KANORIA PG MAHILA MAHAVIDYALAYA
JAIPUR

DEPARTMENT OF ECONOMICS

QUESTION BANK

Course Name
B.A. Hons- Part I (Semester I and II)
B.A. Hons- Part II (Semester III and IV)
B.A. Pass Course- Part I (Semester I and II)
B.A. Pass Course- Part II (Semester III and IV)

Kanoria PG Mahila Mahavidyalaya
Department of Economics

Introductory Microeconomics – UG9102- ECO51T-101
B.A. HONS Semester I

Unit I

Very Short Answer Questions

1. 1. Define economics in one line.
2. 2. What is opportunity cost?
3. 3. Name the three basic economic problems.
4. 4. Differentiate between positive and normative economics.
5. 5. State the law of demand.
6. 6. What causes a movement along a demand curve?
7. 7. Define market supply.
8. 8. What is market equilibrium?
9. 9. Define elasticity of demand.
10. 10. What is consumer surplus?

Short Answer Questions

11. 1. Explain the concept of scarcity and choice in economics.
12. 2. Describe the determinants of demand.
13. 3. Write a short note on the law of supply.
14. 4. What happens when supply shifts along a supply curve?
15. 5. Explain the significance of producer surplus.
16. 6. Explain the concept of opportunity cost with an example.
17. 7. Discuss the causes of a shift in the demand curve.
18. 8. What are the factors affecting price elasticity of demand?
19. 9. Write a note on the importance of supply in economics.
20. 10. Distinguish between movement along the supply curve and a shift in the supply curve.

Descriptive Answer Questions

21. 1. Discuss the three central problems of an economy with examples.
22. 2. Explain the concept of market equilibrium using demand and supply curves.
23. 3. Explain the law of demand. Illustrate with a diagram and exceptions to the law.
24. 4. Discuss the concept of elasticity of demand and its types with practical examples.

Unit II

Very Short Answer Questions

25. 1. What is a budget constraint?
26. 2. Define utility.
27. 3. What is the Diamond-Water paradox?
28. 4. What is an indifference curve?
29. 5. State one property of an indifference curve.
30. 6. What is the substitution effect?
31. 7. Define consumer equilibrium.
32. 8. What is income effect?
33. 9. What is the concept of marginal utility?
34. 10. What is the difference between saving and consumption?

Short Answer Questions

35. 1. Write a short note on diminishing marginal utility.
36. 2. Explain the income-consumption curve.
37. 3. How do consumers maximize utility?
38. 4. Discuss labour supply and leisure choice.
39. 5. Briefly describe the derivation of the demand curve from the indifference curve.
40. 6. Write a note on the consumer's choice under budget constraint.
41. 7. Explain the meaning of indifference map.
42. 8. What are the characteristics of an indifference curve?
43. 9. Differentiate between income effect and substitution effect.
44. 10. Briefly explain consumer equilibrium using the indifference curve approach.

Descriptive Answer Questions

45. 1. Explain the consumer’s choice theory with the help of indifference curves.
46. 2. Discuss the role of income and substitution effects in determining consumer demand.
47. 3. Explain how a consumer reaches equilibrium using indifference curves and budget constraints.
48. 4. Discuss the consumption and saving decision in response to changes in income and interest rates.

Unit III

Very Short Answer Questions

49. 1. Define production.
50. 2. What is the isoquant curve?
51. 3. What is the law of variable proportions?

52. 4. What is meant by returns to scale?
53. 5. Define cost in the short run.
54. 6. What is revenue?
55. 7. What is perfect competition?
56. 8. What is a cost function?
57. 9. What is producer equilibrium?
58. 10. Define marginal cost.

Short Answer Questions

59. 1. Describe the behaviour of a profit-maximizing firm.
60. 2. Explain the concept of isocost lines.
61. 3. Write a note on long-run cost curves.
62. 4. Briefly explain revenue maximization.
63. 5. Discuss short-run equilibrium in perfect competition.
64. 6. Explain the law of variable proportions with a diagram.
65. 7. What is the difference between short-run and long-run costs?
66. 8. Describe the concept of returns to scale with examples.
67. 9. Explain the relationship between marginal cost and average cost.
68. 10. What are the characteristics of a perfectly competitive market?

Descriptive Answer Questions

69. 1. Explain the production function with the help of isoquants and isocosts.
70. 2. Discuss the equilibrium of a firm under perfect competition in the short run and long run.
71. 3. Describe the cost curves in the short run and long run with diagrams.
72. 4. Explain the equilibrium of a firm under perfect competition in the short run and long run with suitable diagrams.

Unit IV

Very Short Answer Questions

73. 1. What is a monopoly?
74. 2. Mention one source of monopoly.
75. 3. What is price discrimination?
76. 4. Define monopolistic competition.
77. 5. What is the role of advertising in monopolistic competition?
78. 6. What is an oligopoly?
79. 7. Give one assumption of monopoly.
80. 8. Define equilibrium in monopolistic competition.
81. 9. What is excess capacity?
82. 10. Mention one feature of oligopoly.

Short Answer Questions

83. 1. Differentiate between monopoly and perfect competition.
84. 2. Explain the role of non-price competition in monopolistic markets.
85. 3. What are the features of monopolistic competition?
86. 4. Discuss long-run equilibrium of a monopolistic firm.
87. 5. What is the role of barriers to entry in monopoly?
88. 6. State the features of a monopoly market.
89. 7. What is meant by price discrimination? Give examples.
90. 8. Explain the role of advertising under monopolistic competition.
91. 9. How is the equilibrium of a firm achieved under monopolistic competition?
92. 10. What are the main characteristics of an oligopoly?

Descriptive Answer Questions

93. 1. Explain price and output determination under monopoly in the short and long run.
94. 2. Compare and contrast monopolistic competition and oligopoly with examples.
95. 3. Analyze the price-output decisions of a monopolist with the help of diagrams.
96. 4. Discuss the characteristics and price-output determination under monopolistic competition.

KANORIA P.G. MAHILA MAHAVIDYALAYA

DEPARTMENT OF ECONOMICS

Mathematical Methods for Economics - I

UG9102-ECO-51T-102

B.A.(Hons.) Semester-1

UNIT-1

Very Short Answer Questions

1. Define sets.
2. What is a subset?
3. What is a slope ?
4. Define functions.
5. Complement Set.
6. De Mogran's Law.
7. Define Relation.

Short Answer Questions

8. Derive the slope of the given linear function -

$$Y = a + mx$$

9. What is the difference between an implicit and explicit function?
10. Find the cartesian product of the following -

(i) $A = \{1, 7, 9\}$

$B = \{2, 3\}$

(ii) $A = \left\{\frac{3}{2}, \frac{7}{2}, \frac{9}{2}\right\}$

$B = \left\{\frac{4}{3}\right\}$

11. Find the cartesian Product ($A \times B$, $B \times A$) of the following. Using graph show that $A \times B \neq B \times A$.

(i) $A = \{2, 5, 7\}$

$B = \{8, 10, 11\}$

(ii) $A = \{1, 2, 3\}$

$B = \{4, 5, 6\}$

12. In a class of 50 students, 30 have economics, 25 have mathematics, and 10 have both the subjects. Find number of students taking niether of the 2 subjects.

13. What is constant function, explain with diagram.

Descriptive Type Questions

14. Explain different types of functions graphically.

15. What is the difference between a linear and non-linear function (with graph)?

16. What do you understand by Set Theory. Explain operations on set. What are the different identities of sets?

17. In a school there are 30 teachers who teach mathematics or physics. Of these, 18 teach mathematics and 6 teach both. How many teach physics only? Use Venn diagram.

18. In a school of 100 students, 50 use college library, 40 use their own sources and 40 borrow books. If 20 students use college library and their own sources, 15 use their own sources and borrow books, and 10 10 use college library and borrow books. Find the number of students who access all the 3 options.

19. There are 300 companies in the market using different media for advertisement. 200 companies use newspaper, 100 use radio and 80 use handbills. There are 50 companies using both newspaper and radio, 30 using radio and handbills, and 50 using newspaper and handbills. There are 20 companies using all the 3 media platforms. Find –

(i) Find the number of companies using media other than newspaper, radio and handbills.

(ii) No. of companies using newspaper only.

20. In a survey, it was found that out of 1000 teachers, 48% consume coffee, 54% consume tea and 64% smoke. Out of them, 28% consume both coffee and tea, 32% consume both tea and smoke, and 30% consume both coffee and smoke. 6% of the above consume niether of the 3. Find –

(i) Those who consume all three.

(ii) took only coffee

(iii) who smoke and consume tea but not coffee.

UNIT - II

Very Short Answer Questions

21. Implicit function.

22. Differentiate – $Y = 3x + 4$

23. Find $\frac{\partial z}{\partial x}$, where,

$z = 2x^2 + 3y$

24. If $Y = u \cdot v$, where $Y = f(x)$, find $\frac{dY}{dx}$.

{Also $u = f(x)$, $v = f(x)$}.

25. What is inverse of a function?

Short Answer Questions

26. Differentiate $\left\{\frac{dy}{dx}\right\}$

(i) $y = x^{e^x}$

(ii) $y = (x^x)^x$

27. If $x^3 + y^3 = 1$ is an implicit function, then find $\frac{dy}{dx}$.

28. If $y = x^4 - 3x^3 + 4$, find $\frac{d^2y}{dx^2}$.

29. If $y = \left(x^2 + \frac{1}{x^2}\right)$, prove that $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 4y$

30. Find partial derivatives $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ –

(i) $z = 3xy - x^2 + 2y - y^3$

(ii) $z = \frac{3x + 2y}{4x + 7y^2}$

31. Differentiate –

(i) $y = \frac{7x + 3x^2}{-2x^3}$

(ii) $y = (4x^2 + 1)(2x + 3)$

(iii) $y = \log\left(\frac{2x+3}{3x-2}\right)$

(iv) $y = \log\left[(2x^2+1)(3x-4)\right]$

(v) $y = \frac{1}{3}x^3 - \frac{5}{2}x^2 + 6x + 1$

32. Find dz -

(i) $z = 3x^2 + 2xy + 6y^2 - 4x - 5y$

(ii) $z = 7x^3 - 6y^3 - 5xy + 7x$

(iii) $z = \frac{7x+3y}{4x}$

(iv) $z = (2x + y)(3x^2 - 1)$

Descriptive Answer Questions

33. If $P = 120 - 8q$, find MR at $q = 4$.

34. If $AC = 3q + 7 + \frac{12}{q}$, find MC at $q = 3$.

35. If, $a + bx = xy$, then prove that $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 0$

36. If, $y = 4z^2 + 2z + 5$, where, $z = 3x^2 + x$, then find $\frac{dy}{dz}$.

37. Find total differential dz of -

$$z = \frac{3x^3 + 7y^2 - 6xy}{3x + 4y}$$

38. If, $y = \frac{7x^2}{x-1}$, find the value of $\frac{d^2y}{dx^2}$ at $x = 2$.

39. Differentiate -

(i) $y = \left(\sqrt{x^2+2}\right) \cdot \left(3x^3\right)$

(ii) $y = \frac{5x^2 + 7x - 4}{\sqrt{x}}$

(iii) $y = \frac{ax^2 + bx - c}{x^3}$

39. Find the partial derivatives $\frac{\partial z}{\partial x}$, $\frac{\partial z}{\partial y}$, $\frac{\partial^2 z}{\partial x \partial y}$, $\frac{\partial^2 z}{\partial y \partial x}$, $\frac{\partial^2 z}{\partial x^2}$ and $\frac{\partial^2 z}{\partial y^2}$.

(i) $z = \frac{3x^2 + 2xy}{4y}$

(ii) $z = (3x^3 + 9)(5x^2 - 4xy)$

40. Find the second order total derivative -

(i) $z = 3x^2 + 4xy - 8y^2 - 9x - 7y + 14$

(ii) $z = \frac{4x^2 - 3y}{2x}$

41. Differentiate $\left\{\frac{dy}{dx}\right\}$

(i) $(2x^3 + 7y)^2 = x^5$

(ii) $(5y - 21)^3 = 6x^5$

42. Determine the slope of following functions at $x = 5$.

(i) $y = (2x^3 - 5)^2$

(ii) $y = \frac{3x - 4}{x}$

(iii) $y = \log \sqrt{x}$

UNIT - III

Very short Answer Questions

43. Define Indefinite Integrals.
44. Define Definite Integrals.
45. Define consumer surplus.
46. Define Producer surplus.
47. Integrate -

$$\int (2x + 7) \cdot dx$$

Short Answer Questions

48. Integrate -

(i) $\int \frac{1}{x} \cdot \log x \cdot dx$.

