SMART SKILLS

ACADEMIC SESSION 2021-22

ECONOMICS

CLASS XI

CONTENTS

Syllabus for Academic Session 2021- 22

Theory: 80 marks
Project: 20 marks **Duration-3 hours**

1. Weightage by content

Unit No.	Topic	Marks
Part A	**Statistics for Economics**	**40**
1.	Introduction	13
2.	Collection, Organisation and Presentation of data	
3.	Statistical tools and interpretation	27
Part B	**Introductory Microeconomics**	**40**
4.	Introduction	4
5.	Consumer's equilibrium and demand	13
6.	Producer behaviour and Supply	13
7.	Forms of market and Price determination under perfect competition with simple applications	10
Part C	**Project Work**	**20**

2. Types of questions

Typology of questions	Marks	Percentage
Remembering and Understanding	44	55%
Application	18	22.5%
Analysing ,Evaluating and Creating	18	22.5%
Total	**80**	**100%**

Monthly Syllabus

JUNE 2021

o Meaning, Scope and importance of Statistics in Economics

o Collection of data

•Primary vs. secondary data

•Census vs. sampling method

•Concept of sampling methods

o Organization of data

•Formation of series: individual, discrete, continuous

•Frequency distribution

•Preparation of questionnaire

o Presentation of data

• Frequency curve, Histograms, Polygon and Ogives, Bar diagrams, Pie charts, Time series graphs, Tables

o Condensation of data

•Measures of central tendency: arithmetic mean, median, mode, quartiles

JULY 2021

Introduction to microeconomics

•Meaning of microeconomics and macroeconomics; positive and normative economics

•What is an economy? Central problems of an economy: what, how and for whom to produce;

•Production possibility frontier and opportunity cost.

Consumer Equilibrium and Demand

•Consumer's equilibrium - meaning of utility, marginal utility, law of diminishing marginal utility,

•Conditions of consumer's equilibrium using marginal utility analysis.

•Indifference curve analysis of consumer's equilibrium-the consumer's budget (budget set and budget line), preferences of the consumer (indifference curve, indifference map) and conditions of consumer's equilibrium.

AUGUST 2021

•Demand, market demand, determinants of demand, demand schedule, demand curve and its slope

•Movement along and shifts in the demand curve

• Price elasticity of demand - factors affecting price elasticity of demand, measurement of price elasticity of demand –percentage method.

SEPTEMBER 2021

Producer Behaviour and Supply

•Meaning of Production Function – Short-Run and Long-Run

•Total Product, Average Product and Marginal Product.

•Returns to a Factor

Cost

•Short run costs - total cost, total fixed cost, total variable cost; Average cost; Average fixed cost, average variable cost and marginal cost-meaning and their relationships

OCTOBER 2021

•Revenue - total, average and marginal revenue - meaning and their relationship

•Producer's equilibrium-meaning and its conditions in terms of marginal revenue-marginal cost

•Supply, market supply, determinants of supply, supply schedule, supply curve and its slope, Movements along and shifts in supply curve

•Price elasticity of supply; measurement by percentage method

NOVEMBER 2021

Forms of Market and Price Determination

•Perfect competition - Features; Determination of market equilibrium and effects of shifts in demand and supply.

•Other Market Forms - monopoly, monopolistic competition - their meaning and features.

Simple Application of Tools of Demand and Supply-Price ceiling and Floor price

DECEMBER 2021

o Measures of dispersion

•Range, Interquartile range, Mean deviation, Quartile deviation, Standard deviation, Coefficient of variation

o Correlation

•Scatter diagram

•Karl Pearson's coefficient of correlation

JANUARY 2022

•Spearman's coefficient of rank correlation

o Index Numbers and Mathematical functions and slopes

FEBURARY 2022

• Revision

Introduction & Economic Problems

Learning Outcomes:
The students will be able to:

- **define an economy**
- **differentiate between positive and normative economics, micro and macro economics**
- **discuss the functioning of a simple economy and basic terminology and tools of economics.**
- **define the basic economic problem**
- **evaluate the central problems of an economy and draw and analyse diagrams of a Production Possibility Frontier**

The following are 1mark questions:

1. What is economics?
2. What is meant by marginal rate of transformation?
3. Give one point of difference between microeconomics and macroeconomics.
4. Is the study of the automobile industry a macro economic study? Why?
5. When is the allocation of resources in an economy considered to be efficient?
6. There is widespread unemployment in an economy. Depict this situation on a diagram using a PPF.
7. Why is the study of the problem of unemployment in India considered a macroeconomics study?
8. What does a rightward shift in a PPF indicate?
9. Why is a PPF concave?
10. A teacher can do three jobs – teach in a school, take home tuitions or write books. She earns Rs 1 lakh per annum from teaching, 1.5 lakh per annum from tuitions and Rs 3 lakh per annum as royalty from the sale of her books. What is the opportunity cost of writing books?
11. What is an economy?
12. What is meant by consumption?
13. What is meant by production?
14. The MRT of books is 5 bottles. What does this mean?

The following are 3/4 mark questions:

1. Explain three factors that give rise to an economic problem.
2. What does a PPF represent? When does it shift to the left? Explain with a diagram.
3. Explain the central problem of 'for whom to produce'.

4. What is the effect of 'a growth in resources' on a production possibility frontier? Explain with the help of a diagram.
5. In what sense is the problem of 'how to produce' a central problem of an economy?
6. Explain the central problem of 'what to produce 'with the help of an example.
7. Explain the problem of allocation of resources faced by an economy.
8. Draw a production possibility frontier. What does a point inside the frontier indicate?
9. Explain what a movement along a PPF shows.
10. Why is the production possibility frontier called the opportunity cost curve?
11. What is the opportunity cost of a given activity? Explain with the help of an example.
12. Calculate marginal rate of transformation in the following example. Plot the PPF by taking cloth on the x axis. Comment on the shape of the curve.

Food (in Kg)	280	258	233	205	175
Cloth(in m)	0	1	2	3	4

13. Identify which of the following are the subject matter of microeconomics and macroeconomics.
    - National Income.
    - Distribution of Bollywood films.
    - Government Budget.
    - Price determination of a commodity.
    - Inflation.
    - Consumption of Coca-Cola in India.
14. Explain the shape of a production possibility frontier. Give reasons.
15. If the marginal rate of transformation is decreasing, what will be the shape of the PPF? Explain with the help of a schedule.
16. Explain the problem of "choice of technique". How does it arise?
17. If the production possibility curve shifts to the right, then it will always be parallel to the original curve. Comment.
18. Distinguish between positive and normative statements with the help of examples.

Consumer's Equilibrium

Learning Outcomes:
The students will be able to:

- **state the basic concepts of utility**
- **explain the relationship between Total Utility and Marginal Utility with the help of a schedule and diagram, including the Law of Diminishing Marginal Utility**
- **explain consumer's equilibrium for a single commodity and for a two commodity case using utility analysis**
- **solve numerical examples to determine consumer's equilibrium under the utility analysis**
- **state and explain the conditions for consumer's equilibrium using the indifference curve analysis**

The following questions are for 1 mark:

1. What is meant by total utility?
2. What is meant by marginal utility?
3. What is marginal rate of substitution?
4. What does the slope of the total utility curve represent?
5. What is an indifference curve?
6. What are monotonic preferences?
7. What is consumer's equilibrium?
8. What does the slope of the budget line give in terms of prices?
9. The TU derived from consuming 3 units of a commodity is 75 utils and the MU of the 4th unit is 10 utils. What is the TU after consuming 4 units?
10. What is a budget constraint?
11. If preferences of a consumer are monotonic, then which of the bundles – 3 eggs and 5 toasts or 4 eggs and 5 toasts will the consumer choose?

The following questions are for 3/4 marks:

1. State and explain the law of diminishing marginal utility.
2. With the help of a diagram explain consumer's equilibrium in case of a single commodity.
3. How many units of a commodity should a consumer buy to get maximum utility? Explain with the help of a numerical example.
4. Explain the relationship between total utility and marginal utility with the help of a diagram.

5. Explain why higher indifference curves reflect higher levels of satisfaction for a consumer.
6. Explain a budget set and budget line. Derive the slope of the budget line.
7. Explain the shape of an indifference curve.
8. The price of Good X is Rs 5 and the consumer has consumed 6 units. The marginal utility of the 6^{th} unit is 15 utils. If the marginal utility of money is 4, then is the consumer in equilibrium. Explain.
9. A consumer consuming one good is in equilibrium. The price of the good falls. What should the consumer do to stay in equilibrium? Justify your answer.
10. Differentiate between ordinal and cardinal utility.
11. What will happen to the budget line when-
    a. Price of good as shown on the x axis falls
    b. Price of good as shown on the y axis rises
    c. Money income falls.

The following questions are for 6 marks:

1. Explain why the ratio of prices of two commodities must be equal to the marginal rate of substitution between the goods for a consumer to be in equilibrium.
2. Why is the point of tangency between the budget line and the indifference curve the point of consumer's equilibrium?
3. Explain three properties of indifference curves.
4. The prices of Good X and Good Y are Rs 4 and Rs 2 respectively and a consumer's income is Rs 40. Answer the following questions:
    a. Can the consumer consume a bundle 5X, 10Y?
    b. If MRS_{xy} is 3, is the consumer in equilibrium? Justify.
    c. What should the consumer do to maximize satisfaction, given her budget constraint? Explain.

5. The marginal utility schedule of commodity X and commodity Y for a consumer is as follows:

Unit of X	MU of X	Unit of Y	MU of Y
1	8	1	14
2	6	2	10
3	4	3	6
4	2	4	4
5	1	5	2

If the total money spent by a consumer is Rs 16, and the price of X is Rs 2 and price of Y is Rs 5, determine consumer's equilibrium if the marginal utility of money is Rs 2. Using indifference curves, explain the total price effect when the price of one commodity falls.

Demand

Learning Outcomes:
The students will be able to:

- **illustrate the concept of individual and market demand and the factors affecting them**
- **state and explain the law of demand**
- **describe demand functions**
- **differentiate between shift and movement**
- **explain the downward sloping demand curve using the marginal utility and indifference curve approaches**
- **state some exceptions to the law of demand**

The following questions are for 1 mark each:

1. What is meant by demand for a commodity?
2. If an increase in the price of Good X leads to a fall in the demand for Good Y, then how are the two goods related?
3. If the demand function for a good is given by $Q_x=20-2P_x$, how much is the quantity demanded when the price is Rs 4/unit?
4. The market for pens has three consumers – A, B and C. If the individual demand for pens at a price of Rs 5/pen for A, B and C is 3 pens, 7 pens and 12 pens respectively, then what is the market demand for pens at a price of Rs 5/pen?
5. A fall in the price of lemon tarts leads to a fall in the demand for lemon cheesecake. How are the two goods related?
6. What is a change in quantity demanded called when the demand for a good falls due to a rise in its own price?
7. What is the effect on the demand curve of a normal good when the income of a consumer decreases?
8. What are substitute goods?
9. What is a demand function?
10. What is a decrease in demand?
11. What is a demand schedule?
12. What causes a downward movement along the demand curve?
13. Mention one factor that causes a rightward shift of the demand curve.
14. Which type of good may have an upward sloping demand curve?

