4 Supply Analysis

Introduction :

The study of supply is as important as the study of demand. Supply is a fundamental economic concept that describes the total amount of a specific good or service that is available to a seller. The total amount of goods or services available for sale at any specified price is known as supply.

Concept of Total Output, Stock and Supply :

Total Output :

Output is produced in the process of production. "Total output can be defined as the sum total of the quantity of the commodity produced at a given period of time in the economy." Production leads to consumption. In the process of production inputs are converted into output or final goods.

Stock :

Stock is the total quantity of commodity available for sale with a seller at a particular point of time. It is the source of supply. It is potential supply. By increasing production, stock can be increased. Without stock, supply is not possible. Normally, stock exceeds supply and it is fixed and inelastic. In case of perishable goods such as milk, fish etc. stock may be equal to supply. On the other hand, for durable goods such as furniture, garments etc. stock can exceed the supply.

Supply :

Supply is a relative term. It is always expressed in relation to price, time and quantity.

Meaning of Supply :

The word 'supply' implies the various quantities of a commodity offered for sale by producers during a given period of time at a given price. It is related to time and price. Supply is a flow concept. It refers to the amount of a commodity that the firms produce and offer for sale in the market over a period of time, say a day, a week, a month or a year.

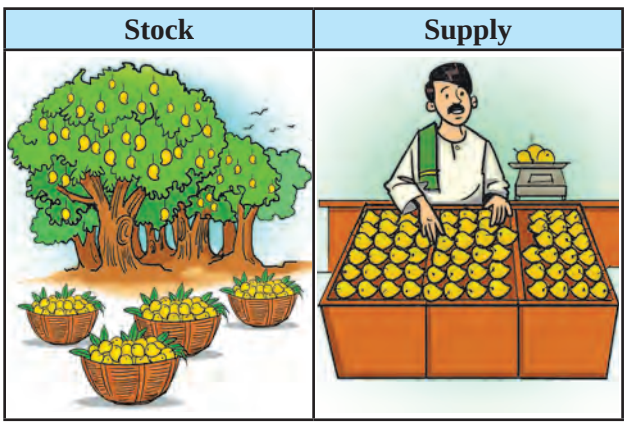


Fig. 4.1

Try this :

Distinguish between stock and supply.

Definition of Supply :

According to Paul Samuelson, "Supply refers to the relation between market prices and the amount of goods that producers are willing to supply."

Supply refers to the quantity of a commodity that a seller is willing and able to offer for sale at a given price, during a certain period of time. For example, a farmer's total output of rice is 4000 kgs. This is the total stock. If the price is ₹ 40 per kg, he offers 1000 kgs for sale. This is the actual supply.

Supply schedule :

A supply schedule is a tabular representation of the functional relationship between price and quantity supplied of a particular commodity.

1) **Individual Supply Schedule :** Individual supply schedule refers to a tabular representation showing various quantities of a commodity that a producer is willing to

sell at various prices, during a given period of time.

Table 4.1

Individual Supply Schedule

Price of a commodity *x* (in ₹ per kgs.)	Supply of a commodity *x* (in kgs.)
10	100
20	200
30	300
40	400
50	500

Table 4.1 explains the functional relationship between price and quantity supplied of a commodity. Lower the price, lower the quantity of a commodity supplied and vice versa. At the lowest price of ₹ 10, supply is also lowest at 100 kgs. At the highest price of ₹ 50, quantity supplied is highest at 500 kgs.

Individual Supply Curve : It is a graphical presentation of individual supply schedule.

Individual Supply Curve

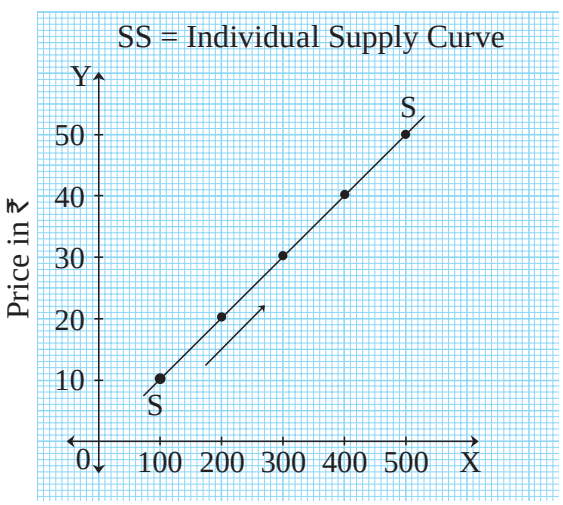


Fig. 4.2

In figure 4.2, quantity supplied is shown on the X axis and price on the Y axis. Supply curve SS slopes upwards from left to right, indicating a direct relationship between price and quantity supplied.

2) Market Supply Schedule : Market supply schedule refers to a tabular representation showing different quantities of commodity which all producers are prepared to sell at different prices at a given period of time.