(ii) $\int_2^4 (7x^2 + 3x - 1) \cdot dx$

49. If the demand function is $P = 27(1+Q)^{-2}$, where $P = 3$, find consumer surplus.

50. If the supply function is $P = 2 + \frac{Q^2}{25}$, where $P = 3$, find Producer surplus.

Discriptive Answer Questions

51. Integrate -

(i) $\int \left(\frac{x^4 - 5x^3 - 5x^2 + 7x - 11}{x}\right) \cdot dx$

(ii) $\int \frac{2x + 5}{2x^2 + 10x + 5} \cdot dx$

52. Given -

$MC = 7q^2 - \frac{4}{5}q + 7$

$FC = 200$

Find - (i) AVC

(ii) TC

53. If MR is given as $MR = 30 - 4x^2$, where x is output, find TR and AR.

54. If the demand function for monopolist is $P = 274 - Q^2$ and $MC = 4 + 3Q$, find consumer surplus.

55. If $MR = 25 - 3Q^2$, and supply function is $P = 2Q + 1$, find -

(i) Demand function

(ii) Asuming that market is in perfect competition, find consumer surplus and producer surplus.

56. If the demand and supply function are $P_d = 20 - 3x^2$ and $P_s = 2x^2$ respectively. Find consumer and producer surplus.

57. Demand function : $16 - x^2$
Supply function : $4 + x$
Find -

(i) Consumer Surplus

(ii) Producer Surplus

(iii) Consumer surplus when good is a free good.

UNIT-IV

Very Short Answer Questions

58. Define Singular Matrix.

59. Define Identity matrix.

60. Give an example of column matrix and row matrix/vector.

61. What is Null Matrix.

62. Give an example of Symmetric matrix.

63. Find $|A|$, if $A = \begin{vmatrix} -2 & 8 \\ -4 & 1 \end{vmatrix}$.

64. If $A = \begin{pmatrix} 2 & 8 \\ 7 & -1 \end{pmatrix}$, find $5A$.

65. Define cramer's Rule.

66. Give any 2 basic properties of determinants.

67. What is transpose of a matrix.

68. If $A = \begin{pmatrix} -3 & 0 \\ -2 & 1 \end{pmatrix}$, find $7|A|$.

Short Answer Questions

69. If $A = [2 \quad 1 \quad 7 \quad 9]$ and $B = \begin{pmatrix} 3 \\ 8 \\ 5 \\ 6 \end{pmatrix}$, prove that $AB \neq BA$.

70. If $A = \begin{pmatrix} 1 & 8 \\ 7 & 5 \end{pmatrix}$ and $B = \begin{pmatrix} -2 & 0 \\ 4 & -2 \end{pmatrix}$, then find -

(i) $A - B$

(ii) $3A + 2B$

71. If $A = \begin{pmatrix} 9 & -8 \\ 5 & 10 \end{pmatrix}$, show that $IA = AI = A$.

72. Evaluate -

$$\begin{bmatrix} 12 & 4 \\ 9 & 20 \end{bmatrix} + \begin{bmatrix} -5 & 7 \\ -11 & 4 \end{bmatrix} - \begin{bmatrix} 1 & -2 \\ 0 & 13 \end{bmatrix}$$

73. Find A^{-1}, when $A = \begin{pmatrix} 2 & 4 \\ -1 & 3 \end{pmatrix}$

74. If $A = \begin{bmatrix} 4 & -1 & 5 \\ 7 & 2 & 0 \end{bmatrix}$, find AA'.

Descriptive Answer Questions

75. If, $Y = C + 50$

$-0.8Y + C = 80$

then find the value of Y and C using matrix inversion method.

76. Solve the following simultaneous equations using matrix inversion.

$$x+y+z=6$$
$$x-y+z=2$$
$$2x+y-z=1$$

77. Solve the following simultaneous equations using Cramer's Rule.

(i)
$$3x-y+4z=13$$
$$5x+y-3z=5$$
$$x+y+z=3$$

(ii)
$$2x_1+x_2=24$$
$$3x_1-2x_2=8$$

Prove –

(i)
$$\begin{vmatrix} b+c & a-b & a \\ c+a & b-c & b \\ a+b & c-a & c \end{vmatrix} = 3abc-a^3-b^3-c^3$$

(ii)
$$\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$$

Find A^{-1}

(i)
$$A=\begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{pmatrix}$$

(ii)
$$A=\begin{pmatrix} 1 & 4 & 3 \\ 4 & 2 & 1 \\ 3 & 2 & 2 \end{pmatrix}$$

Kanoria PG Mahila Mahavidyalaya
Department of Economics
UG9102-ECO-52T-104
Introductory Macroeconomics
B.A. HONS Semester II

UNIT 1

Very Short Answer Questions

1. What is Macroeconomics?
2. How is microeconomics different from macroeconomics?
3. State two uses of Macroeconomics.
4. Mention two limitations of Macroeconomics.
5. What is static analysis in economics?
6. What is dynamic analysis in macroeconomics?
7. What are economic activities?
8. List the four factors of production.
9. Define a macroeconomic variable.
10. What is the circular flow of income?
11. Define National Income.
12. What is GDP?
13. How is personal income different from national income?
14. What is disposable personal income?
15. Name the three measures of National Income.
16. How are GDP, NDP, and NNP interrelated?
17. What are factor payments in the circular flow of income?
18. Distinguish between final goods and intermediate goods.
19. Why are intermediate goods not included in gross domestic product of a country?

Short Answer Questions

20. Differentiate between microeconomics and macroeconomics.
21. Explain the circular flow of national income in a two-sector economy.
22. Explain the interrelationship between the three measures of National Income.
23. Why is there a need for a separate theory of macroeconomics ?
24. What is meant by withdrawals and injections ? How do they affect the size of the circular flow of income and expenditure in an economy?
25. Explain how national income is measured by value added method.

Long Answer Questions

26. Explain circular flow of income in a three-sector economy?
27. Explain different methods to measure National Income?

28. Define macroeconomics. Explain its meaning, scope, and importance in modern economic analysis.
29. Explain the following terms:
    (i) Net value added
    (ii) Net factor income from abroad
    (iii) Transfer Payments by the Government
    (iv) Depreciation.
30. Explain how national income is measured through expenditure method. What types of expenditure are included in measuring national income of a country?
31. Explain 'income method' of measuring national income.

UNIT 2

Very Short Answer Questions

32. Define money.
33. Mention any one function of money.
34. What is M1 in money supply?
35. What is high-powered money?
36. Define money multiplier.
37. What is credit creation?
38. Who proposed the classical quantity theory of money?
39. What is the transactions demand for money?
40. What is liquidity preference?
41. Who developed the portfolio balance approach?
42. What is the key idea of Friedman's theory of money demand?

Short Answer Questions

43. Define money and explain its functions.
44. What are the main components of the money supply in India?
45. Explain the concept of high-powered money.
46. Define money multiplier. How is it calculated?
47. What is credit creation by commercial banks? Briefly explain.
48. What are the main determinants of money supply?
49. Briefly explain the classical quantity theory of money.
50. What are the main components of Keynesian theory of money demand?
51. Explain the Baumol-Tobin model of transaction demand for money.
52. What is Tobin's portfolio balance approach to demand for money?
53. Summarize Friedman's demand for money theory.

Long Answer Questions

54. Define money. Explain its functions and significance.

55. What is money supply? Discuss its components, measurement, and determinants.
56. Explain the concepts of high-powered money and money multiplier. How are they related?
57. Discuss the process of credit creation by commercial banks.
58. Explain the tools of monetary policy used to control inflation and maintain economic stability.
59. Discuss the classical quantity theory of money. What are its assumptions and criticisms?
60. Explain Keynes' liquidity preference theory of demand for money.
61. Discuss the Baumol-Tobin model and how it refines the classical transaction demand for money.
62. Analyze Tobin's portfolio balance approach to money demand. How does it differ from Keynesian theory?
63. Explain the restatement of Quantity Theory of Money as made by Friedman. How does it differ from Fisher's version of the Quantity Theory of Money ?

UNIT 3

Very Short Answer Questions

64. What is a consumption function?
65. Name any two determinants of consumption.
66. Define APC.
67. What is MPC?
68. Who proposed the Absolute Income Hypothesis?
69. What is the key idea of the Relative Income Hypothesis?
70. What is the main feature of the Permanent Income Hypothesis.
71. Name the economist behind the Life Cycle Hypothesis.
72. Define investment function.
73. What is NPV?
74. What does MEC stand for?
75. What is Tobin's Q-Ratio?
76. What is the relationship between MEC and the rate of interest?
77. Distinguish between Keynes's consumption function and Kuznet's consumption function.
78. Show that the sum of APC and APS is equal to one
79. Distinguish between autonomous investment and induced investment.
80. Show that the sum of MPC and MPS is equal to one

Short Answer Questions

81. What are the major determinants of consumption?
82. Explain the Absolute Income Hypothesis.
83. State the main assumptions of the Relative Income Hypothesis.
84. Briefly describe the Permanent Income Hypothesis.

85. What is the Life Cycle Hypothesis and what does it suggest about savings behavior?
86. What are the key determinants of investment function?
87. Differentiate between MEC and MEI.
88. Explain the concept of Net Present Value (NPV) with an example.

89. What is Tobin's Q-Ratio and how does it influence investment?

90. Explain the Net Present Value (NPV) method of investment appraisal. How does it help in deciding whether an investment is profitable?
91. What is the consumption function ? Explain the factors that cause shift in the consumption function.
92. Explain the concepts of demonstration effect and ratchet effect.
93. What is meant by marginal efficiency of capital ? How is it calculated ? What are the factors that determine marginal efficiency of capital in the economy ?
94. Explain Tobin's q – theory of investment.

Long Answer Questions

95. Define the consumption function. Explain its main determinants and significance in macroeconomic analysis.

96. Discuss the Absolute and Relative Income Hypotheses of consumption in detail. How do they differ from each other?

97. Explain the life cycle hypothesis of consumption, Compare the major differences of this hypothesis with the permanent Income hypothesis of consumption.

98. What is the investment function? Explain the major determinants that influence investment decisions in an economy.

99. Describe the working of the Accelerator Theory of Investment?
100. Explain and graphically represent Keynesian consumption function C = a + bY. How do marginal propensity to consume (MPC) and average propensity to consume (APC) change with increase in income in this consumption function ?

UNIT 4

Very short answer questions

101. What is inflation?
102. Define hyperinflation.
103. What is demand-pull inflation?
104. What is cost-push inflation?
105. What does the Phillips Curve show?
106. Mention one measure to control inflation.

107. What is a trade cycle?
108. Name the four phases of a trade cycle.
109. Define stagflation

Short Answer Questions

110. Define inflation and explain any two causes.
111. Distinguish between demand-pull and cost-push inflation.
112. Explain the concept of the Phillips Curve.
113. What are the main phases of a trade cycle?
114. Briefly explain Hawtrey's monetary theory of trade cycles.
115. Describe the role of innovation in Schumpeter's theory of trade cycles.
116. How does the recession phase affect economic activity?
117. Explain the factors causing downward-sloping Phillips Curve.
118. What are the main factors that cause cost-push inflation.
119. Define inflation. Explain its effects on (a) creditors and debtors (b) persons of fixed income group.

Long Answer Questions

120. Explain the concept of the Phillips Curve. What does it suggest about the relationship between inflation and unemployment?Distinguish between short-run and long-run Phillips Curve.
121. Define inflation. Discuss various monetary and fiscal measures used to control inflation.
122. Define trade cycles. Explain the different phases of a trade cycle with suitable examples.
123. Critically examine Hawtrey's monetary theory of trade cycles.
124. Discuss Schumpeter's theory of innovation as a cause of trade cycles. How does innovation lead to economic fluctuations?
125. Compare and contrast Hawtrey's and Schumpeter's theories of trade cycles.

KANORIA P.G. MAHILA MAHAVIDYALAYA

DEPARTMENT OF ECONOMICS

Mathematical Methods for Economics - II

UG9102-ECO-52T-105

UNIT - I

Very Short Answer Questions

1. Define total, marginal and average concepts.
2. Increasing function.
3. Decreasing function.
4. Point of Inflexion.
5. If $Y = 3x^2$, find slope at $x = 4$.

Short Answer Questions

6. Explain relative maximum and relative minimum.
7. Optimize, $f(x) = -x^3 + 6x^2 + 15x - 32$.
8. Find marginal and Average Functions. Evaluate them at $Q = 3$ and $Q = 5$.

(i) $TC = 3Q^2 + 7Q + 12$

(ii) $\pi = Q^2 - 13Q + 78$

(iii) $TR = 12Q - Q^2$

(iv) $TC = 35 + 5Q - 2Q^2 + 2Q^3$

9. Find partial derivatives $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$. Evaluate them at $x = 4$ and $y = 1$.

(i) $z = 3x^2y^3$

(ii) $z = 7x^3 + 9xy + 2y^5$

10. Graphically explain concavity & convexity of a function.

Descriptive Answer Questions

11. Optimize the following functions by -
(i) finding the critical values
(ii) testing the second order condition

a. $Y = -3x^4 - 20x^3 + 144x^2 + 17$

b. $Y = x^4 - 8x^3 - 80x^2 + 15$

c. $Y = -2x^3 + 15x^2 + 84x - 25$

12. Find MR at $Q = 4$, when the demand function is given as $Q = 36 - 2P$.

13. If $TR = 1400Q - 7.5Q^2$ and $TC = Q^3 - 6Q^2 + 140Q + 750$, calculate the maximum profit.

14. Find the critical points and test whether the function is relative maximum or minimum. Given,

$$z = 2y^3 - x^3 + 147x - 54y + 12$$

15. For the following functions, find the critical points and determine if at these points the function is at relative maximum, relative minimum, inflexion point or saddle point.

