I) $(x^2 + 5)^{3/2}$ (II) log[(5-2x)(5+3x)].
20. Find the derivative of the following functions; (I) x^{x^2} (II)$(\log x)^x$
21. Determine the fourth order derivative of the function $y = log\sqrt{3x + 4}$

22. Determine the price elasticity of demand for the function, $x = 32 - 4p - p^2$ where p=3.
23. Determine the price elasticity of demand for the function $x = \frac{27}{p^3}$ where x is the demand for goods at p price.
24. Determine the price elasticity of demand in terms of x for the function $p = \frac{10}{(x+1)^2}$
25. A firm with linear demand function can sell 1000 units when the price is Rs.4 per unit, and 1500 units when the price is Rs2 per unit/ On the given premises determine (I) the demand function (II) the total revenue function (III) the average revenue function and (IV) the marginal revenue function.
26. Explain the relationship between average cost and marginal cost by using derivative?
27. Examine the average and marginal cost relations when the total variable cost is $C = x^3 - 3x^2 + 15x$.
28. Show that the elasticity of dem,and is equal to $\frac{AR}{AR-MR}$ under the linear demand law $p = a + bx$
29. Verify Euler's theorem when $z = x^2 + y^2$
30. Verify Euler's theorem when $z = \frac{x^3+y^3}{xy}$
31. The demand function for the two commodities are given as $x_1 = \frac{-p_1}{p_2^2}$ and $x_2 = \frac{p_1^2}{p_2}$, where p1 and p2 are prices and x1 and x7 denotes the quantities of the two commodities respectively. Shows that the two commoditise are substitute of one another.
32. If A=$\begin{bmatrix} 2 & 1 & 3 \\ 4 & 1 & 0 \end{bmatrix}$ and B=$\begin{bmatrix} 1 & -1 \\ 0 & 2 \\ 5 & 0 \end{bmatrix}$ verify that $(AB)' = B'A'$

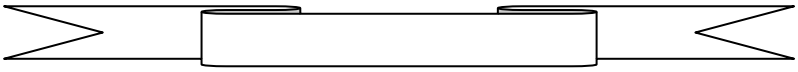
33. What is determinant? Explain the properties of determinant.

34. Prove that $\begin{bmatrix} x+a & b & c \\ c & x+b & a \\ a & b & x+c \end{bmatrix}$=0

35. Solve the following system of equations by using Cramer's rule 3x-4y+5z= -6, X+Y-2Z=-1, 2X+3Y+Z=5

36. Find inverse of the matrix A=$\begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{bmatrix}$

37. Solve the following equation by matrix method X+Y+2Z=4, 2X-Y+3Z=9, 3X-Y-Z=2



DEPARTMENT OF ECONOMICS

+3 1ST YEAR ARTS (2ND SEMESTER)

CORE-3

INTRODUCTORY MACRO ECONOMICS

GROUP-A

Each question Carries 1 mark

1. _____ had classified economics into two branches such as micro economics and macroeconomics.
2. _____ theory is that part of economics which studies the overall average and aggregates of the system.
3. _____ deals with the functioning of the economy as a whole.
4. The famous book 'General theory of Employment, Interest and Money' was written by_____.
5. The famous book 'General theory of Employment, Interest and Money' was published in the year_____.
6. The say's law of market state that _____ creates its own demand.
7. _____ is the combination of inflation and unemployment.
8. A_____ is a quantity measured at a particular point of time.
9. A _____ is a quantity measured over a specified period of time.
10. _____ refers to that position in which all units of an economy are in equilibrium.

11._____ refers to that position of equilibrium which is concerned with the equilibrium of a single economic unit.

12.Net indirect tax = Indirect tax -_____.

13.Market price = Factor cost + Indirect tax - _____.

14.GNP = GDP + _____.

15.NNP at market price = GDP at market price - _____ +_____.

16.NNP at factor cost is also known as _____.