Table 4.2

Market Supply Schedule

Price of commodity (in ₹)	Quantity supplied (in kgs.)			Market supply (in kgs.) (A+B+C)
	Seller A	Seller B	Seller C	
10	100	200	300	600
20	200	300	400	900
30	300	400	500	1200
40	400	500	600	1500
50	500	600	700	1800

In Table 4.2, market supply is obtained by adding the supply of sellers A, B and C at different prices. At a highest price of ₹ 50, market supply is the highest at 1800 kgs. At a lowest price of ₹ 10 market supply is lowest at 600 kgs.

Market Supply Curve : It is a graphical presentation of market supply schedule.

Market Supply Curve

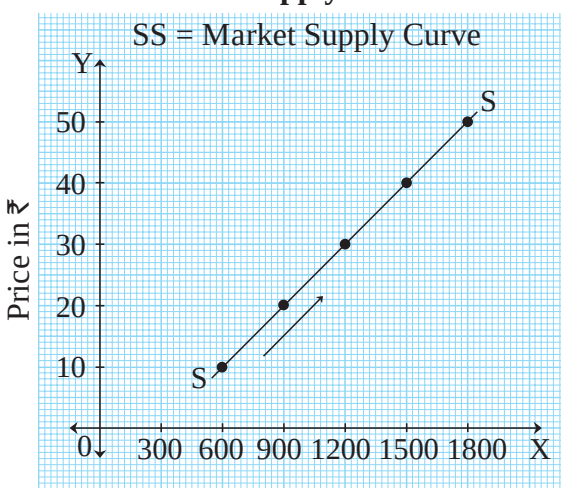


Fig. 4.3

In figure 4.3, quantity supplied is shown on the X axis and price on the Y axis. Supply curve SS slopes upwards from left to right, indicating a direct relationship between price and market supply.

Try this :

Draw a supply curve with the help of a hypothetical supply schedule.

Determinants of Supply :

1) **Price of commodity :** Price is an important factor influencing the supply of a commodity. More quantities are supplied at a higher price and less quantities are supplied at a lower price. Thus, there is a direct relationship between price and quantity supplied.
2) **State of technology :** Technological improvements reduce the cost of production which lead to an increase in production and supply.
3) **Cost of Production :** If the factor price increases, the cost of production also increases, as a result, supply decreases.
4) **Infrastructural facility :** Infrastructure in the form of transport, communication, power, etc. influences the production process as well as supply. Shortage of these facilities decreases the supply and vice versa.
5) **Government policy :** Favourable Government policies may encourage supply and unfavourable government policies may discourage the supply. Government policies like taxation, subsidies, industrial policies, etc. may encourage or discourage production and supply, depending upon government policy measures.
6) **Natural conditions :** The supply of agricultural products depends on the natural conditions. For example, a good monsoon and favourable climatic condition will produce a good harvest, so the supply of agricultural products will increase and unfavourable climatic conditions will lead to a decrease in supply.
7) **Future expectations about price :** If the prices are expected to rise in the near future, the producer may withhold the stock. This will reduce the supply and vice versa
8) **Other factors :** It includes,
   - nature of the market,
   - relative prices of other goods,
   - export and imports,
   - industrial relations,
   - availability of factors of production etc.

   If all factors are favourable, supply of a commodity will be more and vice versa.

Law of Supply

Introduction :

The law of supply is also a fundamental principle of economic theory like law of demand. It was introduced by Prof. Alfred Marshall in his book, 'Principles of Economics' which was published in 1890. The law explains the functional relationship between price and quantity supplied.

Statement of the Law :

"Other things being constant, higher the price of a commodity, more is the quantity supplied and lower the price of a commodity less is the quantity supplied"

In simple words, "other factors remaining constant, a rise in price results in a rise in the quantity supplied and vice-versa. Thus, there is a direct relationship between price and quantity supplied.

Symbolically,

$S_x = f(P_x)$

S = Supply

x = Commodity

f = Function

P = Price of commodity

Assumptions of the law :

The law of supply is based on the following assumptions :

1) **Constant cost of production :** It is assumed that there is no change in the cost of production .A change in cost of production will affect the profits of the seller. Therefore less quantity will be supplied at the same price.

2) **Constant technique of production :** It is also assumed that technique of production does not change. Improved technique of production may lead to an increase in production. This in turn may lead to an increase in the supply at the same price.

3) **No change in weather conditions :** It is assumed that there is no change in the weather conditions. Natural calamities like floods, earthquakes etc. may decrease supply.

4) **No change in Government policy :** It is also assumed that government policies like taxation policy, trade policy etc. remain unchanged.

5) **No change in transport cost :** It is assumed that there is no change in the condition of transport facilities and transport cost. For example, better transport facility increases supply at the same price.

6) **Prices of other goods remain constant :** Prices of other goods are assumed to remain constant. If they change, the law of supply may not hold true because producer may transfer resources to other products.