(i) $z(x, y) = 3x^3 - 5y^2 - 225x + 70y + 23$

(ii) $f(x, y) = 3x^3 + 1.5y^2 - 18xy + 17$

(iii) $f(x, y) = x^3 - 6x^2 + 2y^3 + 9y^2 - 63x - 60y$

16. If the production function is $Q = 10 - 2L^2 + LK - K^2$, $P_L = P_K = ₹3$ and $P_Q = ₹6$, then find the value of maximum profit.

17. Test the concavity and convexity of following at critical points.

(i) $TC = 2Q^3 - 4Q^2 + 140Q + 845$
$TR = 5900Q - 10Q^2$
Solve for π function.

UNIT-II

Very Short Answer Questions

18. Define Saddle Point.
19. Define Point of Inflexion.
20. What are the conditions for concavity and convexity of a function.

Short Answer Question

21. Explain second order condition for constrained optimization problem.
22. Optimize $z = 4x^2 + 3xy + 6y^2$, subject to, $x + y = 56$. (First Order Condition)

Descriptive Answer Questions

23. Optimize the function, if the objective function is $z = 8x^2 + 6xy + 12y^2$ and constraint is $x + y = 112$.
24. If the utility function is $U = q_1 q_2$ and $200 - 4q_1 - 10q_2 = 0$ is budget constraint, at what value of q_1 and q_2 utility will be maximum.
25. Optimize - $f(x, y) = 26x - 3x^2 + 5xy - 6y^2 + 12y$ Subject to. - $3x + y = 170$.
26. Find the critical values for minimizing costs of a firm producing 2 goods x and y, where the TC function is $C = 8x^2 - xy + 12y^2$. The firm is bounded by a contract to produce a minimum combination of goods totalling 42.

UNIT - III

Very Short Answer Questions

27. Define Homogeneous Difference Equation.
28. Define Non-Homogeneous Difference Equation.
29. Define time path equation.
30. Cobweb Model.
31. Define difference equation.

Short Answer Questions

32. If the first order difference is $Y_t = 7Y_{t-1} - 18$, where Y is income. Find solution of non-homogeneous difference equation (Y_c).
33. Explain the nature and stability of a time path equation.
34. Explain the order of difference equation.

Descriptive Answer Questions

35. Find the time path equation and depict its nature.

(i) $Y_t = \frac{1}{3}Y_{t-1}$ and $Y_0 = 3$.

(ii) $Y_t = 4Y_{t-1} - 9$ and $Y_0 = 5$

(iii) $Y_t = -3Y_{t-1} + 20$ and $Y_0 = -8$.

36. Derive the time-path equation for 'P', from the given demand and supply function, depict its nature.

(i) $Q_{dt} = 200 - 0.4P_t$

$Q_{st} = -40 + 0.6P_{t-1}$

$P_0 = 260$

(ii) $Q_{dt} = 60 - 0.25P_t$

$Q_{st} = -10 + 0.1P_{t-1}$

$P_0 = 275$

(iii) $Q_{dt} = 180 - 0.75P_t$

$Q_{st} = -30 + 0.30P_{t-1}$

$P_0 = 220$

37. From the given consumption and investment function find the time path equation and depict its nature. Also prove the result for $t = 1$.

(i) $Y_t = C_t + I_t$

$C_t = 100 + 0.8Y_{t-1}$

$I_t = 100$

$Y_0 = 3500$

(ii) $Y_t = C_t + I_t$

$C_t = 400 + 0.6Y_t + 0.35Y_{t-1}$

$I_t = 240 + 0.15Y_{t-1}$

$Y_0 = 7000$

38. In Harrod Model, if the Investment function is $I_t = 5.32(Y_t - Y_{t-1})$, saving function is $S_t = 0.32Y_t$ and $Y_0 = 1000$. Determine the growth path for income.

39. Derive the solution for -

(i) $Y_{t+2} - 4Y_{t+1} + 4Y_t = 0$

(ii) $Y_{t+2} - 5Y_{t+1} + 6Y_t = 0$

UNIT - IV

Very Short Answer Questions

40. Define differential equation.

41. Explain solution of differential equation.

Short Answer Questions

42. Find the solution of differential equation

$$\frac{dy}{dx} = 3x.$$

43. Find the solution of differential equation

$$\frac{d^2y}{dx^2} = a$$

44. Explain the order and degree of differential equations.

Descriptive Answer Questions

45. Solve -

$(1+xy)dx - (1-x)dy = 0$

46. If the price elasticity of demand is -1. Find the demand function $Q = f(P)$.

47. If the price elasticity of demand is $e = \frac{-(P+P^2)}{Q}$, and at $P = 10$, $Q = 400$, then find the demand function.

48. Derive demand function, when,

$$e = -\frac{(10P + 4P^2)}{Q}, \text{ and } Q = 1000 ; P = 20.$$

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Department of Economics
UG9102- ECO-63T-201
Intermediate Microeconomics
B.A. Hons Sem -III

Unit 1

Very Short Answer Questions

1. What is a commodity bundle?
2. Define an indifference curve.
3. What is a utility function?
4. State the meaning of the budget set.
5. Define price elasticity of demand.
6. What is a Hicksian substitution effect?
7. Write the Slutsky equation in elasticity form.
8. What does an indifference curve represent?
9. What is an optimal choice?

Short Answer Questions

10. Explain the properties of indifference curves.
11. What are the assumptions of the theory of consumer choice?
12. Explain the significance of the budget constraint.
13. Describe the concept of marginal rate of substitution (MRS).
14. How is utility maximized under a given budget?
15. Explain the decomposition of price effect using Slutsky's method.
16. How does Hicksian substitution differ from Slutsky substitution?
17. Write and explain the Slutsky equation.
18. What are the implications of elasticity in consumer demand?

Long Answer Questions

19. Explain how the consumer reaches equilibrium using indifference curves and budget lines.
20. Derive the Slutsky equation and explain each component.
21. Compare and contrast Hicksian and Slutsky methods of decomposing the price effect.
22. Analyze the effect of a change in price on consumer choice using decomposition of the price effect.
23. Derive and explain the elasticity form of the Slutsky equation.
24. How does a change in income affect the consumer's optimal choice? Use indifference curves to explain.

Unit 2

25. Define a production function.
26. What is the difference between short-run and long-run production?
27. What is the Law of Diminishing Returns?
28. Define Returns to Scale.
29. What is an expansion path?
30. What is a ridge line in production analysis?
31. Define Isoquant.
32. What is meant by a fixed coefficient production function?

Short Answer Questions

33. Distinguish between the law of variable proportion and returns to scale.
34. Describe the key features of the Cobb-Douglas production function.
35. What are ridge lines and what do they represent in production theory?
36. Explain the shape and properties of isoquants.
37. Describe the differences between fixed coefficient and CES production functions.
38. What is an expansion path and how is it derived?
39. What do isoclines represent in production analysis?

Long Answer Questions

40. Explain the difference between the short-run and long-run production functions with diagrams.
41. Discuss the Law of Variable Proportions and illustrate it using a total product curve.
42. Analyze the concept of Returns to Scale and explain the three types with a diagram.
43. Compare and contrast the Cobb-Douglas, CES, and fixed coefficient production functions.
44. Discuss the properties and implications of the CES (Constant Elasticity of Substitution) production function.
45. How does a producer decide on the optimal combination of inputs in the long run?
46. Write the mathematical form of the Cobb-Douglas production function and explain its components.

Unit 3

Very Short Answer Questions

47. What is meant by allocative efficiency?
48. Define monopoly.
49. What is a cartel?
50. State two features of an oligopoly.
51. What is the kinked demand curve hypothesis?

52. What is meant by price leadership in oligopoly?
53. How does taxation affect monopoly pricing?
54. Mention one reason why monopolies are less efficient than competitive firms.
55. Define productive efficiency.
56. What is the main assumption behind the kinked demand curve?
57. Define consumer surplus?
58. Define producer surplus?

Short Answer Questions

59. Compare the efficiency of perfect competition and monopoly.
60. How does a monopoly create deadweight loss?
61. Explain the impact of a specific tax on a monopolist's output and price.
62. What are the characteristics of an oligopolistic market?
63. Describe the kinked demand curve and its implications for price rigidity.
64. What is a price cartel? Give an example.
65. Explain the concept of price leadership with a diagram.
66. What is the effect of taxation on market equilibrium under perfect competition?
67. How does a cartel influence output and pricing in an oligopolistic market?
68. What are the limitations of the kinked demand curve model?

Long Answer Questions

69. Compare and contrast the relative efficiency of competitive and monopoly markets in terms of output, price, and welfare.
70. Discuss how taxation affects consumer surplus, producer surplus, and deadweight loss in monopoly and competitive markets.
71. Explain the kinked demand curve model of oligopoly. How does it lead to price rigidity?
72. Analyze the working of a cartel in an oligopolistic market. What are the challenges in maintaining a cartel?
73. Discuss the concept of price leadership. How does it help in reducing uncertainty in oligopolistic pricing?
74. With diagrams, show how taxation shifts supply and affects equilibrium under monopoly and competition.
75. Describe different forms of price leadership and evaluate their effectiveness.
76. How do firms in an oligopoly behave differently compared to those in monopoly and perfect competition?

Unit 4

Very Short Answer Questions

77. What is derived demand?
78. Define marginal productivity of an input.

79. What does the marginal revenue product (MRP) measure?
80. Define value of marginal product (VMP).
81. What causes a shift in the input demand curve?
82. What is a competitive labour market?
83. State the factor affecting the supply of labour.
84. What is the difference between MRP and VMP?
85. What happens to input demand when the price of the final good increases?

Short Answer Questions

86. Explain the concept of derived demand with an example.
87. How is the marginal productivity of labour calculated?
88. Distinguish between marginal revenue product and value of marginal product.
89. What are the key factors that shift the input demand curve?
90. Explain the shape of the labour supply curve.
91. What determines wage in a perfectly competitive labour market?
92. How does a firm decide how much labour to hire in the short run?
93. Explain why the MRP curve is downward sloping.

Long Answer Questions

94. Explain the concept of derived demand and its importance in input markets.
95. Analyze how a firm determines its demand for labour using MRP and VMP in a perfectly competitive firm.
96. Discuss the factors influencing shifts in the input demand curve.
97. With the help of diagrams, explain how wage is determined in a competitive labour market.
98. Compare and contrast MRP and VMP. How do they relate to hiring decisions?
99. Describe the relationship between the productivity of an input and its demand.
100. Explain how changes in technology affect the demand for labour.
101. Discuss the factors that determine the supply of labour.
102. How does wage determination differ in competitive vs. non-competitive labour markets?
103. Using diagrams, show the equilibrium in a labour market and explain what happens when the wage is above or below the equilibrium level.
104. Analyze how a firm determines its demand for labour using MRP and VMP in an imperfect market.

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UNIT-I

Very Short Answer Questions

1. Define Indifference curve.
2. What are the basic properties of Indifference Curve.
3. Income Elasticity.
4. Define elasticity
5. Complimentary goods.
6. Substitute goods.
7. Ordinary Demand Function
8. Compensated Demand Function

Short Answer Questions

9. Show the relationship between e_d, AR and MR.
10. If the demand function is $x = a - bp$, find price elasticity of demand (e_d).
11. Check whether the function is concave or convex at the critical points.

(i) $y = x^3 - 3x^2 - 9x + 27$

(ii) $y = x^3 - 6x^2 + 9x + 300$

12. Derive labour supply function.

13. What are the condition for concavity and convexity of a function.

Descriptive Answer Questions

14. Prove the convexity of Indifference curve.

15. If, $x_1 = \frac{P_2}{P_1}$ and $x_2 = \frac{(P_1)^2}{P_2}$, find partial elasticities of demand. Also tell the nature of the goods.

16. If the demand function for tea is given as -

$Q_t = 380 - 5P_t + 2P_c + 0.2Y$, where Y (Income) = 1000, P_t (price of tea) = 20, P_c (price of coffee) = 10. Find -

(i) cross price elasticity

(ii) income elasticity.

17. If the utility function $U = q_1^2 q_2$ is given and the budget constraint is $150 - 5q_1 - 5q_2 = 0$, find the value of q_1 and q_2 at which utility is maximum.

18. Derive Slutsky equation for 2-commodity cases.

19. If the utility function is $U = q_1 q_2$ and budget constraint is $Y = P_1 q_1 + P_2 q_2$. Derive -

(i) Ordinary Demand Function

(ii) Compensated demand function.