17.Personal income = _____- corporate saving – corporate tax.

18.Disposable personal income = Personal income-_____.

19._____ method is also known as value added method.

20.National income identity in a two-sector economy requires Investment must be equal to_____.

21.National income identity in a three-sector economy requires Investment plus Government expenditure must be equal to_____.

22.National income identity in a four-sector economy requires I+G+(X-M) =_____.

23.A_____ is an outflow or withdrawal of income from the circular flow.

24.According to _____ money is what money does.

25.The paper notes and coins are called_____.

26._____ assets is an assets that can be easily exchanged for goods and services.

27.The direct exchange of economic goods for one another is called_____.

28.When money takes the form of a commodity with intrinsic value it is called _____.

29._____ is money that cannot be redeemed for anything other than that a replica of itself.

30.Time deposits, Bill of exchange, Treasury bills etc are example of _____ money.

31.Debit cards, Credit cards are example of _____ money.

32._____ are those coins whose face value is more than intrinsic value.

33.The book "Purchasing power of money' was written by_____.

34.The transaction approach of quantity theory money was put forward by_____.

35.The modern quantity theory money was given by_____.

36.The liquidity theory of money was given by_____.

37.According to keynes the transaction demand for money is a function of _____.

38.The speculative demand for money is a function of _____.

39.At a low rate of interest demand for money become perfectly elastic, this situation is called_____.

40.Currency with the public + Bank reserve = _____.

41._____ is the ratio of change of money supply to the change in High powered money.

42.There is a _____ relation between value of money and price level.

43.A persistent and appreciable rise in general price level is called_____.

44.According to _____ " Inflation is unjust, deflation is inexpedient, of the two perhaps deflation is worse".

45._____ represent inverse relationship between rate of unemployment and rate of changes in wage rate.

46. The shape of long run phillips curve is_____.
47. _____ implies absence of involuntary unemployment.
48. The principle of effective demand was given by _____.
49. _____ is the logical starting point of keynesian theory of employment.
50. _____ is determined at the level where aggregate demand is equal to aggregate supply
51. The ratio of consumption to income is called_____.
52. The ratio of change in consumption to change in income is called_____.
53. APC + APS =_____.
54. MPC + MPS =_____.
55. If MPC is 0.75, value of the multiplier will be _____.
56. The psychological law of consumption was given by_____.
57. Induce investment is a function of _____.
58. The concept of multiplier was first developed by_____.
59. Employment multiplier was given by_____.
60. Investment multiplier was given by_____.

GROUP-B

Each question carries 2 marks.

1. What is economic static?
2. Define comparative static.
3. Define stock.
4. Define equilibrium.
5. What is partial equilibrium?

6. What is GNP?
7. Define NDP at factor cost.
8. What is private income?
9. Define money.
10. Define near money.
11. What Fisher's equation?
12. Give Cambridge equation.
13. What do you mean by value of money?
14. Define inflation.
15. What is hyper inflation?
16. What is suppressed inflation?
17. What is full employment?
18. What is MPC?
19. What is MPS?
20. What is APC?
21. What is Multiplier?
22. What do you mean by induced investment?
23. What is aggregate demand?
24. What is forward multiplier?
25. What is marginal propensity to save?
26. What is investment demand schedule?
27. What is token money?
28. What is say's law?
29. What is budget?
30. What is unbalance budget?
31. What is consumption function?
32. What do you mean by financial investment?
33. What do you mean by autonomous investment?

34. What do you mean by net investment?
35. Define value addition.
36. What is meant by problem of double counting?
37. Write any two conceptual difficulties faced in the estimation of national income.
38. What is green accounting?
39. Why saving treated as leakage in a circular flow model?
40. Mention any two characteristics of money.
41. What is primary function of money?
42. Define cost push inflation.
43. What is meant by demand pull inflation?
44. What is the meaning of laissez-faire policy?
45. Explain voluntary unemployment.
46. What do you mean by ex-ante saving?
47. What do you mean by ex-post saving?
48. What is aggregate supply?
49. What do you mean by effective demand?
50. What do you mean by real investment?