The following questions are for 3/4 marks each:

1. Explain the law of demand with the help of a demand schedule.

2. State the assumptions of the law of demand.
3. With the help of a suitable example distinguish between normal goods and inferior goods.
4. Differentiate between substitute goods and complementary goods.
5. State any three causes of a leftward shift of a demand curve of a commodity.
6. Distinguish between individual demand schedule and market demand schedule.
7. State the change in quantity demanded of the good in column 2 when the price of the good in column 1 rises. Give reasons.

S.No.	Price of	Demand for	Effect on demand	Reason
1.	Tennis shoes by Nike	Tennis shoes by Reebok		
2.	Pencils	Erasers		
3.	Air travel between Delhi and Goa	Mayonnaise		

8. Distinguish between contraction of demand and decrease in demand with the help of diagrams.
9. What is an unfavourable change in taste? How does it affect the demand for a commodity?
10. With the help of a diagram, explain the impact of a rise in the price of complementary good on the demand for a commodity.

The following questions are for 6 marks each:

1. Explain with the help of diagrams the effect of the following changes on the demand of a commodity:
   (i) A fall in the price of complementary goods (ii) A fall in the price of substitute goods
2. Explain the effects of a change in income of a buyer on the demand for a good.
3. State three causes each for a rightward shift and a leftward shift of a demand curve.
4. Explain the term 'change in demand' and represent the same graphically. Also state three factors responsible for change in demand.
5. Explain with the help of diagrams the effect of the following changes on the market demand of a commodity:

(i) The number of users increases

(ii) A rise in the income of the buyers if the commodity is inferior

6. Distinguish between change in demand and change in quantity demanded. Use diagrams.
7. What is market demand? If there are only two consumers in the market, explain how it is derived from individual demand using a schedule.
8. State and explain three determinants of market demand.

Elasticity of Demand

Learning Outcomes:
The students will be able to:

- **discuss elasticity of demand**
- **define the different degrees of elasticity**
- **apply proportionate method of calculating price elasticity of demand**
- **explain the factors that impact the elasticity of demand**
- **elaborate the significance of studying the elasticity of demand**

The following questions are for 1 mark each:

1. What is meant by price elasticity of demand?
2. Draw a demand curve with unitary price elasticity.
3. When is the demand for a commodity called perfectly elastic?
4. What is elastic demand?
5. What is inelastic demand?
6. Draw a perfectly inelastic demand curve.
7. What will be the value of elasticity of demand if the demand curve is a vertical line parallel to the y-axis?
8. A 10% increase in price leads to a 20% fall in quantity demanded. What is the value of price elasticity of demand?
9. When is demand unitary elastic?
10. State one factor that affects the magnitude of price elasticity of demand.
11. What is the value of elasticity of demand on a rectangular hyperbola demand curve?

The following questions are for 3/4 marks each:

1. Draw demand curves showing price elasticity of demand equal to
   (i) unity (ii) infinity (iii) zero.
2. Explain how the availability of close substitutes for a good affects the price elasticity of demand of that good.
3. Explain how the nature of a good affects the price elasticity of demand.
4. If two negatively sloped straight line demand curves intersect each other, will price elasticity of demand be equal at the point of intersection? Justify.
5. A consumer buys 2,000 units of a good at a price of Rs. 10/- per unit. When the price falls he buys 2,500 units. If price elasticity of demand is -2, what is the new price?

6. A consumer buys 10 units of a good at a price of Rs. 4/- per unit. When price falls by Rs 1/- per unit, he buys 20 units. Calculate the price elasticity of demand.
7. At a price of Rs. 20/- per unit the quantity demanded of a commodity is 400 units. If the price falls by 10%, its quantity demanded rises by 90 units. Calculate its price elasticity of demand.
8. A consumer spends Rs. 250/- on a good when its price is Rs. 10/- per unit. When the price rises to Rs. 11/- per unit, he spends Rs. 240/-. Calculate the price elasticity by the percentage method.
9. As a result of a 10% fall in the price of a good, its demand rises from 200 to 240 units. Find out the price elasticity of demand. Is its demand elastic?
10. Price elasticity of demand of a good is (-)2. 100 units of this good are bought at a price of Rs. 10/- a unit. How many units will be bought at a price of Rs 11/- per unit?
11. The slope of a demand curve is -0.4, calculate is the elasticity of demand, if at an initial price of Rs. 5/- per unit, the initial quantity demanded was 20 units of the commodity.
12. Price elasticity of demand of good X is twice that of good Y. At a price of Rs. 4/- per unit, 10 units of good X are bought. When price of good X increases to Rs. 5/- per unit, demand falls to 5 units. Calculate price elasticity of demand for good Y. What can be said about the elasticity of goods X and Y?

The following questions are for 6 marks each:

1. Explain 3 factors affecting elasticity of demand.

Production

Learning Outcomes:
The students will be able to:

- **define production and distinguish between short run and long run production function**
- **state and explain the law of diminishing returns, its application and the pattern and relationships of TP, AP and MP**
- **solve numerical examples to calculate AP, MP and TP**
- **state and explain the law of variable proportions**

The following questions are for 1 mark each:

1. What is meant by a production function?
2. State the law of variable proportions.
3. What is marginal product of a factor of production?
4. As the variable input is increased by one unit, the total output increases at a decreasing rate. What can be said about marginal product of labour?
5. What happens to marginal product when average product is at its maximum?
6. What do diminishing returns to a factor refer to?
7. How is TP derived from a MP schedule?
8. What is a market period?
9. Can total product decline?

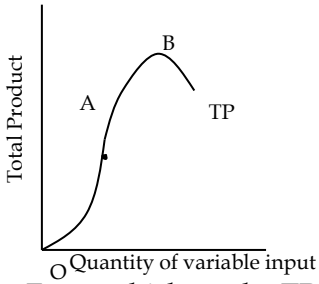
The following questions are for 3/4 marks each:

1. Distinguish between variable and fixed factors of production.
2. Distinguish between a long run and a short run production function.
3. The following table gives the TP schedule of labour. Find the corresponding AP and MP of labour.

Units of labour	0	1	2	3	4	5
TP	0	15	35	50	40	48

4. MP can be zero or negative but AP can never be zero or negative. Explain.
5. Show the relationship between AP and MP for a given variable factor with the help of a diagram.
6. Why does the total product initially increase at an increasing rate in the short run?

7. Complete the following table assuming that there are increasing returns to a factor:



Units of variable input	1	2	3	4
TP	100			

   a. From which on the TP curve does the firm experience diminishing returns to a factor?
   b. Why do diminishing returns occur?

8. Complete the following table:

Units of labour	TP	AP	MP
1	20		
		21	22
3	66		
		22	22
5		21	

The following questions are for 6 marks each:

1. Explain the phases of the Law of Variable Proportions in terms of total product. Use a diagram.
2. Explain the likely behaviour of Total Product and Marginal Product when only one input is increased while all other inputs are kept unchanged/Explain the short run law that highlights the returns to a factor.
3. Explain the Law of diminishing returns to a factor with the help of a schedule.
4. State whether the following statements are true or false. Justify your answer.
   a. Total product falls only when marginal product falls.
   b. Average product rises as long as marginal product rises.
   c. Average product is equal to marginal product when marginal product is at its maximum.

Theory of Costs

Learning Outcomes:
The students will be able to:

- **explain the meaning of economic costs**
- **define different short-run costs and depict their shape and relationship graphically**
- **differentiate between fixed and variable costs**

The following questions are for 1 mark each:

1. What is meant by costs in economics?
2. Define total cost.
3. What is meant by fixed cost of production?
4. If the average cost of producing 3 units of output is Rs 5, then what is the total cost of producing 3 units?
5. The MC of the 4th unit of output is Rs 10 and the total variable cost of 3 units is Rs 22. What is the TVC of 4 units of output?
6. If the economic cost of producing a pen is Rs 25 and the explicit cost is Rs 15, then what is the implicit cost?
7. Give two examples of explicit costs in a tailoring shop.
8. If the fixed cost of producing 10 units of a good is Rs 60, then what is the average fixed cost of producing 60 units?
9. The marginal cost and total cost of producing 5 units of a good are Rs. 4 and Rs. 24 respectively. What is total cost of producing 4 units?

The following questions are for 3/4 marks each:

1. Explain with the help of a diagram the relationship between total cost and marginal cost.
2. When is AVC = ATC? Explain.
3. Is total cost the sum total of marginal cost? Why?
4. Why is the AC curve U-shaped?
5. Why is the area under the AFC curve constant?
6. The following information is given about a firm:

Output (in units)	0	1	2	3	4	5	6
Total Cost (Rs)	150	300	420	600	790	1000	1260

From the above information find out*:*

- Average fixed cost of producing 3 units
- Average variable cost of producing 4 units

- Least average cost level of output
- Marginal cost of producing 5th unit

7. Differentiate between (a) Explicit costs and implicit costs (b) Private costs and social costs.
8. Classify the following into fixed cost and variable cost giving reasons.
   (a) Interest on capital
   (b) Call related charges in a telephone bill
   (c) Wages to permanent employees
9. A firm's average fixed cost of producing 2 units of a good is Rs. 9 and given below is its total cost schedule. Calculate its average variable cost and marginal cost for each of the given level of output.

Output units	1	2	3
Total Cost (Rs)	23	27	30

10. Can average cost fall when marginal cost is rising? Justify your answer.
11. Differentiate between fixed costs and variable costs.
12. Calculate average cost from the following table and determine the phase of production process in which the firm is producing the goods.

Output	4	5	6	7
Total Cost (Rs)	240	300	360	420

13. Discuss the fallacies in each of the following statements:
    - AC is at its minimum, when MC is at its minimum point.
    - AFC is constant for each level of output because fixed costs never change.
    - MC is always falling when AC is falling.
    - A total cost curve always starts from the point of origin.