20. Explain Engel Aggregation condition

21. Explain Cournot Aggregation condition

UNIT - II

Very Short Answer Questions

23. Expansion Path.

24. Output elasticity of labour.

25. Output elasticity of capital.

26. Homogeneous Production function.

27. $MRTS_{LK}$.

28. MP_L

29. MP_K.

Short Answer Questions

30. If production function is $Q = 5L^{0.8}K^{0.2}$, then find $MRTS_{LK}$.

31. Obtain expansion of Cobb-Douglas production function.

32. Find the degree of homogeniety for the given production function.

i) $z = f(x,y) = \frac{x^2}{y^2} + \frac{y^2}{x^2}$

ii) $z = \sqrt{ax^2 + bxy + cy^2}$

iii) $z = x^3 + 3x^2y + 3xy^2 + y^3$

33. What are the properties of a well behaved production function.

Descriptive Answer Questions

34. Briefly explain cobb-Douglas production function. write its properties.

35. Explain Euler's Theorem, if the production function is given as $Q = AK^{0.4}L^{0.6}$

36. Find elasticity of substitution, when production function is $Q = (aK^{-\beta} + bL^{-\beta})^{-\frac{1}{\beta}}$.

37. If the production function is $Q = 18 - \frac{1}{L} - \frac{1}{K}$, $P_L = 4$, $P_K = 3$, $P_Q = 36$. Find the value of L, K, Q at which profit is maximum. Find value of total profit. {taking 'Q' as constraint}.

38. If $Q = 5L^{0.7}K^{0.3}$, $P_L = ₹1$, $P_K = ₹2$. Find the minimum cost combination of Labour and capital for output.

39. If $Q = L^{1/2}K^{1/2}$, $P_L = ₹4$, $P_K = ₹2$ and $TC = ₹80$. Find the value of Labour and capital at which output is maximum.

40. If $Q = f(a,b) = 20 - a^{-1} - b^{-1}$, $P_Q = 5$, $P_a = 20$, $P_b = 40$. Maximize profit, where output is constraint.

UNIT - III

Very Short Answer Questions

41. What is input demand function.

42. Homogeneous difference equation

43. Non-Homogeneous difference equation.

44. Cobweb model.

Short Answer Questions

45. What are the properties of input demand function.

46. Briefly explain the properties of cost function.

47. Graphically explain the nature and stability of cobweb model.

Descriptive Answer Questions

48. If, $Q = AK^{\alpha}L^{\beta}$ and $C = w \cdot L + r \cdot K$, derive input demand function for labour.

49. If, $Q = AK^{\alpha}L^{\beta}$ and $C = w \cdot L + rK$, derive input demand function for capital.

50. If, $Q = L^{0.5}K^{0.5}$ and $C = w \cdot L + r \cdot K$, where P is price of output. Derive cost function $C = f(Q, w, r)$.

51. Derive time path equation for 'P' and depict its nature.

(i) $Q_{dt} = 200 - 0.4P_t$

$Q_{st} = -40 + 0.6P_{t-1}$

$P_0 = 260$

(ii) $Q_{dt} = 21 - 2P_t$

$Q_{st} = -3 + 6P_t$

and $P_{t+1} = P_t - 0.3(Q_{st} - Q_{dt})$.

UNIT - IV

Very Short Answer Questions

52. Game Theory.
53. Zero Sum Game
54. Pure and Mixed Strategy game
55. Input - Output Model
56. LPP.

Short Answer Questions

57. Briefly explain Hawkin - Simon condition
58. What are dual and primal.
59. What is the difference between open input - output model and closed input - output model.
60. Check Hawkin - Simon condition -

$$A = \begin{pmatrix} 0.1 & 0.3 & 0.1 \\ 0 & 0.2 & 0.2 \\ 0 & 0 & 0.3 \end{pmatrix}$$

61. Find the solution when the (saddle-point solution) pay-off matrix of player A is -

$$A = \begin{pmatrix} 25 & 20 & 17 & 40 \\ 30 & 19 & 13 & 15 \\ 45 & 7 & 15 & 10 \\ 0 & 9 & 16 & 5 \end{pmatrix}$$

Descriptive Answer Questions

62. Find the value of game, when,

$$A = \begin{pmatrix} 6 & -2 & 2 \\ -4 & 5 & 4 \end{pmatrix}$$

63. Using graphical method solve the following -

(i) Min. $C = 3x + 5y$

s.t. $5x + 2y \geq 10$

$x + y \geq 4$

$x + 3y \geq 6$

$x, y \geq 0$

(ii) Max. $\pi = 6x + 3y$

s.t. $4x + y \leq 12$

$2x + 2y \leq 10$

$2x + 4y \geq 8$

$x, y \geq 0$.

64. Using simplex method solve the following -

(i) Max. $\pi = 40x_1 + 35x_2$

s.t $6x_1 + 4x_2 \leq 220$

$3x_1 + 10x_2 \leq 280$

$x_1, x_2 \geq 0$

65. Find gross - output when,

$$A = \begin{pmatrix} 0.3 & 0.4 & 0.1 \\ 0.5 & 0.2 & 0.6 \\ 0.1 & 0.1 & 0.1 \end{pmatrix}, \quad F = \begin{pmatrix} 10 \\ 5 \\ 15 \end{pmatrix}$$

66. Find final demand, when,

$$A = \begin{pmatrix} 0.2 & 0.1 & 0.2 \\ 0.5 & 0.4 & 0.3 \\ 0.1 & 0.4 & 0.2 \end{pmatrix}, \quad X = \begin{pmatrix} 100 \\ 200 \\ 160 \end{pmatrix}$$

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UG9102-ECO-64T-204
Intermediate Macroeconomics
B.A. Hons Sem -IV

Unit 1

Very Short Answer Questions

1. What is aggregate income?
2. Define nominal income.
3. Define real income.
4. Give one reason why GDP may not reflect welfare accurately.
5. Mention one omission in the measurement of aggregate income.
6. Give an example of a non-monetary activity not included in GDP.

Short Answer Questions

7. Define aggregate income. What are its main components?
8. Differentiate between real income and nominal income with examples.
9. What is the relationship between aggregate income and economic welfare?
10. Why is real income considered a better indicator of economic well-being than nominal income?

Long Answer Questions

11. Define aggregate income and explain its components. How is it related to national output and expenditure?
12. Discuss in detail the connection between income and welfare. Why might a rise in GDP not lead to an increase in welfare?
13. Discuss how aggregate output, income, and expenditure are interconnected in a circular flow model.

Unit 2

Very Short Answer Questions

14. What is the quantity theory of money?
15. State the quantity equation.
16. What does the symbol V represent in the quantity equation?
17. What is meant by constant velocity of money?
18. Define inflation.
19. What is the Fisher equation?

20. What is the difference between real and nominal interest rates?
21. What is the effect of inflation on the demand for money?

Short Answer Questions

22. Explain the transactions version of the quantity theory of money.
23. Define and explain the *quantity equation* (MV = PY).
24. What is the *Fisher effect*? State its implication on interest rates.
25. Distinguish between *real interest rate* and *nominal interest rate* with an example.
26. How does an increase in inflation affect the *demand for money*?
27. Discuss how changes in the money supply influence *price level and output*.

Long Answer Questions

28. Discuss the *quantity theory of money* in detail.2. Derive and explain the **quantity equation**. What assumptions are made regarding velocity and output?
29. Analyze the relationship between **money supply growth and inflation** in the long run.
30. Explain the **Fisher effect** and its implications for the relationship between inflation and nominal interest rates.
31. Critically examine the assumptions of the quantity theory of money. How realistic is the assumption of constant velocity?
32. Critically examine the Cambridge Cash-Balance Theory of Demand for Money. How does it differ from Fisher's transactions approach to demand for money ?
33. Why do people hold money when they can earn interest by lending it to others or by buying interest yielding bonds of the companies ?

Unit 3

Very Short Answer Questions

34. What is the classical theory of income and employment?
35. Define the principle of effective demand.
36. What is meant by wage rigidity in Keynes's model?
37. What is the Keynesian multiplier?
38. What is Say's Law of Markets?
39. What is money illusion?

Short Answer Questions

40. Explain the concept of neutrality of money in the classical model.
41. What are the key assumptions of the classical theory of employment?
42. Briefly describe Keynes's critique of classical theory.
43. What is the principle of effective demand? How does it determine employment?
44. Explain the working of the Keynesian multiplier with a simple example.

45. How did the Keynesian model explain the causes of the Great Depression?

Long Answer Questions

46. Explain the **complete classical model** of income and employment. What are its main features?
47. Discuss the **Keynesian critique** of classical theory. How did Keynes differ in his approach?
48. What is the **money wage rigidity model**? How does it lead to unemployment according to Keynes?
49. (1) Show the effects of introduction of a new technology on labour market, product market and capital market in the classical full-employment model.
    (2) Show with the classical full-employment model how the increase in labour supply through increase in labour participation rate will affect labour market, product market.

Unit 4

Very Short Answer Questions

50. What does the IS curve represent?
51. What does the LM curve represent?
52. Define general equilibrium in the IS-LM model.
53. What is the natural rate of unemployment?
54. Define frictional unemployment.
55. What is real wage rigidity?
56. Define structural unemployment.
57. What causes the IS curve to shift?
58. What is aggregate demand (AD)?
59. What happens to output in the short run when prices are sticky?

Short Answer Questions

60. Explain how the IS curve is derived.
61. How is the LM curve derived from the money market equilibrium?
62. What factors lead to a shift in the IS curve?
63. What causes a shift in the LM curve?
64. Differentiate between frictional, structural, and cyclical unemployment.
65. Explain the concept of real wage rigidity and its effect on unemployment.
66. How is the aggregate demand curve derived from the IS-LM framework?
67. Briefly explain how the AD-AS model shows macroeconomic equilibrium in the short and long run.
68. Describe the role of time horizons in the AD-AS model.
69. What are the policy implications of shifts in the AD and AS curves?

Long Answer Questions

70. Derive the IS and LM curves and explain how they together determine general equilibrium in the goods and money markets.
71. Discuss the effects of fiscal and monetary policy using the IS-LM model.
72. Derive the aggregate demand and aggregate supply curves. How do they determine macroeconomic equilibrium?
73. Explain how the AD-AS model can be used to differentiate between short-run and long-run macroeconomic outcomes.
74. Illustrate and explain the macroeconomic impact of shifts in the AD and AS curves.
75. Compare the IS-LM model and the AD-AS model in explaining economic fluctuations.
76. Derive the aggregate demand curve (with varying price level). Why does it slope downward? Show the effect of an increase in nominal money stock on aggregate demand curve.
77. The AS–AD model explains the multiplier effect of increase in Government expenditure on aggregate output when
    (1) price level remains constant
    (2) price level rises.
78. Define IS curve. What are the factors that determine the slope or steepness of the IS curve ?
79. What is the LM curve ?How is it derived from money market equilibrium ?On which factors does its slope and position depend?
80. Explain through IS-LM curves model how the following will affect rate of interest.

(a) Expansion in money supply
(b) Increase in propensity to consume
(c) Increase in Government expenditure
(d) Decline in investment demand
(e) Fall in the liquidity preference of the people

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Statistics-I
B.A. Hons Sem -IV

Unit 1

Very Short Answer Questions

1. What is statistics?
2. Mention two uses of statistics in economics.
3. Name two methods of data collection.
4. What is a primary data source?
5. Define tabulation.
6. Name any two types of diagrams used to represent data.
7. What is a histogram?
8. What is a pie chart used for?
9. Define mean?
10. What is the median?
11. Define mode.
12. Find the harmonic mean:
    75, 5, 475, 382, 63
13. Find the value of median in asymmetric distribution, when mode and mean are 32.1 and 35.4 respectively.
14. What is exclusive type series
15. What is inclusive type series
16. Calculate mode:
    10,27,24,12,27,20,27,18,15,30
17. Calculate median for the data:
    1100, 1160, 1000, 1070, 1200,1120
18. Calculate the arithmetic mean of incomes:
    1700, 1750, 1690, 1650, 1800, 1830, 1950, 1840
19. Find the quartiles (Q1 and Q3) for the data:
    5, 10, 15, 20, 25, 30, 35, 40

Short Answer Questions

20. What are the methods of collecting primary and secondary data?
21. Define arithmetic mean. Mention its merits and demerits.
22. Compute the value of harmonic mean

Marks	Frequency

10	20
20	30
25	50
40	15
50	5

23. A car travels three equal distances at speeds of 30 km/h, 40 km/h, and 60 km/h. Find the harmonic mean speed.
24. Calculate the arithmetic mean:

Marks	No. of students
20	8
30	20
40	12
50	10
60	4

25. Compute arithmetic mean by short-cut method

Marks	No. Of students
0-10	5
10-20	10
20-30	25
30-40	30
40-50	20
50-60	10

26. The mean marks of 100 students were found to be 40. Later on it was discovered that a score of 53 was misread as 83. Find the correct mean.
27. The mean height of 25 male workers in a factory is 61 inches and the mean height of 35 female workers in the same factory is 58 inches. Find the combined mean height of workers in the factory.