GROUP-C

Each question carries three marks

1. Explain the scope of macroeconomics?
2. What are the limitations of macroeconomics?
3. Distinguish between micro and macroeconomics.
4. Define economic dynamics.
5. Define the concept of flow.
6. What is general equilibrium?

7. Define GDP at market price.
8. What is meant by net national product at factor cost?
9. What is personal income?
10. Distinguish between GDP and GNP.
11. Define intermediate goods.
12. What is meant by problem of double counting?
13. Write three conceptual difficulties faced in the estimation of national income.
14. What is green accounting?
15. Why saving treated as leakage in a circular flow model?
16. Mention main characteristics of money.
17. What is primary function of money?
18. What is secondary function of money?
19. What is contingency function of money?
20. Define outside money.
21. Define inside money.
22. Define fiat money.
23. What is limited legal tender money?
24. Define full-bodied money.
25. What is velocity of money?
26. What is an Index Number?
27. Define wholesale price index.
28. Define consumer price index.
29. Define cost of living index
30. Mention the characteristics of index number.
31. What is meant by simple index number?
32. Define wage induced inflation.
33. What is profit push inflation?

34. What are the measures to control inflation?
35. Define demonetisation.
36. What do you mean by stagflation?
37. What is inflationary gap?
38. Define cost push inflation.
39. What is meant by demand pull inflation?
40. What is the meaning of laissez-faire policy?
41. Explain voluntary unemployment.
42. What do you mean by ex-ante saving?
43. What do you mean by ex-post saving?
44. What is aggregate supply?
45. What do you mean by effective demand?
46. What do you mean by real investment?
47. What is the difference between induced and autonomous investment?
48. What is difference between ex-ante saving and ex-post saving?
49. What is dynamic multiplier?
50. Distinguish between expansionary and contractionary fiscal policy.

GROUP-D

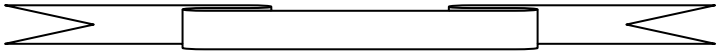
Each question carries 7 marks

1. What do you mean by macroeconomics? Discuss the importance and limitation of macroeconomics.
2. Distinguish between micro and macroeconomics. Discuss the salient features and limitation of macroeconomics.

3. Define macroeconomics. Explain the scope and limitations of macroeconomics.
4. What is meant by economic static, comparative static and economic dynamics?
5. What do you mean by concept of equilibrium? Explain its significance in economic analysis.
6. Explain briefly the main concepts of national income. State their interrelationship with each other.
7. Explain concept of domestic product. Distinguish between gross domestic product and gross national product.
8. What do you mean by national income? What are the various conceptual and statistical problems faced while estimating national income?
9. Define gross national product. Discuss the product and income method of calculating gross national product. Would the estimate be equal by either method?
10. Explain the interrelationship between products or value added, income generation and expenditure method of national income accounting.
11. Explain in brief the product method of measurement of national income. Mention the difficulties involved in the use of product method of measurement of national income.
12. Explain in brief the methods of measurement of national income. What are the difficulties in the measurement of national income?
13. Explain diagrammatically the circular flow of income and product in two sector model.
14. Explain the circular flow of income in a three sector economy with the help of a diagram.
15. Explain circular flow of income in four sector model.