The following questions are for 6 marks each:

1. Why does the difference between ATC and AVC decrease with an increase in the level of output? Can these two be equal at some level of output? Explain.
2. Explain the relationship between marginal cost and average cost with the help of an appropriate diagram.
3. Calculate TFC, TVC and MC from the following TC schedule:

Output	0	1	2	3
Total Cost (Rs)	45	75	100	120

Theory of Revenue

Learning Outcomes:
The students will be able to:

- **define different revenue concepts and depict their shape and relationship graphically.**
- **explain the relationship between the revenue curves under different scenarios of price and output**

The following questions are for 1 mark each:

1. What is average revenue?
2. What is meant by marginal revenue?
3. When a firm sells its entire output at a fixed price, what will be the shape of AR and MR curves?
4. What is a price line?
5. What change will take place in marginal revenue when TR is increasing at an increasing rate?
6. What is the impact on TR when MR is zero?

The following questions are for 3/4 marks each:

1. Define marginal revenue. How is it different under perfect and imperfect market conditions?
2. Complete the following table:

Units sold	Total Revenue (Rs)	Average Revenue (Rs)	Marginal Revenue (Rs)
1		10	
2	19		
3		9	
4	34		7
5		8	

3. Complete the following table:

Output (units)	Price (Rs)	Total Revenue (Rs)	Marginal Revenue(Rs)
1	7		
2	6		
3	4		
4	2		

4. Distinguish between average revenue and marginal revenue.
5. Discuss the relationship between AR and MR when:
   a. A firm is able to sell more output only when price is lowered.
   b. A firm is able to sell more output without changing the price.
6. Explain the shape of the total revenue curve facing a perfectly competitive firm.
7. Using a diagram, explain what happens to TR when MR is :
   a) positive
   b) negative
8. What will be the effect of the following changes in TR on MR:
   a) TR increases at a decreasing rate
   b) TR increases at a constant rate

The following questions are for 6 marks each:

1. How do changes in marginal revenue affect total revenue? Explain with the help of a schedule and a diagram.
2. Complete the following table:

Units sold	TR (Rs)	AR (Rs)	MR (Rs)
1	-	10	-
2	19	-	-
3	-	9	-
4	34	-	7
5	-	8	-
6	-	-	5

3. What is total revenue of a firm? Give the meaning of average revenue and marginal revenue. What happens to average revenue when marginal revenue is (i) equal to AR, (ii) less than AR?
4. Calculate TR, AR and MR from the following table:

Price	1	2	3	4	5	6	7
Demand	90	80	70	60	50	40	30

Producer's Equilibrium

Learning Outcomes:
The students will be able to:

- **define producer's equilibrium**
- **explain how it is attained for a perfectly competitive firm using MC-MR approach**

The following questions are for 1 mark each:

1. Define producer's equilibrium.
2. What happens to a firm's profits if at the point where MC = MR its marginal cost is less than marginal revenue at the unit of output after MC=MR?
3. What is the extent of losses that a firm incurs when it produces no output?
4. What is meant by equilibrium level of output of a firm?
5. What is break-even level of output?
6. What profits, if any, does a firm earn at break-even level of output?
7. State the general profit maximizing conditions of a firm.

The following questions are for 3/4 marks each:

1. Explain what happens when the marginal revenue of a firm is greater than its marginal cost at a given level of output.
2. Explain what happens when the marginal cost of a firm is greater than its marginal revenue at a given level of output.

The following questions are for 6 marks:

1. From the table below identify the profit maximizing level of output. Justify your answer:

Output (units)	AC (Rs)	AR (Rs)
1	6	4
2	5	4
3	4	4
4	4	4
5	5	4

2. The following table shows the total cost schedule for a competitive firm. It is given that the price of the good is Rs 10. Calculate the total profit at each level of output. Does the firm incur loss at any level of output?

Output (Units)	TC (Rs)
0	5
1	15
2	22
3	27
4	31
5	38
6	49
7	63
8	81
9	101
10	123

3. From the following table determine the output level where a firm achieves producer's equilibrium. State the reasons for this level of output.

Output (units)	TR (Rs)	AC (Rs)
1	20	20
2	40	15
3	60	12
4	80	10
5	100	12
6	120	15

4. Using a schedule and the marginal revenue – marginal cost approach; explain the point at which a producer maximizes profits.

Supply and Elasticity of Supply

Learning Outcomes:
The students will be able to:

- **define individual and market supply and analyse the factors affecting them**
- **state and explain the law of supply**
- **interpret supply functions**
- **explain the difference between shift and movement**
- **explain the upward sloping supply curve using the marginal cost curve**
- **state some exceptions to the law of supply**
- **illustrate the meaning of elasticity of supply and the different degrees of elasticity**
- **apply the percentage method of calculating price elasticity of supply**

The following questions are for 1 mark each:

1. What is meant by market supply?
2. What will happen to the supply curve of cloth if new firms enter the market?
3. What will happen to the supply curve for fans if the excise duty on fans increases?
4. What does the positive sign (+) before price indicate in a supply function?
5. What is an upward movement on the supply curve called?
6. What is meant by elasticity of supply?
7. What is the value of a relatively elastic supply curve?

The following questions are for 3/4 marks each:

1. Discuss any two factors that determine the supply of a commodity.
2. Explain the impact of a rise in the price of other goods on the supply curve of a commodity. Use a diagram.
3. Distinguish between contraction and decrease in supply.
4. With the help of a diagram explain what is meant by a movement on a supply curve.
5. With the help of a diagram, explain a change in supply.
6. Discuss two factors that determine the elasticity of supply.
7. Is the value of price elasticity of supply positive or negative? Explain.

The following questions are for 6 marks:

1. Distinguish between change in quantity supplied and change in supply.
2. Using diagrams explain the impact of the following on the supply curve of wooden furniture:
    a. Wood prices increase
    b. Use of new wood cutting machines

Numerical Questions

1. Calculate the price elasticity of supply if for a 5% change in price there is a 25% change in quantity supplied.
2. From the following information calculate the market supply schedule:

Price/unit (Rs)	Firm A (units)	Firm B (units)	Firm C (units)
5	10	12	20
6	14	18	25
7	18	25	32
8	22	35	40

3. Given a supply function $q^s_x = - 10 + 2p$
    a. Calculate the quantity supplied at a price of Rs 15 per unit.
    b. At what price will the firm be willing to supply 50 units?
    c. What is the price below which the firm will not supply its commodity?
    d. Calculate the price elasticity of supply at Rs 10.

4. At a market price of Rs 8 per unit, the quantity supplied of a commodity is 200 units. Its price elasticity of supply is equal to 1.5. If its price rises to Rs 10 per unit, calculate its quantity supplied at the new price.

5. When the price of a commodity falls from Rs 10 per unit to Rs 9 per unit, its quantity supplied falls by 20%. Calculate its price elasticity of supply.

6. When the market price of a good is Rs 20, a firm earns a revenue of Rs 100. The market price increases to Rs 30 per unit and the firm earns revenue of Rs 300. What is the price elasticity of supply?

7. The price elasticity of supply of a commodity is 2. When its price rises from Rs 8 to Rs 10 per unit, its quantity supplied increases by 500 units. Calculate the quantity supplied at the increased price.

8. At a price of Rs 40 per unit, the quantity supplied of a commodity is 400 units. When its price falls by 10 per cent, its quantity supplied falls by 36 units. Calculate the elasticity of supply. Is the supply elastic?

9. At a price of Rs 5 per unit a firm supplies 500 units of a commodity. When price rises by Rs 1, quantity supplied increases to 700 units. What is the elasticity of supply?

10. Two commodities A and B have the same elasticity of supply. A 20% rise in the price of commodity A leads to a rise in its supply from 400 to 500 units. What will be the percentage change in quantity supplied of commodity B if its price falls by 10%?

Market Equilibrium

Learning Outcomes:

The students will be able to:

- **demonstrate the process of determining equilibrium price in a perfectly competitive market**
- **analyse the impact on price and quantity of changes in demand and supply**
- **numerically determine equilibrium price and quantity**
- **explain the impact of government intervention on market price**
- **describe an economically non viable industry**

The following questions are for 1 mark each:

1. What is meant by equilibrium price?
2. Give the meaning of excess demand for a product.
3. Give the meaning of excess supply of a product.
4. How does an increase in the price of a substitute good affect the equilibrium price?
5. How does an increase in input price affect the equilibrium quantity exchanged in the product market?
6. How does a favourable change in taste of a good affect the equilibrium price and quantity?
7. How does a cost saving technological progress affect the equilibrium price and quantity of a product?
8. How does an increase in excise tax rate affect the equilibrium price and the quantity of a good?
9. What is the minimum price that a producer must get for his product?
10. At what price – higher or lower than the equilibrium price – will there be an excess demand?
11. When will an increase in demand imply an increase in price but no change in quantity?
12. When will an increase in demand imply an increase in quantity demanded but no change in price?

The following questions are for 3/4 marks each:

1. How is equilibrium price determined under perfect competition? Explain with the help of a diagram.
2. Explain the process of price determination in a perfectly competitive market with a fixed number of firms. Use demand and supply schedules to support your answer.

3. What will happen in a perfectly competitive market if the prevailing price in the market is (a) above equilibrium price; (b) below equilibrium price?
4. Explain the effect of an increase in demand of a commodity on its equilibrium price and quantity. Use a diagram.
5. Explain the chain effects on demand, supply and price of a commodity caused by a leftward shift of its supply curve. Use a diagram.
6. Explain the effect of a simultaneous decrease in both demand and supply of a commodity on its equilibrium price and quantity.
7. The demand function and supply function for a good are given as follows- $Q_d = 110 - 10P$ and $Q_s = -100 + 20P$. Find equilibrium price and quantity.
8. Consider the market demand and supply schedules for chocolate bars

Price/unit (Rs)	Quantity demanded (units)	Quantity supplied (units)
12	100	420
11	150	300
10	200	200
9	260	60
8	330	10

   a. Find the equilibrium price of chocolate bars.

   b. Why is a price of Rs 12 per chocolate bar not an equilibrium price?

   c. When the government reduces excise duty on a commodity, how does it affect its equilibrium price and quantity?

The following questions are for 6 marks each:

1. At the given market price of a commodity there is excess supply. How will the equilibrium price be reached?
2. Explain the effect of the following changes on equilibrium price and quantity of a good (a) cost saving technological progress. (b) fall in price of substitute good.
3. "Equilibrium price may or may not change with shifts in both demand and supply curves" Comment.
4. Suppose the demand for Sanskriti sweatshirts increases. Simultaneously due to an increase in the price of cotton, the supply of these sweatshirts decreases. How will it affect the price and quantity sold of sweatshirts?