28. Find weighted arithmetic mean

Wages per day	No. Of workers
40	20
32	15
15	5

29. Find the value of median

Income	No. Of persons
1000	24
1500	26
800	16
2000	20
2500	6
1800	30

30. Calculate the median

Marks	No. Of students
45-50	10
40-45	15
35-40	26
25-30	42
20-25	31
30-35	30
15-20	24

31. Calculate the median and mean

Weight(in gms)	No. Of apples

410-419	14
420-429	20
430-439	42
440-449	54
450-459	45
460-469	18
470-479	7

32. Calculate the median

Marks	No. Of students
Less than 5	29
Less than 10	224
Less than 15	465
Less than 20	582
Less than 25	634
Less than 30	644
Less than 35	650
Less than 40	653
Less than 45	655

33. Calculate median

Marks	No. Of students
0-10	5
10-30	15
30-60	30
60-80	8
80-90	2

Long Answer Questions

34. Define statistics. Discuss its nature, scope, and uses in economics and business.
35. An incomplete distribution is given

Variable	Frequency
0-10	10
10-20	20
20-30	?
30-40	40
40-50	?
50-60	25
60-70	15

You are given that the median value is 35. Find out missing frequency, given total sum of frequency is 170

36. Find the value of mode and median

Marks (More Than)	Frequency
More than 0	100
More than 10	90
More than 20	80
More than 30	65
More than 40	40
More than 50	20
More than 60	0

37. Find the missing frequency, when geometric mean is 15.3

X	Frequency
8	5
25	3
17	4
30	?

Unit 2

Very Short Answer Questions

38. What is meant by dispersion?
39. Define skewness.
40. What does kurtosis measure?
41. Mention any one method of measuring correlation.
42. What is the range of Karl Pearson's coefficient of correlation?
43. What is positive and negative correlation?
44. Define Spearman's Rank Correlation.
45. Write the formula for probable error.
46. Find mean deviation and standard deviation, if quartile deviation is 54.
47. Find the standard deviation of first 15 natural numbers
48. What is a perfect positive correlation?
49. Find the range: 5, 8, 10, 12, 20.
50. If r = 0.85, what is 6 × Probable Error (PE), when n = 20?

Short Answer Questions

51. Differentiate between positive and negative skewness.
52. Calculate standard deviation
    240,290,260,245,255,288,272,263
53. Calculate quartile deviation and coefficient of quartile deviation

Marks	Frequency
10	4
20	7
30	15
40	8
50	7
60	2

54. Distinguish between Karl Pearson's and Spearman's correlation.
55. Define and explain mesokurtic, leptokurtic and platykurtic curves.
56. (1) Calculate standard deviation for: 3, 7, 8, 10, 12.
    (2)Find coefficient of variation for a dataset with Mean = 50, SD = 10.
57. Compute Karl Pearson's correlation coefficient for:

X	10	20	30	40
Y	15	25	35	45

58. Calculate Spearman's Rank Correlation for the following ranks:

| A | 1 | 2 | 3 | 4 | 5 |
| B | 2 | 1 | 4 | 3 | 5 |

59. Compute **quartile deviation** and its coefficient from the following data:

12, 15, 18, 20, 24, 30, 32, 36, 40, 45

Long Answer Questions

60. Discuss the different measures of dispersion and their merits and demerits.
61. (1) The mean and standard deviation of a set of 100 observations were worked out as 40 and 5 respectively, which by mistake took the value 50 in place of 40 for one observation. Find the correct mean and variance.

(2) The mean of 5 observations is 4.4 and the variance is 8.24. If the three of the five observations are 1,2 and 6, find the other two.

62. Find the combined standard deviation and also find which of the two distribution is more variable

	Boys	Girls
Number	100	50
Mean weight	60	45
Standard deviation	3	2

63. Calculate standard deviation, variance and coefficient of variation

Age under	No. Of persons
10	15
20	30
30	53
40	75
50	100
60	110
70	115

80	125

64. Find mean deviation and coefficient of mean deviation
    (1) By mean
    (2) By median
    (3) By mode

X	Frequency
0-10	7
10-20	12
20-30	18
30-40	25
40-50	16
50-60	14
60-70	8

65. What is kurtosis? Explain different types of kurtosis with diagrams.
66. Calculate Karl Pearson's coefficient of correlation for:

X	2	4	6	8	10
Y	1	3	5	7	9

67. From the following data, calculate mean, variance, standard deviation, and coefficient of variation:

12, 15, 20, 22, 26, 30

68. Calculate Spearman's Rank Correlation coefficient for:

Student	A	B	C	D	E	F
Rank X	1	2	3	4	5	6
Rank Y	2	1	4	3	6	5

69. Calculate the **standard deviation** and **coefficient of variation** for the following frequency distribution:

Class Interval	Frequency
0 - 10	5
10 - 20	8
20 - 30	12
30 - 40	7
40 - 50	3

70. From the following data, calculate **mean deviation** from the **mean** and **median**:

5, 10, 15, 20, 25, 30

71. (1) Calculate **Bowley's coefficient of skewness** for the following:

Value (X)	5	10	15	20	25	30
Frequency	3	5	8	4	2	1

(2) Given the following data, calculate **Karl Pearson's coefficient of skewness**:
Mean = 60, Median = 55, Standard Deviation = 10

72. Ten students were ranked in two subjects. Calculate Spearman's rank correlation:

Student	A	B	C	D	E	F	G	H	I	J
Rank X	1	3	2	4	5	7	6	8	10	9
Rank Y	2	1	4	3	6	5	8	7	9	10

Unit 3

Very Short Answer Questions

73. What is regression analysis?
74. Define regression coefficient.
75. What is the least squares method?
76. What is a time series?
77. What is the trend in time series?
78. Given r = 0.9 and $b_{yx} = 0.45$, find b_{xy}.
79. Identify the type of time series trend from this data: 10, 20, 30, 40, 50.
80. Name the four components of a time series.
81. Define secular trend.
82. What is a seasonal variation?
83. What do you mean by cyclical variation?
84. Identify the trend in the series: 50, 55, 60, 65, 70.

Short Answer Questions

85. Distinguish between correlation and regression.
86. Calculate two regression lines
When correlation coefficient is 0.8

	Adv. Exp (X)	Sales (Y)
Mean	10	90
Standard deviation	3	12

87. Why there is two regression lines
88. Differentiate between linear trend and seasonal variation in time series.
89. State the difference between positive and negative association with examples.
90. Write a short note on random or irregular variations.
91. Calculate a 3-year moving average for the following data:

Year	2019	2020	2021	2022	2023
Sales	150	160	170	180	200

92. Fit a straight-line trend using the least squares method for the following data and estimate sales for 2025:

Year	2020	2021	2022	2023	2024
Sales	100	110	130	150	170

93. Fit a regression line Y on X using the least squares method for the following data:

X	1	2	3	4	5
Y	2	4	5	4	5

94. Compute the regression coefficients b_{xy} and b_{yx} for:

X	10	20	30	40
Y	8	15	20	25

95. Determine the trend line using the method of least squares for the following time series:

Year	2019	2020	2021	2022	2023

| Sales | 100 | 120 | 130 | 150 | 170 |

Long Answer Questions

96. Fit the regression line Y on X using least squares and estimate Y when $X = 6$:

X	2	4	6	8	10
Y	3	5	7	9	11

97. From the data below, compute:
- Both regression equations
- Correlation coefficient

| X | 5 | 10 | 15 | 20 | 25 |
| Y | 7 | 12 | 17 | 22 | 27 |

98. Using the method of least squares, fit a linear trend and forecast the value for 2025:

Year	2020	2021	2022	2023	2024
Production	500	520	550	580	600

99. Fit a straight-line trend to the following data using least squares and estimate the value for 2027:

Year	2018	2019	2020	2021	2022	2023
Output	200	210	220	230	250	270

100. Using the method of least squares, fit a straight-line trend and find the trend values:

Year	2017	2018	2019	2020	2021
Sales	50	55	65	70	75

101. Compute the seasonal indices by the **method of simple averages** from the following quarterly data:

Quarter	Year 1	Year 2	Year 3
Q1	80	85	90
Q2	100	110	120
Q3	130	140	150
Q4	90	95	100

Unit 4

Very Short Answer Questions

102. What is an index number?
103. Define interpolation.
104. What is binomial expansion used for in interpolation?
105. Define null hypothesis.
106. What is a Type I error?
107. What is a Type II error?
108. Define level of significance.
109. What is a critical region?

Short Answer Questions

110. Explain the uses of index numbers in economics.
111. Why fisher's index number is called ideal index
112. Differentiate between interpolation and extrapolation.
113. Distinguish between Type I and Type II errors.
114. Construct a price index using the Laspeyres method from the following:

Commodity	A	B
Base year price	10	20
Current year price	12	25
Base year quantity	5	2

115. Using Newton's Forward Interpolation, estimate the value of y when x = 3:

x	1	2	4	5
y	1	4	16	25

116. A sample of 100 students has an average height of 160 cm with a standard deviation of 10 cm. Test whether the average height differs significantly from 158 cm at 5% level of significance.

Long Answer Questions

117. Define index numbers. Explain different types and methods of constructing index numbers.

118. Construct Fisher's Ideal Index Number using the following data:

Commodity	A	B	C
Price (base)	10	15	25
Price (current)	12	20	30
Quantity (Base)	5	10	4
Quantity (current)	4	8	6

119. Interpolate the missing value for x = 2.5 using binomial expansion for the table:

| x | 1 | 2 | 3 | 4 |
| y | 1 | 8 | 27 | 64 |

120. A machine produces bolts with a mean length of 5.8 cm. A sample of 36 bolts has mean 6.0 cm and SD 0.6 cm. Test the hypothesis that machine is working properly at 5% significance.

121. A sample of 100 students has an average score of 68. The population mean is known to be 65 and standard deviation is 10. Test the hypothesis at 5% level of significance.

Kanoria PG Mahila Mahavidyalaya

Department of Economics

Microeconomics – UG9101-ECO-51T-101

B.A./B.Sc. Semester I

UNIT I

Very Short Answer Questions

1. What is the law of demand?
2. Define opportunity cost.
3. What is meant by market equilibrium?
4. Give the meaning of elasticity.
5. State the law of supply.
6. What are the three central problems of an economy?
7. What is the concept of choice in economics?
8. Define consumer surplus.
9. What is meant by supply curve?
10. Mention two determinants of demand.

Short Answer Questions

11. Explain the determinants of supply.
12. Distinguish between movement along the demand curve and shift of the demand curve.
13. What are the main features of the law of supply?
14. Explain the concept of market equilibrium with a diagram.
15. What are the problems of an economic system?
16. Write a short note on elasticity and its applications.
17. Explain the concept of producer surplus.
18. Discuss the concept of opportunity cost.
19. Explain the law of demand and the factors affecting it.
20. How is market demand derived?

Descriptive Answer Questions

21. Discuss the subject matter of economics. Explain the scope and method of economics.
22. Explain the law of demand and its exceptions. What are the determinants of demand?
23. Discuss elasticity of demand and its applications.
24. Explain law of supply and shifts in supply curve.
25. Analyze market equilibrium with demand and supply curves.

UNIT II

Very Short Answer Questions

26. Define budget constraint.
27. What is the Diamond-water paradox?
28. What is meant by consumer equilibrium?
29. Write the meaning of indifference curve.
30. What is income effect?
31. What is marginal utility?
32. What is substitution effect?
33. Define utility.
34. What is meant by consumption decision?
35. Define price change effect.

Short Answer Questions

36. Discuss the difference between total utility and marginal utility.
37. Explain the derivation of the demand curve using indifference curve analysis.
38. Write a short note on the law of diminishing marginal utility.
39. Explain the concept of income and substitution effect with the help of a diagram.
40. Explain the consumer choice under budget constraint.
41. How does a consumer attain equilibrium through indifference curves?
42. What is the role of income in consumer decision-making?
43. Discuss consumer surplus using indifference curves.
44. Briefly explain price consumption curve.
45. Explain consumer equilibrium under utility approach.

Descriptive Answer Questions

46. Analyze the household consumption decision using the concept of indifference curves and budget constraint.
47. Describe the meaning and importance of utility. How does diminishing marginal utility affect consumer choice?

UNIT III

Very Short Answer Questions

48. What do you mean by isoquant?
49. What is marginal cost?
50. What is long-run cost?
51. Define iso-cost line.
52. What is meant by cost minimization?
53. Define production function.
54. What is meant by law of variable proportions?

55. Mention any two types of cost.
56. Define short-run cost.
57. What is meant by economies of scale?

Short Answer Questions

58. Write a short note on the production function.
59. Explain the concept of iso-cost line.
60. Write a note on the production process of a firm.
61. Distinguish between isoquant and isocost lines.
62. Differentiate between short-run and long-run costs.
63. Discuss the relationship between marginal cost and average cost.
64. What are the main types of cost in the short run?
65. Explain the behavior of costs in the long run.
66. Write a short note on cost curves.
67. Explain the concept of cost minimization.