16. Distinguish between real flows and money flows. Explain and illustrate with the help of a diagram.
17. What is meant by batter system of exchange? Explain its merits and demerits.
18. Money is what money does. " critically examine the statement .
19. What is money? Critically examine the statement.
20. Critically examine Fishers equation of quantity theory of money.
21. Critically examine Cambridge equation of quantity theory of money.
22. Explain Keynes fundamental equation of money and prices.
23. Would you consider cash balance approach to the value of money as superior to transaction theory? Explain.
24. What is an Index Number? What are its uses? Discuss the problems of constructing an index number.
25. Analyse the process of measuring the value of money and discuss its limitations.
26. Define inflation. What are the causes of inflation? Suggest measures to correct it.
27. Critically examine the effects of inflation on economic development.
28. Define stagflation. Suggest various measures to combat it.
29. Explain Keynesian theory of inflation. Discuss the concept of inflationary gap.
30. Explain Phillips inflation-unemployment trade off.
31. Critically examine the classical theory of employment.
32. "The full employment is a normal feature of capitalistic economy." Critically examine the statement.
33. "Supply creates its own demand." Explain the statement critically.
34. Explain the Keynesian theory of income and employment.

35. Explain meaning of the term propensity to consume. What are the main features or characteristics of consumption function?
36. What is marginal propensity to consume? What are its determinants?
37. State and explain Keynes psychological law of consumption along with its importance in the determination of income and employment in the economy.
38. What is meant by investment? Analyse the factors which govern the inducement to invest.
39. Discuss the significance of marginal efficiency of capital and rate of interest as determinants of investment.
40. Explain and illustrate the concept of multiplier. What is the importance of multiplier in economic analysis and economic policy?



DEPARTMENT OF ECONOMICS

+3 1ST YEAR ARTS (2ND SEMESTER)

CORE-4

MATHEMATICAL METHODS FOR ECONOMICS-II

GROUP-A

Each question carries 1 mark

1. The input output model was developed by_____.
2. _____ Shows the numbers of units any industry's output needed to produce one unit of another industry's output.
3. The input coefficient matrix is also called_____ matrix.
4. _____ Condition used to test the feasibility of an input output model.
5. In case of input output model the [I-A] matrix is known as_____.
6. For the feasibility of input output model, the determinant of [I-A] matrix must be_____.
7. For the feasibility of input output model, the diagonal elements of [I-A] matrix must be_____.
8. In_____ model the entire production is consumed internally.
9. In _____ model there is absence of final demand sector.
10. The second order derivative of $y = 4x^2$ is_____.
11. The second order derivative of $y = \frac{1}{3x^2}$ is_____.

12. The second order derivative of $y = 5x^3 + 3x^2 + 34$ is_____.
13. The second order derivative of $y = e^{2x}$_____.
14. If the 1st order derivative is greater than zero, then the function is called_____ function.
15. If the 1st order derivative is less than zero, then the function is called_____ function.
16. A function is _____ at x=a if in an area very close to [a.f(a)] the graph of the function lies completely above its tangent line.
17. A function is _____ at x=a if in an area very close to [a.f(a)] the graph of the function lies completely below its tangent line.
18. A positive second order derivative at x=a denotes the function is _____ at a.
19. A negative second order derivative at x=a denotes the function is _____ at a.
20. A_____ is a point at which the function is either at a relative maximum or minimum.
21. _____ is a point on the graph where the function crosses its tangent line and changes from convex to concave or vice versa.
22. _____ occurs only where the second order derivative is zero.
23. At the point of inflexion value of second order derivative is_____.
24. _____ is the process of finding the relative maximum or minimum of a function.
25. The dy/dx of $2x - 3y = 6$ is _____.
26. The dy/dx of $x^2 + 2y = 23$ is _____.
27. The dy/dx of $3x^2 + 4y = 65$ is _____.
28. The total differential of $y = 4x^3 + 7x^2 - 3x + 3$ is _____.