Forms of Market

Learning Outcomes:
The students will be able to:

- **infer the basis for the existence of different forms of markets**
- **differentiate between the market forms in terms of its characteristics**
- **analyze the implications of the features on output, revenue curves and profit**

The following questions are for 1 mark each:

1. In which market is the product homogeneous?
2. What is meant by product differentiation?
3. Under which market form does product differentiation take place?
4. Draw the AR, MR curves of a monopolistic firm in a single diagram.
5. What is the relationship between the average revenue curve and the demand curve in a monopoly market?
6. Under which market forms are there restrictions on the entry of new firms?
7. Draw the demand curve of a firm under monopoly.
8. What are selling costs?
9. What is persuasive advertising?
10. What are patent rights?
11. Give two examples of monopolistic competition.
12. Which feature/features of monopolistic competition is/are monopolistic in nature?
13. Which feature/features of monopolistic competition is/are competitive in nature?

The following questions are for 3/4 marks each:

1. How is a perfectly competitive firm a price taker?
2. State three features of monopoly.
3. Distinguish between monopoly and monopolistic competition.
4. Why is the average revenue curve of a firm under perfect competition parallel to the X-axis and negatively sloped under monopoly?
5. Define monopolistic competition. Can a seller in such a market influence prices?
6. Why is the demand curve facing a firm under perfect competition perfectly elastic?
7. Explain the importance of free exit and entry in perfect competition.

8. Explain the importance of 'no close substitutes 'of a product in a monopoly.
9. Differentiate between product differentiation and price discrimination.
10. Explain two factors which would make competition imperfect.
11. What is a shutdown point for a perfectly competitive firm?

The following questions are for 6 marks each:

1. Explain briefly three features of perfect competition.
2. "Under perfect competition the seller is a price taker whereas under monopoly he is a price maker". Explain.
3. Identify the market forms for the two sellers of good A and good B given the following information. Give reasons for your answer.

Output sold (Units)	Price per unit of good A (Rs)	Price per unit of good B (Rs)
10	5	5
20	5	4
30	5	3

4. Explain the features of a monopoly market. Why is the demand for a good under monopolistic competition more elastic than under monopoly?
5. A perfectly competitive firm accepts a market price equal to Rs 15.
   (a) Derive its TR schedule for an output range from 0 to 10 units.
   (b) Suppose market price increases to Rs 17, will the new TR curve be flatter or steeper? Explain
6. Explain the implications of the following:
   b. Differentiated products
   c. Large number of sellers
7. State whether the following statements are true or false. Give reasons for your answer.
   a. Under perfect competition there can be only one ruling price in the market.
   b. Firms operating under monopolistic competition have homogeneous goods.
   c. Each firm has a downward sloping demand curve under monopolistic competition.

Collection and Organisation of Data

Learning Outcomes:

The students will be able to:

- **state the meaning and purpose of data collection**
- **distinguish between primary and secondary sources of data**
- **state the methods of collection of data**
- **distinguish between Census and Sample Surveys**
- **demonstrate the techniques of sampling**
- **review and discuss some important sources of secondary data**
- **classify data and distinguish between quantitative and qualitative classification**
- **prepare a frequency distribution table, form classes and tallies and differentiate between univariate and bivariate frequency distributions.**

1. In a village of 200 farms, a study was conducted to find the cropping pattern. Out of 50 farms surveyed, 50% grew only wheat. Identify the population and the sample size.

2. What kind of classification is depicted in the following table?

   Sales of a firm (2003-2005)

Year	Sales Rs lakhs
2003	80
2004	90
2005	95

3. Prepare a frequency array of marks obtained by 25 students of a class in an economics test:
   20, 15, 20, 30, 40, 25, 25, 30, 40, 20, 35, 35, 50, 15, 50, 25, 40, 40, 30, 50, 25, 30,

   30, 15, 45

4. Prepare a frequency distribution of the age of 25 students of class XI as given below:

   15, 16, 16, 17, 18, 18, 17, 15, 15, 16, 16, 15, 16, 16, 15, 17, 17, 18, 19, 16

5. From the following data relating to wages of 20 workers, prepare a frequency distribution of exclusive series with a class interval of 5:
   10, 15, 25, 27, 29, 20, 24, 23, 22, 12, 14, 16, 17, 18, 19, 18, 16, 15, 5, 9

6. Construct a frequency distribution of inclusive series with an interval of 4:

10	17	15	22	11	16	19	24	29	18
25	26	32	14	17	20	23	27	30	12
15	18	24	36	18	15	21	28	33	38
34	13	10	16	19	22	29	19	23	31

7. Convert the following inclusive series into exclusive series:

C.I.	1 – 5	6 – 10	11 – 15	16 – 20	21 – 25
No. of workers	10	15	20	25	30

8. From the following frequency distribution prepare 'less than' and 'more than' cumulative frequency distribution:

Wages (Rs)	100 – 110	110 – 120	120 – 130	130 – 140	140 – 150
No. of workers	4	12	20	7	5

9. Convert the following into normal frequency distribution:

Less than	25	30	35	40	45	50
Frequency	8	22	50	85	105	120

10. Convert the following into normal frequency distribution:

More than	0	10	20	30	40	50
Frequency	50	46	40	20	11	4

11. Convert the following 'less than' cumulative frequency distribution into 'more than' cumulative frequency distribution:

Marks	Less than 5	Less than 10	Less than 15	Less than 20
No. of students	7	20	38	55

12. If class mid points in a frequency distribution of a group of persons are
125, 132, 139, 146, 153, 160, 167, 174, 181
Find:
(a) Size of class intervals
(b) The class boundaries.

13. If the class marks in a grouped frequency distribution of weights (kgs) of a group of students are:
75, 84, 93, 102, 111, 120, 129
Find out:
a) Width of the class/size of the class interval.
b) The class limits.

Presentation of Data

Learning Outcomes:

The students will be able to:

- **present the data using appropriate tables, diagrams and graphs**
- **choose the most appropriate form to represent the given data**

Tabulation

1. Draw a blank table depicting university admission details showing faculty, sex and residence.

2. The Economic Survey of 2002 revealed that in 2001 – 2002, total production of food grains was 1928 lakh tons of which production of rice and wheat was 860 and 708 lakh tons respectively. The rest was production of other crops. Percentage share of rice and wheat in the total production of crops was 44.60 and 36.72 respectively. Construct a suitable table.

3. Point out the mistakes in the following table and rearrange it in the form of a good table.

Literate	Less than 20	20 -30	30 -40	40 and above
Male				
Female				

4. The Indian Sugar Mills Association reported that "sugar production during the first fortnight of December, 2001 was 3, 87,000 tons as against 3, 78,000 tons during the same fortnight last year 2000. The off - take of sugar from factories during the first fortnight of December 2001 was 2,83,000 tons for internal consumption and 41,000 tons for exports as against 1,54,000 tons for internal consumption and nil for exports during the same fortnight last season". Present the data in a tabular form.

5. 70 members of a club went on a picnic and on an average they paid Rs 14. There were 50 senior citizens each of whom paid Rs 15.The younger members were charged at a higher rate. The number of helpers was 10 (half of them were males) and they were taken free of cost. The number of females was 10 % of the total of which one was a senior citizen. Tabulate the above information.

6. Out of a total number of 1,807 women who were interviewed for employment in a textile factory of Mumbai, 512 were from textile areas and the rest from the non-textile areas. Among the married women who belonged to textile areas, 247 were experienced and 73 inexperienced, while for non-textile areas the corresponding figures were 49 and 520 respectively. The total number of inexperienced women was 1,341 of whom 111 resided in textile areas. Of the total number of women, 918 were unmarried, and of these the number of experienced women in the textile and non-textile areas was 154 and 16 respectively. Tabulate the given information.

Diagrammatic Presentation

1. Draw a suitable diagram to depict demand and availability of steel ('000 tons)

Year	Demand	Availability
1984-85	6168	6569
1985-86	6558	8219
1986-87	7088	8989
1987-88	7658	9859

2. The following table gives data on birth rate in India according to census survey of different years. Present the information in the form of a simple bar diagram.

Year	1931-40	1941-50	1951-60	1961-70	1971-80	1981-90
Birth rate	45	40	42	41	38	36

3. Present the following data in the form of horizontal bar diagram:

Students	A	B	C	D	E	F
Marks	300	250	200	150	100	50

4. Use a suitable diagram to present the following data :

Statement of cold drinks sold in Sanskriti School canteen

Month	Ice Tea	Fruit Juice	NimbuPani	Total
July	100	160	420	680
August	120	130	360	610
September	100	120	300	520
October	150	80	400	630

5. India's import of crude oil is shown in the following table. Present the information in a pie diagram and a percentage bar chart.

Country	Year	
	1960-61	1998-99
OPEC countries	4.6	28.7
OECD countries	78	55
East European countries	3.4	11.6
Non oil exporting countries	11.8	42.1
Other countries	2.2	12.6

Graphic Presentation

1. Construct a histogram using the given data :

Weekly wages (Rs)	10-15	15-20	20-25	25-30	30-40	40-55	55-95
No. of workers	7	19	28	15	12	12	8

2. On a graph paper show that the area under a histogram is equal to the area under a frequency polygon and also a frequency curve.

3. Draw a histogram and a frequency polygon :

Marks	5-9	10-14	15-19	20-24	25-29	30-34
Students	4	17	25	32	12	6

4. Draw less than and more than ogive from the following frequency distribution :

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. of Students	7	10	20	13	12	10	15	8

5. Draw a frequency curve to depict the following information :

Movies seen per month	0-10	10-20	20-30	30-40	40-50	50-6-	60-70
No. of households	10	18	20	26	21	15	8

6. The following table gives data on the cost and sale of a factory (in thousand rupees)and of its competitor between January and June. Present the information in a time series graph.

Month	January	February	March	April	May	June
Cost	5	7.5	5	10	12.5	15
Sales	7.5	10	7.5	12.5	15	17.5
Cost (compt)	6	8	6	8	11.5	16
Sales (compt)	9	9.5	8	15	15	20

From the above graph, comment on the following:
(a) What can you say on the cost trends of the factory and its competitor?
(b) Comment on the sales of the 2 firms.

Measures of Central Tendency

Learning Outcomes:

The students will be able to:

- **summarise a set of data by one single number**
- **recognise and distinguish between the different types of averages**
- **compute different types of averages**
- **draw meaningful conclusions from a set of data**
- **develop an understanding of which type of average would be the most useful in a particular situation.**

Mean

1. The following table gives the daily income of 10 workers in a factory. Find the mean by using direct & step deviation method.