Descriptive Answer Questions

68. Discuss different cost concepts and explain the relationship between cost and output in the long run.
69. Explain the law of variable proportions with the help of a diagram.
70. Explain the behavior of profit-maximizing firms in the short run and long run.

UNIT IV

Very Short Answer Questions

71. Define perfect competition.
72. Mention one feature of monopoly.
73. What is equilibrium price?
74. What is meant by monopolistic competition?
75. Define oligopoly.
76. What is the role of advertising in monopolistic competition?
77. Write one characteristic of perfect competition.
78. Mention one assumption of monopoly.
79. State one feature of oligopoly.
80. Define market structure.

Short Answer Questions

81. What are the main assumptions of perfect competition?
82. How does a firm determine output in the short run under monopoly?
83. What are the features of a monopolistic competitive market?
84. What is the role of advertising in monopolistic competition?
85. Briefly explain price determination under perfect competition.

86. Discuss the characteristics of an oligopoly market.
87. Write a short note on output determination under monopoly.
88. Compare perfect competition and monopolistic competition.
89. What are the types of monopoly?
90. Write a note on price discrimination.

Descriptive Answer Questions

91. Explain the features and equilibrium conditions of a firm under monopolistic competition.
92. Define monopoly. Discuss the price and output determination under monopoly in the short run and long run.

KANORIA P.G. MAHILA MAHAVIDYALAYA

DEPARTMENT OF ECONOMICS

Fundamental Methods of Mathematical Economics

UG0802/803

B.Sc. Semester - II

UNIT - I

Very Short Answer Questions

1. Define singular matrix.
2. Define Identity matrix.
3. Give an example of column matrix and row matrix/vector.
4. What is null matrix.
5. Give an example of symmetric matrix.
6. Find $|A|$ if, $A = \begin{vmatrix} 2 & -1 \\ 5 & 3 \end{vmatrix}$.
7. If $A = \begin{pmatrix} 3 & -2 \\ 0 & 7 \end{pmatrix}$, find $4A$.
8. Define cramer's Rule.
9. Give any 2 basic properties of determinants.
10. What is transpose of a matrix.
11. If $A = \begin{bmatrix} 2 & 4 \\ -1 & -2 \end{bmatrix}$, find $4|A|$.

Short Answer Questions.

12. If $A = [1 \quad 7 \quad 3 \quad 2]$ and $B = \begin{bmatrix} 1 \\ 0 \\ 5 \\ 2 \end{bmatrix}$, prove that $AB \neq BA$.

13. If $A = \begin{bmatrix} 2 & 7 \\ -3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -2 \\ 5 & 8 \end{bmatrix}$, then find -

(i) $A - B$

(ii) $2A + 3B$

14. If $A = \begin{bmatrix} 5 & -8 \\ 3 & 0 \end{bmatrix}$, show that $IA = AI = A$.

15. Evaluate -

$$\begin{bmatrix} 1 & 4 \\ 2 & 6 \end{bmatrix} + \begin{bmatrix} 2 & 3 \\ 1 & -5 \end{bmatrix} - \begin{bmatrix} 3 & 8 \\ -2 & 5 \end{bmatrix}$$

16. Find A^{-1}, when $A = \begin{pmatrix} 3 & 8 \\ -7 & 4 \end{pmatrix}$.

17. If $A = \begin{bmatrix} 1 & 2 & 1 \\ 3 & 0 & 2 \end{bmatrix}$, find AA'.

Descriptive Answer Questions

18. Solve the following simultaneous equations using matrix inversion.

$$x + y + z = 6$$
$$5x - y + 2z = 9$$
$$3x + 6y - 5z = 0$$

19. Solve the following simultaneous equations using Cramer's Rule.

(i) $5x + 3y = 30$
$6x - 2y = 8$

(ii) $2x - 3y + 4z = 8$
$3x + 4y - 5z = -4$
$4x - 5y + 6z = -12$

20. Prove -

(i) $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

(ii) $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$

(iii) $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$

(iv) $\begin{vmatrix} b+c & a-b & a \\ c+a & b-c & b \\ a+b & c-a & c \end{vmatrix} = 3abc - a^3 - b^3 - c^3$

21. Find A^{-1},

(i) $A = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{pmatrix}$

(ii) $A = \begin{pmatrix} 1 & 4 & 3 \\ 4 & 2 & 1 \\ 3 & 2 & 2 \end{pmatrix}$

22. If, $Y - C = 50$
$-0.8Y + C = 80$
then find the value of Y and C using matrix inversion method.

UNIT - II

Very Short Answer Questions

23. Define Point of Inflexion.

24. Define Saddle Point.

25. What are the conditions for concavity and convexity of a function.

Short Answer Questions

26. Find maxima and minima, point of inflexion for the following -

(i) $z = 2x^2 - 2xy + y^2 + 5x - 3y$

(ii) $z = 4x + 2y - x^2 + xy - y^2$

(iii) $z = xy - 2y^2$

27. Given production function $Q = 3LK + 3L - K^2 - 3L^2 + 25$, where Q is output, L is labour and K is capital. For what value of L and K, the output will be maximum.

28. If the production function is -

$$Q = 5LK - 2L^2 - 2K^2,$$

then find $\frac{\partial Q}{\partial L}$ and $\frac{\partial Q}{\partial K}$, what does they mean?

29. If $Q = aL^{0.7}K^{0.3}$, find -

(i) MP_L and MP_K.

(ii) AP_L and AP_K.

(iii) $MRTS_{LK}$.

Descriptive Answer Questions

30. If the production function is $Q = 10 - 2L^2 + LK - K^2$, $P_L = P_K = ₹3$ and $P_Q = ₹6$, then find the value of maximum profit.

31. Optimize the function, if the objective function is $z = 8x^2 + 6xy + 12y^2$ and constraint is $x + y = 112$.

32. If $U = q_1 q_2$ is utility function and $200 - 4q_1 - 10q_2 = 0$ is budget constraint, at what value of q_1 and q_2 utility will be maximum.

33. Optimize the given function $z = 20 - x^2 + 10x - 2y^2 + 5y$. and find the value of z.

34. Find maxima, minima, saddle point (if any) for the following functions –

(i) $z = x^3 - 3axy + y^3$

(ii) $z = x^2 - y^2 - 2x + 4y + 6$.

UNIT – III

Very Short Questions

35. Define Indefinite Integrals.

36. Define definite Integrals.

38. Define consumer surplus

39. Define Producer surplus

40. Integrate –

$\int (2x + 5)\, dx$

Short Answer Questions

41. Integrate –

$\int \frac{1}{x} \cdot \log x \cdot dx$

42. Integrate –

$\int_1^4 (x^2 + 3x) \cdot dx$

43. If the demand function is $P = 16 - Q^2$ and $Q = 3$, find the consumer surplus.

44. If the supply function is $P = 2x + 1$ and $Q = 3$, find Producer surplus.

Descriptive Answer Questions

45. Integrate –

(i) $\int (x^4 - 5x^3 - 5x^2 + 7x - 11) \cdot dx$

(ii) $\int \frac{2x + 5}{2x^2 + 10x + 5} \cdot dx$

46. Given,

$MC = 3q^2 - 6q + 5$

$FC = 100$

Find – (i) AVC

(ii) TC

47. If MR is given as, $MR = 20 - 3x^2$, where x is output, find TR and AR.

48. If the demand function for monopolist is $P = 20 - 4x^2$ and $MC = 2x + 6$, find consumer surplus.

49. If $MR = 25 - 3Q^2$, and supply function is $P = 2Q + 1$, find –

(i) Demand function

(ii) Assuming that market is in Perfect competition, find consumer surplus and producer surplus.

50. If the demand and supply function are $P_d = 9 - x^2$ and $P_S = 3 + x$ respectively. Find consumer and producer surplus.

51. $P_d = 16 - x^2$: Demand Function
$P_s = 4 + x$: Supply Function
Find –

(i) Consumer Surplus
(ii) Producer Surplus
(iii) Consumer surplus when good is a free good.

UNIT - IV

Very Short Answer Questions

52. Define homogeneous difference equation.
53. Define Non-homogeneous difference equation.
54. Define time path equation.
55. Cobweb model.
56. Define Difference equation.

Short Answer Questions.

57. If first order non-homogeneous difference equation is $Y_t = 7Y_{t-1} - 12$, where Y is income. Find Y_e (solution of non-homogeneous difference equation).
58. Explain the nature and stability of a time path equation.

Descriptive Answer Questions

59. Find the time path equation and depict its nature.

(i) $Y_t = \frac{1}{3} Y_{t-1}$ and $Y_0 = 3$.

(ii) $Y_t = 4Y_{t-1} - 9$ and $Y_0 = 5$.

(iii) $Y_t = -3Y_{t-1} + 20$ and $Y_0 = -8$.

60. Derive the time path equation for the given demand and supply function, depict its nature.

(i) $Q_{dt} = 100 - 0.5 P_t$,
$Q_{st} = -50 + 0.5 P_{t-1}$,
$P_0 = 155$

(ii) $Q_{dt} = 18 - 3P_t$

$Q_{st} = -3 + 4P_t$

$P_0 = 5$

(iii) $Q_{dt} = 43 - 0.4P_t$

$Q_{st} = -5 + 0.1P_t$

61. From the given consumption and investment function find the time path equation and depict its nature. Also prove the result for $t = 1$.

(i) $Y_t = C_t + I_t$

$C_t = 400 + 0.6Y_t + 0.35Y_{t-1}$

$I_t = 240 + 0.15Y_{t-1}$

$Y_0 = 7000$

(ii) $Y_t = C_t + I_t$

$C_t = 100 + 0.5Y_{t-1}$

$I_t = 50$

$Y_0 = 2000$

62. In Harrod model, if the investment function is $I_t = 4.5(Y_t - Y_{t-1})$, saving function is $S_t = 0.22Y_t$ and $Y_0 = 10,000$. Determine the development-path for income.

63. Derive the solution for -

(i) $Y_{t+2} - 4Y_{t+1} + 4Y_t = t$

(ii) $Y_{t+2} - 5Y_{t+1} + 6Y_t = 0$.

Kanoria PG Mahila Mahavidyalaya

Department of Economics

Indian Economy – UG9101-ECO-52T-103

B.A. Semester II

UNIT-I

Very Short Answer Questions

1. What is the demographic transition theory?
2. Name two natural resources important to the Indian economy.
3. Define malnutrition.
4. What is structural change in national income?
5. What is meant by national income?
6. Name two types of natural resources found in India.
7. Define education in the context of human development.
8. What is the significance of minerals in the Indian economy?

Short Answer Questions

9. Explain the basic features of the Indian economy.
10. Discuss India's performance in the Human Development Index.
11. Write a short note on India's natural resource base.
12. What are the key demographic issues faced by India?
13. Explain the concept of health as a component of human development.

Descriptive Answer Questions

14. Discuss the historical overview and major structural changes in the Indian economy.
15. Explain demographic trends and issues in India. How do they impact economic growth?
16. Describe the role of natural resources in India's economic development.

UNIT-II

Very Short Answer Questions

17. What is meant by agrarian structure?
18. Mention any one issue related to labour reforms.
19. What is capital formation?
20. Name any one small-scale industry in India.

Short Answer Questions

21. Write a note on land reforms in India.
22. Briefly discuss labour reforms in India.
23. Explain the importance of productivity in the agricultural sector.
24. How does foreign investment impact the Indian industry?
25. Explain the role of competition policy in the industrial sector.
26. What are the features of India's public sector enterprises?

Descriptive Answer Questions

27. Evaluate the role and performance of agriculture in the Indian economy.
28. Describe the major policies and reforms in the industrial and labour sectors.
29. Analyze the role of the public sector in industrial development in India.
30. Evaluate the role of small-scale industries in promoting inclusive growth and employment.
31. Discuss the impact of foreign investment and globalization on Indian industry.

UNIT-III

Very Short Answer Questions

32. What is meant by 'Balance of Payments'?
33. Name any one function of IMF.
34. What is the full form of WTO?
35. Define foreign trade.
36. Mention two example of India's service exports.
37. What is the meaning of structural reform?

Short Answer Questions

38. Explain the role of foreign trade in the Indian economy.
39. What are the causes of an unfavourable balance of trade?
40. What are the functions of the WTO in global trade?
41. Write a short note on the role of IT services in Indian foreign trade.
42. What are the effects of trade liberalization on the Indian economy?

Descriptive Answer Questions

43. Analyze the trends and performance of India's foreign trade.
44. Discuss the major causes and corrective measures for India's balance of payments issues.
45. Assess the contribution and challenges of the service sector in the Indian economy.

UNIT-IV

Very Short Answer Questions

46. What is the role of NITI Aayog?
47. Define unemployment.
48. Define inequality in economic terms.

Short Answer Questions

49. Write a short note on poverty in India.
50. What is the significance of planning in the Indian economy?
51. What is meant by public sector?
52. Describe the importance of small-scale industries.
53. Write a short note on the problem of unemployment in India.