29. The total differential of $y = 7x^2 + 4x - 45$ is _____.
30. The total differential of $y = 4x^2 3x$ is _____.
31. The total differential of $y = \frac{2x-3}{3x}$ is _____.
32. The necessary condition for maximisation is $f'(a) =$ _____.
33. The necessary condition for minimisation is $f'(a) =$ _____.
34. The sufficiency condition for maximisation is $f''(a)$ _____.
35. The sufficiency condition for minimisation is $f''(a)$ _____.
36. The critical value of the function $y = 7x^2 + 112x - 54$ is _____.
37. The critical value of the function $y = -9x^2 + 72x - 13$ is _____.
38. The critical value of the function $y = -7x^2 + 126x - 23$ is _____.
39. For the maximization of a multi variable function $f_{xx}.f_{yy}$ must be_____.
40. For the minimization of a multi variable function $f_{xx}.f_{yy}$ must be_____.
41. In case of multivariable optimization if $f_{xx}.f_{yy} < (f_{xy})^2$ and $f_{xx}\ and\ f_{yy}$ have the same signs, the function is at _____ point.
42. In case of multivariable optimization if $f_{xx}.f_{yy} < (f_{xy})^2$ and $f_{xx}\ and\ f_{yy}$ have different signs, the function is at _____ point.
43. The integral value of $\int 3.5dx$ is _____.
44. The integral value of $\int -\frac{1}{2}dx$ is _____.
45. The integral value of $\int dx$ is _____.

46. The integral value of $\int 5x^2 dx$ is _____.
47. The integral value of $\int 8^x dx$ is _____.
48. The integral value of $\int_1^4 10x\, dx$ is _____.
49. Reversing the limit changes the_____ of the definite integral.
50. If the upper limit of the integration equals the lower limit of the integration, the value of the definite integral is _____.
51. If marginal revenue is $100 - 2q - 3q^2$ then total revenue will be_____.
52. If marginal revenue is $84 - 4q - q^2$ then total revenue will be_____.
53. If marginal cost is $25 + 30q - 9q^2$ then total variable cost will be _____.
54. If marginal cost is $45 + 10q - 92$ then total cost will be _____.
55. If all the principal minors are negative, the boarder Hessian is _____ definite.
56. A positive definite Hessian always satisfies the sufficient condition of a relative _____.
57. If the principal minors alternate consistently in sign from positive to negative, the boarder Hessian is_____ definite.
58. A negative definite Hessian always meets the sufficient condition for a relative _____.

GROUP-B

Each question carries 2 marks

1. Define closed input output model?
2. Define open input output model?

QUESTIONS BANK (2024)
DEPARTMENT OF ECONOMICS, PATTAMUNDAI COLLEGE, PATTAMUNDAI

3. What is static input output model?
4. What is dynamic input output model?
5. What is transaction matrix?
6. What is a technological coefficient?
7. What is technological coefficient matrix?
8. What is input vector?
9. State the feasibility conditions of input output model?
10. Find the second order derivative of $y = 3x^4 - 2x^3 + 6x$
11. Find the second order derivative of $\sqrt{1 - x^2}$
12. Find the second order derivative of $y = logx$
13. Find the second order derivative of $y = \log(x + a)$
14. What is increasing function?
15. What is decreasing function?
16. What is concavity of a function?
17. What is convexity of a function?
18. What is point of inflexion?
19. State the condition for convexity of a function?
20. State the condition for concavity of a function?
21. State the condition for point of inflexion?
22. Define total differential?
23. Find the total differential of the function $y = 7x^3 - 5x^2 + 6x - 3$
24. Find the total differential of the function $y = (4x + 3)(3x - 8)$
25. Find the total differential of the function $z = 7x^2y^3$
26. Find the total differential of the function Z=$\frac{9y^3}{x-y}$
27. Find the total differential of the function $z = (x - 3y)^3$
28. Find the total differential of the function Z=$x^2 + 2xy$
29. Find the total differential of the function $Z = x^y$