Workers	A	B	C	D	E	F	G	H	I	J
Daily income (Rs)	120	150	180	200	250	300	220	350	370	260

2. Using the step deviation method, find the mean of the following:

Marks (Less than)	10	20	30	40	50	60
Frequency	5	12	25	36	45	50

3. Following are the marks obtained by 100 students in economics.
   Find the arithmetic mean by using (i) Direct method
   (ii) Step deviation method.

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

4. The sales of a balloon seller in seven days in a week are as given below:

Days	Mon	Tue	Wed	Thurs	Fri	Sat	Sun
Sales(in Rs)	100	150	125	140	160	200	250

   If the profit is 20% of sales, find his average profit per day.

5. Find the missing item p of the following distribution where the arithmetic mean is 11.37.

X	5	7	p	11	13	16	20
F	2	4	29	54	11	8	4

6. Calculate the arithmetic mean from the following data:

Midpoints	5	15	25	35	45	55
Frequency	5	7	12	18	5	3

7. The mean height of 25 male workers in a factory is 61cms, and the mean height of 35 female workers in the same factory is 58cms. Find the combined mean height of 60 workers in the factory.

8. The mean of 200 items was 50. Later it was discovered that two items were misread as 92 and 8 instead of 192 and 88. Find the correct mean.

Median

1. Find the median of the following data: 20, 15, 25, 28, 18, 16, and 30.

2. Calculate the median from the following data by arranging them in ascending order:

X	160	151	162	164	156
Frequency	5	6	6	2	7

3. Calculate the mean and median from the following data series:

Marks	10-20	20-30	30-40	40-50	50-60	60-70
No of students	5	5	5	20	10	5

4. Using the graphic method locate median from the following information:

Marks	0-10	10-20	20-30	30-40	40-50
No of students	10	20	30	20	10

5. Compute the median for the following data:

Values(Less than)	10	20	30	40	50
Frequency	11	18	34	48	60

6. A survey of small scale units in Thane district indicated the following age of workers:

Age	16-19	20-29	30-39	40-49	50-59	60-69
Frequency	15	46	49	32	28	14

Calculate the median of the above data.

7. Find the missing frequency of the group 20-30, if the median of the series is 28.

Class intervals	0-10	10-20	20-30	30-40	40-50
Frequency	5	8	X	16	6

Mode

1. Calculate the mode of the following data: 3,5,4,7,9,6,5,5,9,1,2,3,5,6.

2. Using the grouping method, calculate the mode of the following data:

Size	30	35	40	45	50	55
Frequency	5	9	16	10	6	4

3. Compute mode from the following data:

Values(Less than)	10	20	30	40	50
Frequency	10	30	60	80	90

4. Calculate the mode of the following data:

Midpoints	5	10	15	20	25	30	35	40	45
Frequency	7	13	19	24	32	28	17	8	6

5. Calculate the mode using the grouping method:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No of students	2	5	7	10	7	5	2

6. Calculate mean, median and mode from the following data:

Monthly income	300-500	500-700	700-900	900-1100	1100-1300	1300-1500
No. of households	25	55	30	20	14	6

7. Locate the mode graphically and also calculate it using the inspection method:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No of students	5	10	20	25	20	10	5

Positional values

1. The following data shows the monthly wages of 10 workers. Calculate the lower and upper quartiles:
   Monthly wages: 120,150,170,180,181,187,190,192,200,210.

2. Calculate Q_1 and Q_3 from the following data:

Wages	0-5	5-10	10-15	15-20	20-25	25-30
No of workers	4	6	3	8	12	7

3. Calculate Q_1 and median with the help of the following data:

Income (in Rs)	800	1000	1200	1400	1600	1800
No. of persons	16	24	26	30	20	5

4. Find median, first quartile and third quartile of the following series:

Height (in cms)	58	59	60	61	62	63	64	65	66
No. Of persons	2	3	6	15	10	5	4	3	1

5. The following table gives the distribution of wages of 65 employees in a factory. Draw a 'less than' curve from the above data and estimate the number of employees earning at least Rs 63 but less than Rs 75.

Wages in Rs (More than)	50	60	70	80	90	100	110	120
No. of employees	65	57	47	31	17	7	2	0

6. The following series relates to the daily income of workers employed in a firm. Compute:
   a) Highest income of lowest 50% workers
   b) Minimum income earned by top 25% workers
   c) Maximum income earned by lowest 25% workers

Daily Income (in Rs)	10-14	15-19	20-24	25-29	30-34	35-39
No. of workers	5	10	15	20	10	5

Measures of Dispersion

Learning Outcomes:

The students will be able to:

- **analyse the limitations of averages**
- **summarize the need for measures of dispersion**
- **enumerate various measures of dispersion**
- **calculate the measures and compare them**
- **distinguish between absolute and relative measures.**

1. Find range and coefficient of range from the following data:

X	25	27	30	31	32	38	48	30	50

2. Find range and coefficient of range from the following data:

Wages	8	9	10	11	12	13	14
No. of workers	10	15	18	10	4	5	3

3. Find range and coefficient of range from the following data:

Size	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	2	3	12	10	8

4. Calculate Inter- quartile range from the following data:

C.I.	1 – 5	6 – 10	11 – 15	16 – 20	20 – 25
Frequency	5	10	15	6	4

5. Calculate quartile deviation and its coefficient from the following data:

Wages	50	55	58	60	70	90	95	110
No. of workers	5	7	12	10	8	6	2	9

6. Calculate coefficient of quartile deviation from the following data:

Wages(Rs)	Less than 35	35 – 37	38 – 40	41 – 43	Over 43
No. of workers	14	62	99	18	7

7. Compute mean deviation from mean and its coefficient from the following data:

Weekly wages (Rs)	200 – 400	400 – 600	600 – 800	800 – 1000
No. of workers	20	40	30	10

8. Calculate mean deviation from the mean from the following data:

C. I.	45 – 50	50 – 55	55 – 60	60 – 65
Frequency	20	26	38	16

9. Calculate standard deviation and its coefficient from the following data using direct method: 100, 90, 120, 110, 80, 70, 150, 130, 50, 100

10. Calculate standard deviation from the following data

No. of goals	0	1	2	3	4
No. of matches	27	9	8	5	4

11. Calculate standard deviation from the following data using step deviation method:

Marks	Below 20	Below 40	Below 60	Below 80	Below 100
No. of students	8	20	50	70	80

12. From the prices of shares X and Y given below, state which share is more stable in value?

X	41	44	43	48	45	46	49	50	42	40
Y	91	93	96	92	90	97	99	94	98	95

13. The scores of two batsmen A and B in five innings during a certain match are:

A	32	28	47	63	71
B	19	31	48	53	67

Which batsman is a better scorer and who is a more consistent batsman?

14. Daily wages paid to workers in two factories X and Y are given below:

Daily wages	No. of workers	
	Factory X	Factory Y
12 – 13	15	25
13 – 14	30	40
14 – 15	44	60
15 – 16	60	35
16 – 17	30	12

a) Which factory pays higher average wages?
b) Which factory has a more consistent wage structure?

Measures of Correlation

Learning Outcomes:
The students will be able to:

- **define the term correlation**
- **explain the nature of relationship between two variables**
- **calculate the different measures of correlation**
- **analyse the degree and direction of the relationships.**

1. If *r* = + 1 or – 1, what kind of relationship exists between X and Y?
2. Find Karl Pearson's coefficient of correlation if N = 50, $\sum X = 75$, $\sum X^2 = 130$, $\sum Y = 70$, $\sum Y^2 = 140$ and $\sum XY = 128$.
3. Can '*r*' lies outside – 1 and + 1?
4. Draw three hypothetical scatter diagrams showing the following value of '*r*': (a) *r* = - 1 , (b) *r* = 0 & (c) *r* = + 1
5. The following data shows respective heights of 8 girls and 8 boys in inches:

Height of girls	65	63	67	64	68	70	71	69
Height of boys	67	66	68	65	69	68	70	68

Construct a scatter diagram and indicate the nature of correlation.

6. Draw a scatter diagram and interpret whether the correlation is positive or negative:

X	4	5	6	7	8	9	10	11	12	13	14	15
Y	78	72	66	60	54	48	42	36	30	24	18	12

7. Calculate Karl Pearson's coefficient of correlation from the following data:

Price (Rs)	10	12	14	16	18
Quantity (Units)	20	29	21	22	28

8. Calculate Karl Pearson's coefficient of correlation from the following data:

Price Index (X)	120	150	190	220	230
Money Supply in Rs Crores (Y)	1800	2000	2500	2700	3000

9. Calculate Karl Pearson's coefficient of correlation between ages of husband and wife from the following data:

Age of husband	21	22	23	24	25	26	27
Age of wife	16	15	17	18	19	20	21

10. Calculate Karl Pearson's coefficient of correlation from the following data:

X	200	190	180	170	160	150
Y	20	30	40	60	70	80

11. A group of 8 students get the following percentage of marks in a test in statistics and accountancy.

% Marks in Statistics	50	60	65	70	75	40	80	85
% Marks in accountancy	80	71	60	75	90	82	70	50

Compute the coefficient of rank correlation.

12. Five competitors in a beauty contest are ranked by three judges in the following order:

Rank by judge A	1	2	3	4	5
Rank by judge B	2	4	1	5	3
Rank by judge C	1	3	5	2	4

Using rank correlation coefficient, determine which pair of judges has the nearest approach to common tastes in beauty.