Descriptive Answer Questions

54. Elaborate on planning in India with reference to objectives, achievements, and NITI Aayog.
55. Examine the distribution of growth with a focus on unemployment, poverty, and inequality.

Kanoria PG Mahila Mahavidyalaya
Department of Economics
UG9101- ECO-63T-201
Principles of Macroeconomics
B.A. Sem -III

Unit 1

Very Short Answer Questions

1. Define macroeconomics.
2. What are the assumptions of Classical economists.
3. What is the main focus of Keynesian economics?
4. Define stock variable.
5. Is income a flow or stock variable?
6. What is the difference between ex-ante and ex-post?

7. Define an endogenous variable.
8. What is an autonomous variable?
9. What is the ratio variable?

Short Answer Questions

10. What are the key features of Classical macroeconomic theory?
11. Outline the main principles of Keynesian economics.
12. Differentiate between
    (1) stock and flow variables
    (2) ex-ante and ex-post
    (3) endogenous and exogenous variables.
    (4) autonomous and induced variables?

13. How are microeconomics and macroeconomics interdependent?

Long Answer Questions

14. Define macroeconomics. Discuss its meaning, subject matter, origin, and significance in detail.
15. Compare and contrast the basic tenets of Classical and Keynesian macroeconomics.

Unit 2

Very Short Answer Questions

16. What is real income?
17. Define nominal incom?

18. Define CPI.
19. What is the GDP deflator?
20. Which index is used to measure the cost of living?
21. What does Net Economic Welfare (NEW) aim to measure?
22. What is the circular flow of income?
23. Define National Income.
24. What is GDP?
25. How is personal income different from national income?
26. What is disposable personal income?
27. Name the three measures of National Income.
28. How are GDP, NDP, and NNP interrelated?
29. What are factor payments in the circular flow of income?
30. Distinguish between final goods and intermediate goods.
31. Why are intermediate goods not included in the gross domestic product of a country?

Short Answer Questions

32. Distinguish between real income and nominal income.
33. What is the Consumer Price Index (CPI)? How is it used to calculate real income?
34. Define the GDP deflator. How does it differ from CPI?
35. Why is real income considered a better indicator of economic well-being than nominal income?
36. Explain the circular flow of national income in a two-sector economy.
37. Explain the interrelationship between the three measures of National Income.
38. What is meant by withdrawals and injections ? How do they affect the size of the circular flow of income and expenditure in an economy?
39. Explain how national income is measured by value added method.

Long Answer Questions

40. Explain circular flow of income in a three-sector economy?
41. Explain different methods to measure National Income?
42. Explain the following terms:

    (i) Net value added

    (ii) Net factor income from abroad

    (iii) Transfer Payments by the Government

    (iv) Depreciation.

43. Explain how national income is measured through expenditure method. What types of expenditure are included in measuring national income of a country?
44. Explain ‘income method’ of measuring national income.

45. Define and differentiate between nominal income and real income. How do changes in price levels affect real income?
46. Discuss the limitations of GDP as a measure of welfare. How does the concept of Net Economic Welfare (NEW) attempt to address these limitations?

Unit 3

Very Short Answer Questions

47. Who proposed the classical quantity theory of money?
48. What is the transactions demand for money?
49. What is liquidity preference?
50. What is the key idea of Friedman's theory of money demand?
51. What is inflation?
52. Define hyperinflation.
53. What is demand-pull inflation?
54. What is cost-push inflation?
55. What does the Phillips Curve show?
56. Mention one measure to control inflation.
57. Define stagflation

Short Answer Questions

58. Briefly explain the classical quantity theory of money.
59. What are the main components of Keynesian theory of money demand?
60. Summarize Friedman's demand for money theory.
61. Define inflation and explain any two causes.
62. Distinguish between demand-pull and cost-push inflation.
63. Explain the concept of the Phillips Curve.
64. What are the main phases of a trade cycle?
65. Explain the factors causing downward-sloping Phillips Curve.
66. What are the main factors that cause cost-push inflation.
67. Define inflation. Explain its effects on (a) creditors and debtors (b) persons of fixed income group.

Long Answer Questions

68. Explain Keynes' liquidity preference theory of demand for money.
69. Explain the restatement of Quantity Theory of Money as made by Friedman. How does it differ from Fisher's version of the Quantity Theory of Money ?
70. Explain the concept of the Phillips Curve. What does it suggest about the relationship between inflation and unemployment?Distinguish between short-run and long-run Phillips Curve.
71. Define inflation. Discuss various monetary and fiscal measures used to control inflation.

Unit 4

Very Short Answer Questions

72. What is a consumption function?
73. Name any two determinants of consumption.
74. Define APC.
75. What is MPC?
76. Define investment function.
77. What does MEC stand for?
78. What is the relationship between MEC and the rate of interest?
79. Show that the sum of APC and APS is equal to one
80. Distinguish between autonomous investment and induced investment.
81. Show that the sum of MPC and MPS is equal to one
82. Define saving function?
83. What is a trade cycle?
84. Name the four phases of a trade cycle.
85. Differentiate between MEC and MEI.
86. What is effective demand?
87. Define full employment.
88. What is Say's Law of Markets?
89. What is aggregate demand (AD)?
90. What does the classical model assume about wages and prices?
91. Mention one assumption of the classical model.
92. What is the main cause of fluctuations in Hicks' theory of trade cycle?

Short Answer Questions

93. What are the major determinants of consumption?
94. What are the key determinants of investment function?
95. What is the consumption function ? Explain the factors that cause shifts in the consumption function.
96. What is meant by marginal efficiency of capital ? How is it calculated ? What are the factors that determine marginal efficiency of capital in the economy ?
97. Explain the concept of effective demand with the help of a diagram.
98. Explain the working of the multiplier with an example.
99. Describe the role of aggregate demand and aggregate supply in the Keynesian model.
100. What is marginal propensity to consume (MPC), and how does it relate to the multiplier?
101. Explain the concept of the multiplier-accelerator interaction.
102. What is the role of autonomous and induced investment in Hicks' trade cycle theory?
103. Describe the assumptions of Samuelson's trade cycle model.
104. Explain the concept of "ceiling" and "floor" in Hicks' model.
105. How does Samuelson's model generate cyclical fluctuations in income?
106. Compare the basic difference between Hicks' and Samuelson's approaches to business cycles.

Long Answer Questions

107. What is the investment function? Explain the major determinants that influence investment decisions in an economy.
108. Describe the working of the Accelerator Theory of Investment?
109. Explain and graphically represent Keynesian consumption function C = a + bY. How do marginal propensity to consume (MPC) and average propensity to consume (APC) change with increase in income in this consumption function ?
110. Define trade cycles. Explain the different phases of a trade cycle with suitable examples.
111. Explain the classical theory of income and employment. What are its main assumptions and criticisms?
112. Describe the Keynesian theory of income and employment. How is it different from classical theory?
113. Discuss the concept of the multiplier. Derive the formula and explain its working with a numerical example.
114. How do Hicks and Samuelson incorporate the concept of investment in their business cycle theories?

Kanoria PG Mahila Mahavidyalaya

Department of Economics

History of Economic Thought - UG9101-ECO-64T-203(B)

B.A Semester IV

Unit I

Very Short Answer Questions

1. What is Mercantilism?
2. Define Physiocracy.
3. Who is known as the father of classical economics?
4. What is the role of government in Mercantilist thought?
5. What does 'Net Product' refer to in Physiocracy?
6. Name one critic of Adam Smith.
7. What is capital accumulation?
8. Define division of labour.
9. What is the Classical School's view on international trade?
10. What does Adam Smith say about economic development?

Short Answer Questions

11. Explain the key ideas of Mercantilism.
12. Discuss the concept of the natural order in Physiocracy.
13. State Adam Smith's views on value.
14. Describe the circulation of wealth in Physiocratic theory.
15. What is the role of agriculture in Physiocratic thought?
16. Describe Adam Smith's theory of capital accumulation.
17. What are the criticisms of Adam Smith?
18. Compare Mercantilism and Physiocracy.
19. Explain the Classical School's view on distribution.
20. What is the role of government in classical economic thought?

Descriptive Questions

21. Discuss the main ideas of Mercantilist thought and its relevance in early economic history.
22. Critically examine Physiocracy and its emphasis on agriculture.
23. Explain in detail Adam Smith's views on division of labour and value.
24. Analyze the classical school's contributions to trade and development theories.

25. Compare and contrast the Mercantilist and Classical Schools of thought.

Unit II

Very Short Answer Questions

26. Who proposed the theory of population?
27. What is the Theory of Gluts?
28. Define Ricardo's theory of value.
29. Name one critic of the classical school.
30. What is the theory of rent?
31. What is meant by foreign trade in classical theory?
32. What is distribution in Ricardo's theory?
33. Who was Sismondi?
34. What is economic development according to Ricardo?
35. Mention one idea by Robert Owen.

Short Answer Questions

36. Briefly explain Malthus's theory of population.
37. What is Ricardo's theory of rent?
38. Explain the concept of gluts in economics.
39. Discuss Friedrich List's contribution.
40. Compare Malthus and Ricardo's views.
41. Explain the role of distribution in classical economics.
42. Discuss the foreign trade theory of Ricardo.
43. What are the criticisms made by Sismondi?
44. Describe Robert Owen's economic ideas.
45. How does Malthus differ from Ricardo on development?

Descriptive Questions

46. Explain Malthus's theory of population and its implications.
47. Discuss Ricardo's theories of value, rent, and distribution.
48. Analyze the theory of gluts and its significance.
49. Critically examine the contributions of Sismondi, Owen, and List as critics of classical economics.
50. Compare and contrast the economic theories of Malthus and Ricardo.

Unit III

Very Short Answer Questions

51. Who is J.S. Mill?
52. Define Labour Theory of Value.

53. What is scientific socialism?
54. Who was Louis Blanc?
55. What is the theory of capital accumulation?
56. Define Utopian Socialism.
57. What is distribution in Mill's theory?
58. Name a socialist mentioned in this unit.
59. What is Karl Marx's view on money?
60. Define crisis theory.

Short Answer Questions

61. Explain J.S. Mill's theory of value.
62. Discuss the views of Mill on production.
63. What are the key ideas of Utopian socialism?
64. Describe Karl Marx's concept of surplus value.
65. What is the contribution of Forier Roberts?
66. Explain capital accumulation and crisis.
67. How does Marx define money?
68. Compare Mill and Marx on distribution.
69. Discuss the theory of production by J.S. Mill.
70. What is the contribution of Proudhon?

Descriptive Questions

71. Elaborate on J.S. Mill's economic theories on value, production, and distribution.
72. Discuss the ideas of Utopian Socialists and their impact on economic thought.
73. Analyze Karl Marx's efforts in scientific socialism and his economic theories.
74. Explain the Labour Theory of Value and its development from Mill to Marx.
75. Discuss the theory of capital accumulation and crisis with reference to socialist thought.

Unit IV

Very Short Answer Questions

76. What is the German Historical School?
77. Define marginalism.
78. Who is Marshall?
79. What is the Mathematical School in economics?
80. What is neoclassical economics?
81. Mention a contribution of Keynes.
82. Who was Kautilya?
83. What is Gandhian economic thought?
84. Define Indian Economic Thought.

85. What is the focus of the German Historical School?

Short Answer Questions

86. Describe the main ideas of the German Historical School.
87. What is the role of the Mathematical School in economic thought?
88. Explain marginalism.
89. What is Marshall's view on value?
90. Discuss Keynesian views on employment.
91. What are the key ideas in Kautilya's Arthashastra?
92. Explain Gandhian principles of economics.
93. Compare the German Historical School with the Neoclassical School.
94. What is the contribution of Marshall to Neoclassical economics?
95. How does Keynes's theory differ from classical economics?

Descriptive Questions

96. Discuss the contribution of the German Historical and Mathematical Schools to economic thought.
97. Analyze the development of marginalism with reference to Marshall and Keynes.
98. Elaborate on Keynes's economic theories and their impact.
99. Compare the Neoclassical School with Classical and Socialist schools.
100. Explain Indian economic thought through the contributions of Kautilya and Gandhi.