30. Find the total derivative dz/dx for $Z = 6x^2 + 15xy + 3y^2$ where $y = 7x^2$
31. Find the total derivative dz/dx for Z= $(13x - 18y)^2$ where $y = 3x - 4$
32. What is implicit function?
33. Find derivative dy/dx of the implicit function $4x^2 - y^3 = 76$
34. Find derivative dy/dx of the implicit function $24x^3 + 4y^2$=564
35. Find derivative dy/dx of the implicit function $7x^2y^3 = 67$
36. Find derivative dy/dx of the implicit function $x^2 + 2xy = 76$
37. What is stationary function?
38. State the condition for increasing function?
39. State the condition for decreasing function?
40. Define maxima of a function?
41. Define minima of a function?
42. State the condition for relative maxima?
43. State the condition for relative minima?
44. Test whether the function is increasing or decreasing or stationary at x=4, $y = 3x^2 - 14x + 5$
45. Test whether the function is increasing or decreasing or stationary at x=4, $y = x^3 - 7x^2 + 6x - 2$
46. Test whether the function is increasing or decreasing or stationary at x=4,$y = x^4 - 6x^3 + 4x^2 - 13$
47. Test to see if the following function is concave or convex at x=3, $y = -2x^3 + 4x^2 = 9x - 15$
48. Test to see if the following function is concave or convex at x=3,$y = (5x^2 - 8)^2$
49. Find the critical value of the function $f(x) = -7x^2 + 126x - 23$
50. Find the critical value of the function$f(x) = 3x^3 - 36x^2 + 135x - 13$

QUESTIONS BANK (2024)
DEPARTMENT OF ECONOMICS, PATTAMUNDAI COLLEGE, PATTAMUNDAI

51. Find the critical value of the function $f(x) = 2x^4 - 16x^3 + 32x^2 + 5$
52. State the condition for relative maximum in case of multi variable function?
53. State the condition for relative minimum in case of multi variable function?
54. What is convex set?
55. What is convex function?
56. What is integration?
57. Determine the integral $\int 4x^3\, dx$.
58. Determine the integral $\int x^{\frac{2}{3}} dx$.
59. Determine the integral $\int x^{-\frac{5}{2}}\, dx$.
60. Determine the integral $\int \frac{1}{3x}\, dx$.
61. Determine the integral $\int (5x^3 + 2x^2 + 3x) dx$.
62. Determine the integral by using the substitution method $\int 10x(\, x^2 + 3)^4 dx$.
63. Determine the integral by using the by parts method $\int \frac{2x}{(8-x)^3} dx$.
64. Evaluate the definite integral $\int_1^{10} 3x^2\, dx$.
65. Evaluate the definite integral $\int_1^{64} x^{-2/3} dx$.
66. What is constraint optimization?
67. State the necessary condition for constraint maxima?
68. State the necessary condition for constraint minima?
69. What is Lagrange multiplier?
70. What is Lagrange function?
71. How to interpret Lagrange multiplier in case of constraint optimization.

QUESTIONS BANK (2024)
DEPARTMENT OF ECONOMICS, PATTAMUNDAI COLLEGE, PATTAMUNDAI

GROUP-C

Each question carries 3 marks

1. State the main features of input output model?
2. State the assumptions of input output model?
3. What is input coefficient matrix?
4. What is Hawkins Simon conditions?
5. What is Leontief matrix?
6. Find the second order derivative of $y = x^3 log x$
7. Find the second order derivative of $y = (2x + 3)^{10}$
8. Find the second order derivative of $y = x^2 + \sqrt{x}$
9. Find the total differential of the function $y = \frac{9x-4}{5x}$
10. Find the total differential of the function $y = (11x + 9)^3$
11. Find the total differential of the function Z=$\sqrt{x + y}$
12. Find the total differential of the function $Z = \frac{x}{x+y}$
13. Find the total derivative dz/dx for$z = \frac{9x-7y}{2x+5y}$ $where\ y = 3x - 4$
14. Find the total derivative dz/dx for$Z = 8x - 12y\ where\ y = \frac{x+1}{x^2}$
15. Find derivative dy/dx of the implicit function $6x^2 + 15xy + 3y^2 = 363$
16. Find derivative dy/dx of the implicit function $3x^2 + 13xy + 7y^2 = 324$
17. Find derivative dy/dx of the implicit function $4x^2 + 5xy + 3y^3$=853
18. Find derivative dy/dx of the implicit function $x^4y^6 = 676$
19. Find the relative extrema of the function $f(x) = -7x^2 + 126x - 23$
20. Find the relative extrema of the function $f(x) = 3x^3 - 36x^2 + 135x - 13$
21. Find the relative extrema of the function $f(x) = 2x^4 - 16x^3 + 32x^2 + 5$