13. Calculate coefficient of rank correlation from the following data:

X	48	33	40	9	16	16	65	24	16	27
Y	13	13	24	6	15	4	20	9	6	19

14. Calculate Spearman's coefficient of correlation from the following data:

X	20	11	24	18	20	22
Y	24	9	20	22	9	21

Index Numbers

Learning Outcomes:

The students will be able to:

- **know the different kinds of index numbers and how to select appropriate weights and base year.**
- **demonstrate the methodology of calculation.**
- **analyse the effect and causes of price rise and hence be a rational consumer.**

1. With the help of following data calculate index number for 2007 taking 2006 as the base year using simple aggregative method:

Commodity	Price in 2006 (Rs)	Price in 2007 (Rs)
A	100	145
B	90	130
C	145	200
D	180	275
E	85	150

2. Compute a price index from the following by simple aggregative & simple average of price relative method:

Commodity	A	B	C	D	E	F
Prices in 2005	200	300	100	250	400	500
Prices in 2008	250	300	150	350	450	550

3. Calculate weighted aggregative price index from the following data by using Paasche's method:

Commodities	Base Year		Current Year	
	Price	Quantity	Price	Quantity
A	10	30	12	50
B	8	15	10	25
C	6	20	6	30
D	4	10	6	20

4. Construct index numbers of prices from the data given below by applying:
   (a) Laspeyre's method (b) Paasche's method

Commodities	Base Year		Current Year	
	Price	Quantity	Price	Quantity
A	2	40	3	20
B	1.5	30	2.5	40
C	1	50	1.5	30
D	2.5	20	2	80

5. From the following data compute index number for 2005 taking 2003 as base year by applying weighted average of price relative method:

Commodity	Quantity	Price (in Rs)	
	2003	2003	2005
A	5 qtl	100	125
B	5 qtl	200	250
C	1 qtl	80	100
D	3 qtl	120	180
E	5 kg	8	10
F	80 kg	2	3

6. The monthly per capita expenditure incurred by workers of an industrial centre during 2002 and 2006 on the following items are given below. The weights of these items are 75, 10, 5, 6 and 4 respectively. Prepare a weighted index number for cost of living for 2006 with 2002 as base.

Items	Price in 2002	Price in 2006
Food	100	200
Clothing	20	25
Fuel and lighting	15	20
House rent	30	40
Miscellaneous	35	65

7. Construct the Consumer Price Index Numbers for 2005 on the basis of 2004 from the following data using:
   (a) Aggregative Expenditure Method
   (b) Family Budget Method

Articles	Quantity consumed in 2004	Price in 2004 (Rs)	Price in 2005 (Rs)
Wheat	2 qtl	150	165
Gram	1 qtl	80	100
Rice	1 qtl	120	150
Bajra	1.5 qtl	60	90
Arhar	1.5 qtl	100	140
Oil	10 qtl	10	12
Gur	40 qtl	2	3

8. What will be the real wage of the consumer if his money wage is Rs 10,000 and the cost of living index is 526?

9. If the salary of a person in the base year is Rs 4000 per annum and the current year salary is Rs 6000. By how much should his salary rise to maintain the same standard of living if the CPI is 400?

10. Calculate the inflation rate from the following data:

Year	1998 – 99	1999 – 2000	2000 – 01	2001 – 02	2002 – 03
WPI (1993 -94)	140.7	145.7	155.7	161.3	166.8

11. Below are given the output data for five industries for two years 2002 and 2006. Prepare the index of industrial production for the year 2006 with 2002 as base year.

Industry	Output (units)		Weights
	2002	2006	
Software	100	150	10
Petrochemical	75	100	30
Fabrics	90	90	20
Coal	60	40	15
Machinery	80	100	25

Basic Mathematical Concepts used in Economics

Mathematical equations and graphical illustrations play a significant role in economics. These tools are used to highlight relationships that exist between different economic variables. Through the use of mathematical language and graphs we can better understand economic theories. Hence, it is important to understand some of the basic concepts and terms that we shall be frequently using during the course next year.

Functions

The concept of functions demonstrates the dependence between variables. These functions show how one variable changes (dependent variable) due to some other variables (independent variables). For example there could be a function: C = f(Y). This equation shows that consumption (C) is a function of income (Y). Here Y is the independent variable and C is the dependent variable. The symbol 'f' suggests that the two variables are related. However, the exact nature of the relationship is given by a more specific equation.

Functions can be of different types – linear or non-linear including cubic and quadratic function. However, mostly in our analysis we shall be using a linear function, which is represented mathematically as the equation of a straight line. It is typically written as:

$y = a + bx$

where y is the dependent variable, whose value depends on the value of the independent variable (x) and two constants – 'a' and 'b'.

Let us now understand the meaning of 'a'. 'a' is the value that y will take when x is equal to zero. In other words, on a graph paper, with x and y axes, 'a' represents the y–intercept.

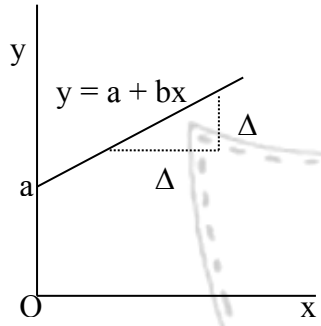
'b' measures the slope of the linear function. Slope is a very important concept in Economics as it tells us how one variable changes in response to a change in another variable. For example in our linear equation, 'b' gives the rate of change of y per unit change in x. More formally, a slope measures the rate of change of the dependent variable when there is a per unit change in the independent variable. It may show for example how demand changes when price changes or how consumption changes when income changes or how sales grow as output changes.

Graphing functional relationships

Let us extend our discussion of the linear function by illustrating it graphically.

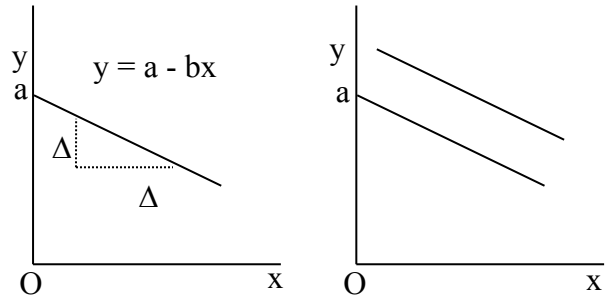
As shown in figure 1 above, the independent variable is measured along the x-axis whilst the dependent variable is measured along the y-axis. 'a' is the value of the y-intercept. This is the point where x is equal to zero. Since we have a linear function, the graph is a straight line. The steepness or flatness of the line is determined by its slope. The greater the slope of a line, the steeper it is. Graphically, the slope is calculated as

slope = $\frac{\text{change in y}}{\text{change in x}} = \frac{\text{rise}}{\text{run}}$



In the diagram the rise is given by the change in y (Δy), whereas the run is given by the change in x (Δx).

In addition to the steepness, the slope also shows the direction of the linear curve. This is seen through the sign before the slope. In our linear equation y = a + bx, the slope b has a positive sign before it. This shows that the linear curve will be an upward sloping line which from left to right. It reflects a positive relationship between y and x. If our linear function is y = a – bx, then the slope b has a negative sign before it. This negative sign would mean that the linear curve will be a downward sloping line, which moves from left to right, as seen in figure 2 given below. It shows that y and x have a negative relationship – a positive rise is due to a negative run and vice versa.

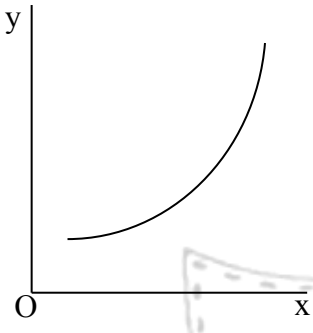


If two linear functions have the same slope they are parallel. This can be seen in figure 3.

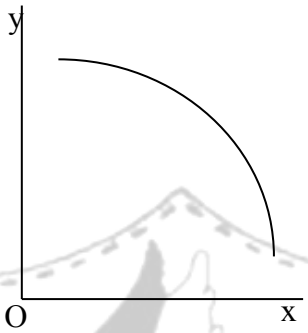
Non Linear Functions

In a linear function, the slope remains constant. So for example, if the slope is 2, it means that for every one unit rise in x, y will rise by 2 units. Similarly, if the slope is -2, it means that for every one unit rise in x, y will fall by 2 units.

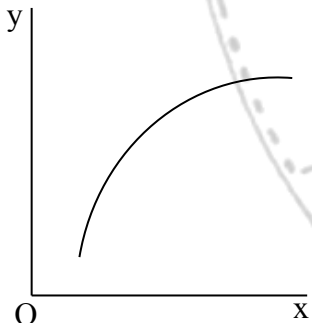
Many a times the slope of a function is not constant. It may rise or fall. These situations are depicted below:



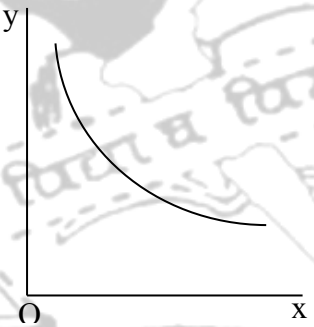
y is increasing at an increasing rate



y is decreasing at an increasing rate



y is increasing at an decreasing rate



y is decreasing at an decreasing rate

Economics Project Class 11--Research Paper

As part of your curriculum, a research paper has to be submitted on **August 18, 2021**. You may choose to write a research paper on any one of the topics suggested in the list. The paper must have a title page, main content, and references. The paper should be typed in font size 11 (Book Antiqua) and should be 3-5 pages, excluding tables, diagrams and references. The project should be submitted after spiral binding.

Steps involved-

1. Students select a general topic for research and make a list of key words to help search for information and get an overview of their topic.
2. Students become "research hounds" when they spend as much time as possible finding all the research available. This is probably the most time-consuming part of the research paper. Students refine their research subject and write a statement of purpose on their chosen topic.
3. Students brainstorm questions about their focused topic, begin to create an outline and start thinking about the first draft. They list more key words, identify the best sources to use, begin making note cards, and create a "working" thesis statement.
4. Students write the body of their paper from their outline and notes and then the introduction and conclusion.
5. Students spend time finalizing the citations and completing the Works Cited page.
6. Students now must carefully evaluate, revise, and proofread their paper. This is one of the most important parts of the process, and it's also the one that students tend to do too quickly. Once finished with the laborious writing of the research paper, they must go through this part of the process more than once in order to submit their very best work.

Please Note-

1. Submissions after the deadline will not be accepted.
2. Intentional plagiarism will not fetch the student any marks.
3. The data in the research paper must include various statistical tools, their interpretation and conclusion must be drawn accordingly.