Kanoria PG Mahila Mahavidyalaya
Department of Economics
UG9101-ECO-64T-203(A)
Statistics
B.A. Sem -IV

Unit 1

Very Short Answer Questions

1. What is statistics?
2. Mention two uses of statistics in economics.
3. Name two methods of data collection.
4. What is a primary data source?
5. Define tabulation.
6. Name any two types of diagrams used to represent data.
7. What is a histogram?
8. What is a pie chart used for?
9. Define mean?
10. What is the median?
11. Define mode.
12. Find the harmonic mean:
    75, 5, 475, 382, 63
13. Find the value of median in asymmetric distribution, when mode and mean are 32.1 and 35.4 respectively.
14. What is exclusive type series
15. What is inclusive type series
16. Calculate mode:
    10,27,24,12,27,20,27,18,15,30
17. Calculate median for the data:
    1100, 1160, 1000, 1070, 1200,1120
18. Calculate the arithmetic mean of incomes:
    1700, 1750, 1690, 1650, 1800, 1830, 1950, 1840
19. Find the quartiles (Q1 and Q3) for the data:
    5, 10, 15, 20, 25, 30, 35, 40

Short Answer Questions

20. What are the methods of collecting primary and secondary data?
21. Define arithmetic mean. Mention its merits and demerits.
22. Compute the value of harmonic mean

Marks	Frequency

10	20
20	30
25	50
40	15
50	5

23. A car travels three equal distances at speeds of 30 km/h, 40 km/h, and 60 km/h. Find the harmonic mean speed.
24. Calculate the arithmetic mean:

Marks	No. of students
20	8
30	20
40	12
50	10
60	4

25. Compute arithmetic mean by short-cut method

Marks	No. Of students
0-10	5
10-20	10
20-30	25
30-40	30
40-50	20
50-60	10

26. The mean marks of 100 students were found to be 40. Later on it was discovered that a score of 53 was misread as 83. Find the correct mean.
27. The mean height of 25 male workers in a factory is 61 inches and the mean height of 35 female workers in the same factory is 58 inches. Find the combined mean height of workers in the factory.

28. Find weighted arithmetic mean

Wages per day	No. Of workers
40	20
32	15
15	5

29. Find the value of median

Income	No. Of persons
1000	24
1500	26
800	16
2000	20
2500	6
1800	30

30. Calculate the median

Marks	No. Of students
45-50	10
40-45	15
35-40	26
25-30	42
20-25	31
30-35	30
15-20	24

31. Calculate the median and mean

Weight(in gms)	No. Of apples

410-419	14
420-429	20
430-439	42
440-449	54
450-459	45
460-469	18
470-479	7

32. Calculate the median

Marks	No. Of students
Less than 5	29
Less than 10	224
Less than 15	465
Less than 20	582
Less than 25	634
Less than 30	644
Less than 35	650
Less than 40	653
Less than 45	655

33. Calculate median

Marks	No. Of students
0-10	5
10-30	15
30-60	30
60-80	8
80-90	2

Long Answer Questions

34. Define statistics. Discuss its nature, scope, and uses in economics and business.
35. An incomplete distribution is given

Variable	Frequency
0-10	10
10-20	20
20-30	?
30-40	40
40-50	?
50-60	25
60-70	15

You are given that the median value is 35. Find out missing frequency, given total sum of frequency is 170

36. Find the value of mode and median

Marks (More Than)	Frequency
More than 0	100
More than 10	90
More than 20	80
More than 30	65
More than 40	40
More than 50	20
More than 60	0

37. Find the missing frequency, when geometric mean is 15.3

X	Frequency
8	5
25	3
17	4
30	?

Unit 2

Very Short Answer Questions

38. What is meant by dispersion?
39. Define skewness.
40. What is regression analysis?
41. Define regression coefficient.
42. Mention any one method of measuring correlation.
43. What is the range of Karl Pearson's coefficient of correlation?
44. What is positive and negative correlation?
45. Define Spearman's Rank Correlation.
46. Given r = 0.9 and $b_{yx} = 0.45$, find b_{xy}.
47. What is the least squares method?
48. Find mean deviation and standard deviation, if quartile deviation is 54.
49. Find the standard deviation of first 15 natural numbers
50. What is a perfect positive correlation?
51. Find the range: 5, 8, 10, 12, 20.

Short Answer Questions

52. Differentiate between positive and negative skewness.
53. Calculate standard deviation
    240,290,260,245,255,288,272,263
54. Calculate quartile deviation and coefficient of quartile deviation

Marks	Frequency
10	4
20	7
30	15
40	8
50	7
60	2

55. Distinguish between Karl Pearson's and Spearman's correlation.
56. Distinguish between correlation and regression.
57. Calculate two regression lines
    When correlation coefficient is 0.8

	Adv. Exp (X)	Sales (Y)
Mean	10	90

Standard deviation	3	12

58. Why there is two regression lines
59. Fit a regression line Y on X using the least squares method for the following data:

X	1	2	3	4	5
Y	2	4	5	4	5

60. Compute the regression coefficients b_{xy} and b_{yx} for:

X	10	20	30	40
Y	8	15	20	25

61. (1) Calculate standard deviation for: 3, 7, 8, 10, 12.
    (2)Find coefficient of variation for a dataset with Mean = 50, SD = 10.
62. Compute Karl Pearson's correlation coefficient for:

X	10	20	30	40
Y	15	25	35	45

63. Calculate Spearman's Rank Correlation for the following ranks:

A	1	2	3	4	5
B	2	1	4	3	5

64. Compute **quartile deviation** and its coefficient from the following data:

    12, 15, 18, 20, 24, 30, 32, 36, 40, 45

Long Answer Questions

65. Discuss the different measures of dispersion and their merits and demerits.
66. Fit the regression line Y on X using least squares and estimate Y when $X = 6$:

X	2	4	6	8	10
Y	3	5	7	9	11

67. From the data below, compute:
    - Both regression equations
    - Correlation coefficient

    | X | 5 | 10 | 15 | 20 | 25 |
    | Y | 7 | 12 | 17 | 22 | 27|

68. (1) The mean and standard deviation of a set of 100 observations were worked out as 40 and 5 respectively, which by mistake took the value 50 in place of 40 for one observation. Find the correct mean and variance.

    (2) The mean of 5 observations is 4.4 and the variance is 8.24. If the three of the five observations are 1,2 and 6, find the other two.

69. Find the combined standard deviation and also find which of the two distribution is more variable

	Boys	Girls
Number	100	50
Mean weight	60	45
Standard deviation	3	2

70. Calculate standard deviation, variance and coefficient of variation

Age under	No. Of persons
10	15
20	30
30	53
40	75
50	100
60	110
70	115
80	125

71. Find mean deviation and coefficient of mean deviation
    (1) By mean
    (2) By median
    (3) By mode

X	Frequency
0-10	7
10-20	12
20-30	18
30-40	25
40-50	16
50-60	14
60-70	8

72. Calculate Karl Pearson’s coefficient of correlation for:

X	2	4	6	8	10
Y	1	3	5	7	9

73. From the following data, calculate mean, variance, standard deviation, and coefficient of variation:

12, 15, 20, 22, 26, 30

74. Calculate Spearman’s Rank Correlation coefficient for:

Student	A	B	C	D	E	F
Rank X	1	2	3	4	5	6
Rank Y	2	1	4	3	6	5

75. Calculate the **standard deviation** and **coefficient of variation** for the following frequency distribution:

Class Interval	Frequency
0 - 10	5
10 - 20	8
20 - 30	12
30 - 40	7
40 - 50	3

76. From the following data, calculate **mean deviation** from the **mean** and **median**:

5, 10, 15, 20, 25, 30

77. (1) Calculate **Bowley's coefficient of skewness** for the following:

Value (X)	5	10	15	20	25	30
Frequency	3	5	8	4	2	1

(2) Given the following data, calculate **Karl Pearson's coefficient of skewness**:
Mean = 60, Median = 55, Standard Deviation = 10

78. Ten students were ranked in two subjects. Calculate Spearman's rank correlation:

Student	A	B	C	D	E	F	G	H	I	J
Rank X	1	3	2	4	5	7	6	8	10	9
Rank Y	2	1	4	3	6	5	8	7	9	10

Unit 3

Very Short Answer Questions

79. What is a time series?
80. What is the trend in time series?
81. Identify the type of time series trend from this data: 10, 20, 30, 40, 50.
82. What do you mean by the association of attributes?
83. What is an index number?
84. Define interpolation.
85. What is binomial expansion used for in interpolation?
86. What is meant by positive association?
87. What symbol is used to denote the absence of an attribute?
88. If (A) = 30 and (B) = 50, what is the maximum value of (AB)?
89. If (A) = 60, (B) = 70, and (AB) = 20, what is (Aβ)?
90. Name the four components of a time series.
91. Define secular trend.
92. What is a seasonal variation?
93. What do you mean by cyclical variation?
94. Identify the trend in the series: 50, 55, 60, 65, 70.
95. What do the symbols (A), (α), (AB), and (Aβ) represent?

Short Answer Questions

96. Differentiate between linear trend and seasonal variation in time series.

97. Explain the uses of index numbers in economics.
98. Why fisher's index number is called ideal index
99. Differentiate between interpolation and extrapolation.
100. Construct a price index using the Laspeyres method from the following:

Commodity	A	B
Base year price	10	20
Current year price	12	25
Base year quantity	5	2

101. Using Newton's Forward Interpolation, estimate the value of y when x = 3:

| x | 1 | 2 | 4 | 5 |
| y | 1 | 4 | 16 | 25

102. State the difference between positive and negative association with examples.
103. Given (A) = 60, (B) = 80, and N = 100, find the range of (AB) for which the data is consistent.
104. In a survey of 200 people, 120 were smokers, 90 were tea drinkers, and 60 were both. Are the attributes "smoking" and "tea drinking" independent?
105. Write a short note on random or irregular variations.
106. Calculate a 3-year moving average for the following data:

Year	2019	2020	2021	2022	2023
Sales	150	160	170	180	200

107. Fit a straight-line trend using the least squares method for the following data and estimate sales for 2025:

Year	2020	2021	2022	2023	2024
Sales	100	110	130	150	170

108. Determine the trend line using the method of least squares for the following time series:

Year	2019	2020	2021	2022	2023
Sales	100	120	130	150	170

Long Answer Questions

109. Using the method of least squares, fit a linear trend and forecast the value for 2025:

Year	2020	2021	2022	2023	2024
Production	500	520	550	580	600

110. Fit a straight-line trend to the following data using least squares and estimate the value for 2027:

Year	2018	2019	2020	2021	2022	2023
Output	200	210	220	230	250	270

111. Out of 500 students, 180 passed in English, 200 passed in Mathematics, and 100 passed in both. Test whether passing in English and Mathematics are independent attributes.
(Use Yule's coefficient of association)

112. Given: N = 400, (A) = 160, (B) = 120, and (AB) = 100.
(a) Find Yule's Coefficient of Association
(b) Comment on the nature of association

113. In a survey of 100 families:
- 70 families consume rice
- 40 families consume wheat
- 20 families consume both

Find the nature of association using Yule's coefficient.

114. Using the method of least squares, fit a straight-line trend and find the trend values:

Year	2017	2018	2019	2020	2021
Sales	50	55	65	70	75

115. Define index numbers. Explain different types and methods of constructing index numbers.

116. Construct Fisher's Ideal Index Number using the following data:

Commodity	A	B	C
Price (base)	10	15	25
Price (current)	12	20	30
Quantity (Base)	5	10	4

Quantity (current)	4	8	6

117. Interpolate the missing value for x = 2.5 using binomial expansion for the table:

| x | 1 | 2 | 3 | 4 |
| y | 1 | 8 | 27 | 64 |

118. Compute the seasonal indices by the **method of simple averages** from the following quarterly data:

Quarter	Year 1	Year 2	Year 3
Q1	80	85	90
Q2	100	110	120
Q3	130	140	150
Q4	90	95	100

Unit 4

Very Short Answer Questions

119. Define null hypothesis.
120. What is a Type I error?
121. What is a Type II error?
122. Define level of significance.
123. What is a critical region?
124. Define probability.
125. What is the degree of freedom in a t-test?
126. What does the level of significance (α) represent?
127. If a sample has a standard deviation of 5 and sample size is 25, find the standard error.
128. For a t-distribution with a sample size of 10, what is the degree of freedom?

Short Answer Questions

129. Distinguish between Type I and Type II errors.
130. Calculate the standard error of the mean for a sample with standard deviation 4 and n = 16.
131. A researcher conducts a t-test and obtains a t-value of 2.3. The critical value at 5% level with 10 degrees of freedom is 2.228. Should the null hypothesis be rejected?
132. Find the probability of getting a head in a single coin toss.
133. A fair die is thrown once. What is the probability of getting an even number?

134. A sample of 100 students has an average height of 160 cm with a standard deviation of 10 cm. Test whether the average height differs significantly from 158 cm at 5% level of significance.

Long Answer Questions

135. A machine produces bolts with a mean length of 5.8 cm. A sample of 36 bolts has mean 6.0 cm and SD 0.6 cm. Test the hypothesis that machine is working properly at 5% significance.

136. A sample of 100 students has an average score of 68. The population mean is known to be 65 and standard deviation is 10. Test the hypothesis at 5% level of significance.

137. Explain the complete process of hypothesis testing with all necessary steps and examples.

138. A sample of 9 students has the following marks in a test: 52, 55, 53, 50, 56, 58, 54, 51, 57. Test whether the average mark is significantly different from 55 using a 5% level of significance (t-test).

139. A coin is tossed 100 times and gives 60 heads. Test whether the coin is fair using hypothesis testing at 5% level of significance.

140. Two samples have means of 50 and 53, and standard deviations of 4 and 5, with sample sizes of 10 and 12. Test whether the difference in means is significant at 5% level using a t-test.