22. State the condition for relative maximum in case of multi variable function?
23. State the condition for relative minimum in case of multi variable function?
24. Optimize the function $y = 7x^2 + 112x - 54$
25. Optimize the function $y = -9x^2 + 72x - 13$
26. Optimize the function $y = x^3 - 6x^2 - 135x + 4$
27. Optimize the function $y = -2x^3 + 15x^2 + 84x - 25$
28. Optimize the function $y = x^4 - 8x^3 - 80x^2 + 15$
29. Optimize the function $y = -(x + 13)^4$
30. Optimize the function $y = (9 - 4x)^4$
31. Maximize the function and find the maximum value TR=$32q - q^2$
32. Maximize the function and find the maximum value $\pi = -q^2 + 11q - 24$
33. Maximize the function and find the maximum value $-q^3 - 6q^2 + 1440q - 545$
34. What is convex set?
35. What is convex function?
36. Determine the integral $\int(2x^6 - 3x^4)dx$.
37. Determine the integral $\int 2^{4x}\, dx$.
38. Determine the integral $\int e^{5x}\, dx$.
39. Determine the integral by using the substitution method $\int x^4(2x^5-5)^4 dx$.
40. Determine the integral by using the substitution method $\int(x - 9)^{\frac{7}{4}}dx$.
41. Determine the integral by using the substitution method $\int 6x - 11)^{-5}\, dx$.

42. Determine the integral by using the substitution method $\int \frac{1}{9x-5} dx$.
43. Determine the integral by using the substitution method $\int 24xe^{3x^2} dx$.
44. Determine the integral by using the by parts method $\int x^2 e^{2x} dx$.
45. Determine the integral by using the by parts method $\int \frac{5x}{(x-1)^2} dx$.
46. Determine the integral by using the by parts method $\int 15x(x+4)^{\frac{3}{2}} dx$.
47. Evaluate the definite integral $\int_0^3 4e^{2x} dx$.
48. Evaluate the definite integral $\int_0^{10} 2e^{-2x} dx$.
49. What is Border Hessian Determinant?
50. State the necessary and sufficient condition for constraint maxima?
51. State the necessary and sufficient condition for constraint minima?

GROUP-D

Each question carries 7 marks

1. Develop an input output model for the economy which is divided into three producing industries. Also point the procedure for its solution?
2. Explain Hawkins-Siman conditions. Are these conditions satisfied for for A=$\begin{bmatrix} 1.2 & 0.3 \\ 0.4 & 1.8 \end{bmatrix}$
3. A three sector economy has the following input coefficient matrix A and the final demand vector F: $A = \begin{bmatrix} 0.3 & 0.2 & 0.2 \\ 0.2 & 0.1 & 0.5 \\ 0.2 & 0.4 & 0.2 \end{bmatrix}$ F=$\begin{bmatrix} 80 \\ 30 \\ 50 \end{bmatrix}$ Find the gross output of each sector to meet the final demand. What would be the labour requirement for the final output of the three industries.

4. A three sector economy has the following input coefficient matrix A and the final demand vector F: $A = \begin{bmatrix} 0.2 & 0.3 & 0.2 \\ 0.4 & 0.1 & 0.3 \\ 0.3 & 0.5 & 0.2 \end{bmatrix}$ F=$\begin{bmatrix} 150 \\ 200 \\ 210 \end{bmatrix}$ Find the gross output of each sector to meet the final demand.
5. Analyse the assumption, uses and limitations of input output model?
6. In a closed input output model, the interrelationship between the industries of the economy and the final demand are given below:

Industries	A	B	C	Final demand
A	10	4	8	14
B	4	6	4	18
C	6	4	4	10

Calculate the output levels of the three industries consistent with the model.