The paper will carry 20 marks and will be assessed as follows-

Rubric for Grading the Research Paper

S.No.	Heading	Marks Allotted
1.	Relevance of the Topic	3
2.	Knowledge Content/ Research Work	6
3.	Presentation Technique	3
4.	Viva	8
	Total	20 Marks

Assignment No. 1 **Max Marks: 20**
Economic Problems

1. What is microeconomics? (1)

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2. Which central problem deals with the distribution of output amongst the factors of production? (1)

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3. A country's resources are fully and efficiently employed. The problem of scarcity exists. What advice will be given to raise the efficiency level of the human resource to fight scarcity? (1)

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4. State one characteristic of human wants. (1)

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5. What is a Production Possibility Frontier? (1)

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6. What is normative economics? (1)

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7. What does an inward shift of the PPF reflect? (1)

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8. What does a movement along the PPF indicate? (1)

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9. How is an economic problem a problem of choice? (3)

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10. What is opportunity cost? Explain with the help of an example. (3)

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11. What will be the effect of the Skill India initiative of the government on the production possibility frontier of India? Explain with the help of a diagram. (3)

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12. Make an imaginary production possibility schedule and the corresponding curve so that the production possibility curve is a straight line. (3)

Assignment No. 2
Consumer's Equilibrium

Max Marks: 20

1. What does the area under the marginal utility curve depict? (1)

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2. What is an indifference map? (1)

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3. The MRS_{xy} = (-) 5. What does this mean? (1)

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4. How do prices of commodities influence the consumer's indifference curve? (1)

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5. Complete the following table and write the formulae: (3)

No. of units consumed	Total Utility	Marginal Utility
1	10	
2		7
3		5
4	24	
5		0
6	20	

6. Chocolates sell for Rs 6 per unit. Prerna who loves chocolates has already consumed 6 bars. Her marginal utility from eating the 6th chocolate is 48 utils. Suppose that the marginal utility of one unit of money is 6 utils, should she consumer more chocolates? Explain. (3)

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7. Draw a schedule which shows a declining MRS_{xy}. (3)

8. Why is an indifference curve convex to the origin? (3)

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9. Explain how a consumer attains equilibrium when she is faced with the choice of two commodities using the utility approach. (*Use an extra sheet)* (4)

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Assignment No. 3
Demand

Max Marks: 20

1. State the Law of Demand. (1)

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2. What are normal goods? (1)

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3. Why does the demand for Apple I phone 8 decrease with a fall in the price of Samsung Galaxy S8? (1)

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4. How is a market demand curve for a commodity derived? (1)

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5. How is the demand for a commodity related to the number of users? (1)

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6. Research has shown that if taxes on tobacco are trebled, it may prevent 200 million deaths. Analyse the economic principles behind this data. (3)

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7. Explain how a fall in income leads to a shift in the demand curve of an inferior commodity. Use a diagram. (4)

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8. The demand function of a commodity x is given as $q_x = 20 - 3 P_x$. The value of q_x (in units) is given as 5, 8, 11 and 14. Determine the corresponding demand schedule. Draw the demand curve for q_x. Show calculations. (4)

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Demand schedule | Demand curve

9. Explain the reason for the downward slope of the demand curve. (*Use extra sheet)*(4)

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Assignment No. 4
Elasticity of Demand

Max Marks: 15

1. What does an elasticity of demand = (-) 1.5 mean? (1)

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2. Which of the following two goods is more elastic- Good X with an elasticity of -0.2 or Good Y with -1.2. Why? (1)

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3. Price elasticity for a chocolate chip cookie is (-) 2. Forty cookies are demanded at Rs 10 per cookie. How many cookies will be bought at Rs 11 per cookie? (3)

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4. Explain how availability of substitutes impacts price elasticity of demand? (3)

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5. For each pair of commodities state which one is more price elastic? Give reasons. (3)

Pair of commodities	More price elastic commodity	Reason
Matchbox or Jimmy Choo shoes		
Umbrella or DVD during rainy season		
Ice-cream or strawberry ice-cream		

6. Elasticity of demand of Good X is twice that of Good Y. When price of Good Y increases from Rs 4 to Rs 6 per unit, its demand falls from 400 units to 300 units. Find the price at which 100 units of Good X is demanded, if at a price of Rs 20, its demand is 80 units. (4)

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Assignment No. 5
Production

Max Marks: 20

1. As the variable input of labour is increased by one unit the total output falls. What can be said about the marginal productivity of labour? (1)

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2. Distinguish between very short run, short run and long run in production. (3)

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3. Explain the reasons for earning increasing returns to a factor. (3)

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4. In which phase of production will a rational producer operate and why? (3)

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5. Explain with the help of a schedule the relationship between average product and marginal product. (4)

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6. The following is known about the firm: (6)

Units of Labour	1	2	3	4	5	6	7
Total Output	10	50	100	140	170	170	140
Marginal Product							

State the underlying law that brings about this change in output as input is changed. Also identify the various phases.

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Assignment No. 6
Theory of Costs

Max Marks: 20

1. If total cost at zero unit of output is Rs 20 and at one unit of output is Rs 25, then what is the total fixed cost? (1)

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2. What are variable costs? (1)

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3. What does the area under the marginal cost curve depict? (1)

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4. If the total cost of producing 4 and 5 units of output is Rs 15 and Rs 18 respectively, then what is the marginal cost of fifth unit of output? (1)

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5. With the help of a schedule, explain the relationship between Total Cost and Marginal Cost. (3)

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6. What is the shape of an AFC curve? Explain. (3)

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7. Complete the following table and write the formulae: (4)

Output (units)	TVC (Rs)	AVC (Rs)	MC (Rs)
1	10		
		8	6
3	27		
		10	13

8. Are the following statements true or false? Give reasons: (6)

(a) Marginal cost must always decline for average variable cost to fall.

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(b) Average total cost can never be equal to average variable cost in the short run.

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(c) If marginal cost is constant, average total cost is also constant.

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Assignment No. 7
Theory of Revenue

Max Marks: 15

1. What is the shape of the demand curve facing a perfectly competitive market? (1)

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2. Why is the AR curve the demand curve of a firm? (3)

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3. What change in total revenue will result in:
   (a) decrease in marginal revenue?
   (b) increase in marginal revenue? (3)

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4. Complete the following table: (4)

Output (units)	Price (Rs)	MR	TR
1		10	
2	9		
3			24
4		4	

5. Explain the relationship between AR and MR under imperfect competition with the help of a diagram. (4)

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Assignment No. 8
Producer's Equilibrium

Max Marks: 15

1. At a particular level of output, a producer finds that MC< MR. What will a producer do to maximize her profits? (1)

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2. A perfectly competitive firm at equilibrium incurs a marginal cost of Rs 50. What is the average revenue of the firm? (1)

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3. Define producer's equilibrium. Is TR= TC a condition for equilibrium? Explain. (3)

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4. The diagram given below shows the MC & MR curves of a producer. Study the diagram and answer the following questions- (4)

a. What is the profit maximizing level of output? Why?

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b. What is the profit minimization level of output? Why?

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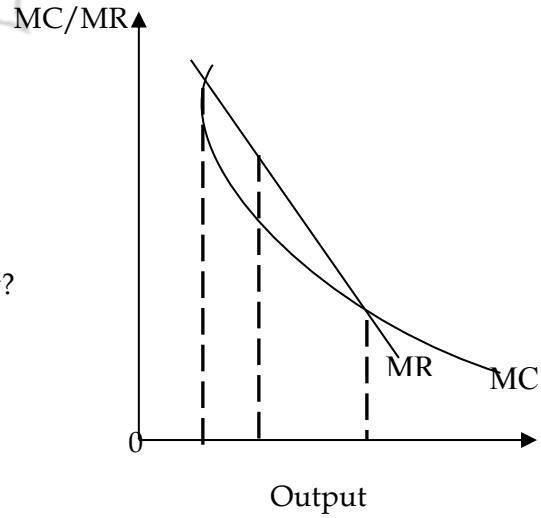

5. From the following schedule, find out the level of output at which the producer is in equilibrium. Give reasons for your answer. (6)

Output (units)	Price (Rs)	Total Cost (Rs)		
0	24	12		
1	24	26		
2	24	50		
3	24	72		
4	24	92		
5	24	115		
6	24	139		
7	24	165		

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Assignment No. 9 **Max Marks: 20**
Supply and Elasticity of Supply

1. What is meant by supply? (1)

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2. What is the distinguishing feature of a supply curve of unitary elasticity? (1)

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3. Demonstrate the law of supply with the help of a diagram. (3)

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4. What happens to the supply of a commodity when the price of its input decreases? Explain with the help of a diagram. (3)

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5. If the market price of a commodity is Rs 4, a seller is willing to sell 600 units of the commodity. When the price rises to Rs 5 how much will he sell if the elasticity of supply is unity? (3)

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6. The elasticity of supply of commodity X is twice that of commodity Y. When the price of commodity X is Rs 4 per unit, the firm's revenue is Rs 80. When price rises by Rs 2, quantity supplied rises to 25 units. How much revenue will the firm earn when commodity Y is sold at a price of Rs 25, if at an initial price of Rs 20, the quantity supplied is 80 units? (3)

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7. Distinguish between change in quantity supplied and change in supply. Use diagrams. (6)

Assignment No. 10 **Max Marks: 20**
Market Equilibrium

1. What is market equilibrium? (1)

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2. Out of demand and supply which plays a greater role in the determination of market equilibrium in the market period? (1)

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3. What happens to equilibrium price of a commodity if there is an 'increase' in its demand and 'decrease' in its supply? (1)

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4. At a price of Rs 15 per unit of a good demand for the good is 200 units while supply is 300 units. What is the likely effect on the price of this good? (1)

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5. Explain the changes that will take place in a market if market price is above equilibrium price. (3)

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6. The market supply and demand are given by the equations: (3)

$q^d_x = (12 - 2p_x)10{,}000$ $q^s_x = (20p_x)1{,}000$

Find the equilibrium quantity and the equilibrium price.

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7. The government enforces a price ceiling on the price of milk. Discuss the implications of this policy on the milk market. (4)

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8. India is on the brink of a drought. If paddy crops fail, then discuss the impact on the equilibrium price of rice. Use a diagram. (6)

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Assignment No. 11 **Max Marks: 20**
Forms of Market

1. What is a market? (1)

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2. Define monopoly. (1)

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3. What is a patent? (1)

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4. State the shape of the average revenue curve under imperfect competition? (1)

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5. What is a cartel? (1)

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6. Explain the shape of the demand curve faced by a firm under perfect competition. (3)

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7. What changes will take place in a perfectly competitive market if firms are earning economic profit in the short run? (3)

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4. What is meant by price discrimination? State the conditions under which a monopoly can practice price discrimination? (3)

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5. Highlight the importance of selling costs under different market forms. (6)

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Assignment No. 12
Collection and Organisation of data

Max Marks: 15

1. A research organization collects data on driving habits of urban Indians which is used by the traffic police. What kind of data is it for the organization and the police? (1)

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2. We have the following information on the monthly expenditure on food (in rupees) for 30 households in a locality. (3)

115	159	196	205	212	223
256	271	310	129	335	169
184	234	245	241	265	298
144	135	172	173	229	243
220	238	278	243	220	238

a) Obtain a frequency distribution using the following class intervals

100-150, 150-200, 200-250, 250-300, 300-350

b) What percentage of households spends less than Rs 250 per month and what percentage of households spends more than Rs 200 per month?

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3. Convert the following inclusive series into an exclusive series (3)

Marks	10 – 14	15-19	20 – 24	25 – 29	30 – 34
No. of students	4	5	8	5	4

Marks					
No. of students					

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4. In a survey it was found that 33 families bought milk in the following quantities in a particular month. Classify the following data in a discrete series, continuous series and 'less than' and 'more than' cumulative frequency series. (8)

40	103	78	71	119
71	63	64	89	78
87	52	51	40	65
98	40	119	52	87
103	46	71	69	71
89	62	87	62	69
51	71	78		

(Attach an additional sheet of paper)

Assignment No: 13
Presentation of data
(You may use a calculator for the calculations)

Max Marks: 45

1. State whether true or false. Also correct the incorrect statement: (3)

   a. A histogram is a graphic representation of the frequency distribution of a continuous variable.
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   b. Graphic presentation of a cumulative frequency distribution can be done through a frequency polygon.
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   c. In percentage bar diagram, all bars are of equal height.
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2. Draw a bar diagram to represent the following figures relating to number of unemployed engineers in six states of India. (3)

State	Delhi	Karnataka	Odisha	Punjab	Rajasthan
No. of unemployed engineers	801	783	433	120	358

3. Draw a suitable diagram to represent the following information. (4)

Statement of crimes in running passenger trains

Year	Murder	Robbery	Loot	Total
1998	108	82	321	511
1999	131	115	386	632
2000	97	144	352	593
2001	102	70	285	457
2002	75	68	245	388

4. Represent the following data in a pie diagram. (4)

Items of Expenditure	Food	Clothing	Rent	Education	Miscellaneous	Total
Family A	400	250	150	40	160	1000
%						100
Degrees						360

5. Draw a 'less than' ogive for the following data: (4)

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	4	4	7	10	12	8	5

6. Construct a histogram from the following distribution of total marks obtained by 65 students of a school in a Board Examination. (4)

Mid points	No. of students	
150	8	
160	10	
170	25	
180	12	
190	7	
200	3	

7. Categorise the following classification as qualitative, quantitative, geographical and chronological. Give reasons. (5)

a. Sales of a firm (2006-08)

Year	2006	2007	2008
Sales (Rs)	80	90	95

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b. No. of firms producing bicycles

Place	Punjab	Haryana	UP
No. of firms	30	20	25

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c. Annual profit of SSIs

Annual profit	0-10	10-20	20-30
No. of firms	5	150	1500

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d. Literacy rate in Bihar

Sex	Rural	Urban	Total
Male	57.70	80.80	60.32
Female	30.03	63.30	33.57

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e. Yearly sales of a teashop

Year	1995	1996	1997	1998	1999
Sales (Rs)	79.2	81.3	82.4	80.5	100.2

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8. Of the 1,125 students studying in a school during 2003-2004, 720 were Hindus, 628 were boys and 440 were science students. The number of Hindu boys was 392 and the number of Hindu boys studying science was 205 while the number of boys studying science was 262. The number of science students among the non-Hindus was 148. Compile this information in a table, obtaining relevant information wherever not given. The information was provided in ABC research paper. (6)

9. Present the following figures for export in tea on a graph. (6)

Year	1997	1998	1999	2000	2001	2002
Assam Tea	250	492	584	800	850	860
Darjeeling Tea	300	596	782	900	762	640

What can you infer about the export of the two varieties of tea?

a. ……

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b. ……

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c. ……

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10. Represent the following data with the help of a histogram. What kind of curve does the data reflect? (6)

Daily Wages (Rs)	10-15	15-20	20-25	25-30	30-40	40-60	60-80
No. of workers	7	19	28	15	12	12	8

(Please attach a graph to answer this question)

Assignment No. 14 **Max Marks: 50**

Measures of Central Tendency-Arithmetic Mean, Median and Mode

(*You may use a calculator*)

1. Test scores for a class of 20 students are as follows-

93, 84, 97, 98, 100, 78, 86, 100, 85, 92, 72, 55, 91, 90, 75,94, 83, 60, 81, 95(1)

Complete the table given below and find the modal interval

Test Scores	91-100	81-90	71-80	61-70	51-60
Frequency					

(1)

2. The following table gives the daily income of ten workers in a factory.
Find the arithmetic mean. (2)

Workers	A	B	C	D	E	F	G	H	I	J
Daily Income (in Rs)	120	150	180	200	250	300	220	350	370	260

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3. Calculate median and upper quartile for the following data showing monthly wages of 10 workers: (3)

120, 150, 170, 180, 181, 187, 190, 192, 200, 210

Median Upper quartile

4. Comment whether the following statements are true or false. Correct the incorrect statement. (4)

(i)The sum of deviation of items from mean is 1.

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(ii)In order to find the Median, one needs to first order the data values from the least to the highest.

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(iii)Arithmetic mean is a positional average.

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(iv)Arithmetic mean is based on all observations.

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(v)Arithmetic mean can be located graphically with the help of ogives.

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5. Calculate the lower quartile from the following data: (4)

Wages (in Rs)	50-60	60-70	70-80	80-90	90-100	100-110	110-120
No. of workers	8	10	16	14	10	5	2

6. The arithmetic mean of the data given below is 28, find the missing frequency using direct method. (5)

Profit	0-10	10-20	20-30	30-40	40-50	50-60
No. of shops	12	18	27	-	17	6

7. Indicate mode on a graph for the following distribution: (5)

Sales (Rs thousand)	53-56	56-59	59-62	62-65	65-68	68-71
Number of days	5	7	9	25	20	18

8. Following table gives the distribution of companies according to the size of capital. Using step deviation method, find out the mean size of the capital of a company. (6)

Capital (in lacs)	Less than 5	Less than 10	Less than 15	Less than 20	Less than 25	Less than 30
No. of companies	20	27	29	38	48	53

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9. The following series relates to the daily income of workers employed in a firm. Compute the maximum income earned by the lowest 25% workers. (6)

Daily income(Rs)	10-14	15-19	20-24	25-29	30-34	35-39
No. of workers	5	10	15	20	10	5

10. Locate median graphically: (6)

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. of students	4	6	10	10	25	22	18	5

11.The following table gives production yield in kg. per hectare of wheat of (8)
150 farms in a village. Calculate mode production yield using grouping method.

Yield	50-53	53-56	56-59	59-62	62-65	65-68	68-71
No. of farms	5	9	16	30	40	32	18

(Please attach a page to answer this question)

Assignment No. 15
Measures of Dispersion

Max Marks: 20

1. In a town, 25% of the persons earned more than Rs45, 000 whereas 75% earned more than Rs18000. Calculate the absolute and relative values of dispersion. (3)

2. For two firms A and B belonging to the same industry, the following data is given: (5)

	Firm A	Firm B
No. of wage earners	586	648
Average monthly wages (Rs)	52.5	47.5
Standard deviation	10	11

a) Which firm A or B pays larger amount as monthly wages?

b) Which firm shows greater variability in the wage rate?

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3. From the following data calculate variance: (6)

Marks	Number of Students (f)	Mid values (X)	d	d′	f .d′	f.d′²
0 – 20	2					
20 – 40	4					
40 – 60	6					
60 – 80	1					
80 - 100	7					
	∑ f =				∑ f .d′ =	

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4. Find the coefficient of mean deviation from mean from the following data. (6)

CI	0 -10	10 -20	20 -30	30 – 40	40 -50
Frequency	2	4	6	4	2

Assignment No. 16
Measures of Correlation
(You may use a calculator)

Max Marks: 35

1. What does the value of r = 0 imply? (1)

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2. Can coefficient of correlation be 1.98? Why? (1)

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3. Draw a scatter diagram and indicate the nature of correlation. (3)

X	10	20	30	40	50	60	70	80
Y	5	10	15	20	25	30	35	40

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4. Seven methods of teaching Economics in two universities were ranked by students of two universities. Calculate Rank difference correlation. What kind of correlation does it indicate? (6)

Teaching methods	Rank of A's students	Rank of B's students	D =	D^2
I	2	1		
II	1	3		
III	5	2		
IV	3	4		
V	4	7		
VI	7	5		
VII	6	6		
				$\sum D^2$ =

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5. Calculate Karl Pearson's coefficient of correlation between the index of industrial production and the number of unemployed in an economy. How does industrial production affect the level of unemployment? The assumed mean for IIP is 105 and 120 for number unemployed. (9)

IIP	Unemployed	dx	dy	dx^2	dy^2	dxdy
100	120					
102	134					
104	150					
107	115					
105	110					
112	140					
103	142					
99	100					

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6. Calculate coefficient of rank correlation between the marks of Indian Economics and Statistics, as indicated by 8 answer books of each of the two examiners. (6)

Marks in Indian Eco	Marks in Statistics	R_1	R_2	D =	D^2
15	16				
10	14				
20	10				
28	12				
12	11				
10	15				
16	18				
18	12				
					$\sum D^2$ =

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7. Calculate Karl Pearson's coefficient of correlation between X and Y and comment on their relationship. (9)

X	Y	d_x =	d_y =	dx^2	dy^2	d_xd_y
1	2					
3	6					
4=A	8					
5	10=A					
7	14					
8	16					
		$\sum d_x$ =	$\sum d_y$ =	$\sum dx^2$ =	$\sum dy^2$ =	$\sum d_xd_y$ =

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Assignment No. 17
Index Numbers
(You may use a calculator)

Max Marks: 15

1. During a certain period, the cost of living index number goes up from 110 to 200 and the salary of the worker is also raised from Rs 325 to Rs 500. Does the worker really gain? Why? (2)

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2. Using the simple aggregate method, calculate the price index number for 2020 with base as 2000 from the following data: (3)

Commodities	Price in 2000	Price in 2020
A	100	140
B	80	120
C	160	180
D	220	240
E	40	40

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3. Construct index number by simple average of price relatives method for 2020 taking the price of 2006 as base from the data given below: (3)

Commodity	A	B	C	D	E
Prices in 2006	30	40	60	80	10
Prices in 2020	45	50	72	88	13
Price relative					

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4. Calculate price index number by weighted average of price relative method: (3)

Commodities	P_0	P_1	W		
A	6	8	40		
B	3	3.2	80		
C	2	3	20		

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5 From the following data construct price indices using Paasche's method for the year 2015 with 2005 as the base year: (4)

Commodities	Price 2005	Price 2015	Expenditure 2005	Expenditure 2015		
A	100	140	4000	4200		
B	80	120	1280	2400		
C	160	180	3200	7200		
D	220	240	2200	1920		
E	40	40	1400	1400		

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