7. Find the 2nd and 3rd order differential coefficients w.r.t x (i) $y = 3x^3 - 9x$ (ii) $y = x^2 log x$
8. Find the 2nd and 3rd order differential coefficients w.r.t x when $y = xe^{x^2}$
9. Show that $y = x^2 = 2x - 3$ *is concave upward and* $y = 5 - 3x - x^2$ *ic concave downward.*
10. Prove that the curve given by $3y = x^3 - 3x^2 - 9x + 11$ has a maximum at x=-1 and minimum at x=3 and point of inflexion at x=1.
11. Maximize profit π for a firm, given total revenue $R = 4000q - 33q^2$ and total cost $C = 2q^3 - 3q^2 + 400q + 5000$, assuming q>0.
12. Find derivative dy/dx of the implicit function $4x^2 + 5xy + 3y^3$=853 and$x^4y^6 = 676$.
13. Find the total differential of the functions Z=$\frac{9y^3}{x-y}$ and$z = (x - 3y)^3$
14. Find the relative extrema of the function $f(x) = 3x^3 - 36x^2 + 135x - 13$ and $f(x) = 2x^4 - 16x^3 + 32x^2 + 5$.

15. Optimize the function $y = x^4 - 8x^3 - 80x^2 + 15 \ \ and \ \ y = -(x + 13)^4$.
16. Optimize the function $y = x^3 - 6x^2 - 135x + 4$ and $y = -2x^3 + 15x^2 + 84x - 25$
17. Optimize the multi variable function $z = 3x^2 - xy + 2y^2 - 4x - 7y + 12$
18. Optimize the multi variable function $z = 48y - 3x^2 - 6xy - 2y^2 + 72x$
19. Optimize the multi variable function $f(x, y) = 3x^3 - 5y^2 - 225x + 70y + 23$
20. Optimize the multi variable function $f(x, y) = 3x^3 - 9xy + 3y^3$
21. Explain the properties of definite integral?
22. Given the demand function $p = 45 - 0.5q, find\ the\ consumer\ surplus$ when p=32.5 and q=25.
23. Given the supply function $p = (q + 3)^2$ find the producer surplus at p=81 and q=6.
24. Given the demand function $p = 25 - q^2$ and the supply function $p = 2q + 1$ assuming perfect competition find consumer and producer surplus.
25. Integrate the following definite integral by using the methods of integration by parts $\int_2^5 \frac{3x}{(x+1)^2}$dx and $\int_1^3 \frac{4x}{(x+2)^3}$.
26. Determine the integral by using the substitution method $\int \frac{1}{9x-5}\, dx$. and $\int 24xe^{3x^2}\, dx$.
27. What combinations of goods x and y should a firm produce to minimize costs when the joint cost function is $C = 6x^2 + 10y^2 - xy + 30$ and the firm has a production quota of $x + y = 34$.estimate the effect on cost if the production quota reduced by 1 unit.

28. What output mix should a profit maximizing firm produce when its total profit function is $\pi = 80x - 2x^2 - xy - 3y^2 + 100y$ and its maximum output capacity is $x + y = 12$.
29. Minimize cost for a firm with the cost function $C = 5x^2 + 2xy + 3y^2 + 800$ subject to the production quota $x + y = 39$.
30. Maximize utility $u = q_1 q_2$ when P1=1 and P2=4 and budget B=120.
31. Optimize the CD production function $q = K^{0.3} L^{0.5}$ subject to the constraint 6K+2L=384.
32. What is constraint optimization? Explain the process of constraint optimization by using Lagrange-Multiplier method.