7) **No future expectations :** The law also assumes that the sellers do not expect future changes in the price of the product.

Law of supply is explained with the help of the following schedule and diagram :

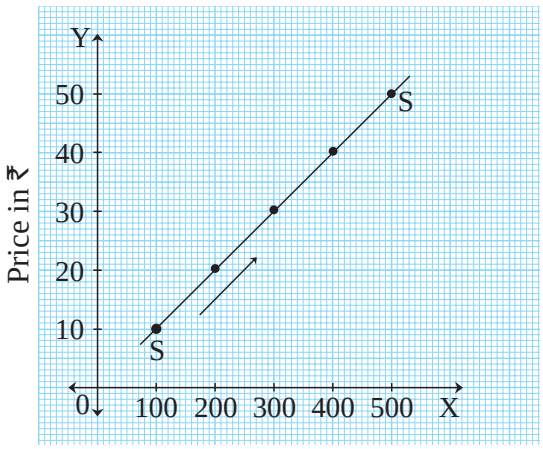
Table 4.3

Supply Schedule

Price of commodity *x* (in ₹)	Supply of commodity *x* (in kgs.)
10	100
20	200
30	300
40	400
50	500

Table 4.3 explains the direct relationship between price and quantity of commodity supplied. When price rises from ₹ 10 to 20, 30, 40 and 50, the supply also rises from 100 to 200, 300, 400 and 500 units respectively. It means, when price rises supply also rises and when price falls supply also falls. Thus, there is direct relationship between price and quantity supplied which is shown in following figure 4.4 :

Supply Curve



Quantity Supplied in kgs

Fig. 4.4

In the figure 4.4, X axis represents quantity supplied and Y axis represents the price of the commodity. Supply curve 'SS' slopes upwards from left to right which has a positive slope. It indicates a direct relationship between price and quantity supplied.

Exceptions to the Law of Supply :

Following are the exceptions to the law of supply:

1) **Supply of labour :** Labour supply is the total number of hours that workers to work at a given wage rate. It is represented graphically by a supply curve. In case of labour, as the wage rate rises the supply of labour (hours of work) would increase. So supply curve slopes upward. Supply of labour (hours of work) falls with a further rise in wage rate and supply curve of labour bends backward. This is because the worker would prefer leisure to work after receiving higher amount of wages. Thus, after a certain point when wage rate rises the supply of labour tends to fall.

It can be explained with the help of a backward bending supply curve. Table no. 4.4 and fig. no 4.5 explains the backward bending supply curve of labour.

Table. 4.4

Labour Supply Schedule

Wage rate (₹) per hour	Hours of work per day	Total amount of wages (₹)
100	5	500
200	7	1400
300	6	1800

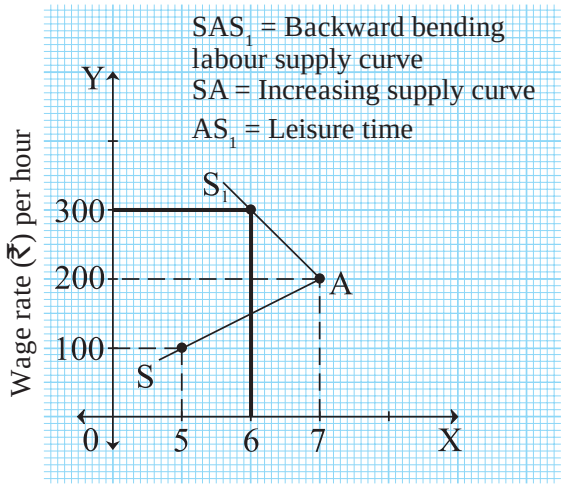


Fig. 4.5

In fig. 4.5, supply of labour (hours of work) is shown on X axis and wage rate per hour is shown on the Y axis. The curve SAS represents backward bending supply curve of labour. Initially, when the wage rate is ₹ 100 per hour, the hours of work is 5. The total amount of wages received is ₹ 500. When wage rate rises from ₹ 100 to ₹ 200, hours of work will also rise from 5 hours to 7 hours and total amount of wages would also rise from ₹ 500 to ₹ 1400. At this point, labourer enjoys the highest amount i.e. ₹ 1400, and works for 7 hours. If wage rate rises further from ₹ 200 to ₹ 300, total amount of wages may rise, but the labourer will prefer leisure time and denies to work for extra hours. Thus, he is ready to work only for 6 hours. At the point A, the supply curve bends backward, which becomes an exception to the law of supply.

2) **Agricultural goods :** The law of supply does not apply to agricultural goods as they are produced in a specific season and their production depends on weather conditions. Due to unfavourable changes in weather, if the agricultural production is low, their supply cannot be increased even at a higher price.

3) **Urgent need for cash :** If the seller is in urgent need for hard cash, he may sell his product at which may even be below the market price.

4) **Perishable goods :** In case of perishable goods, the supplier would offer to sell more quantities at lower prices to avoid losses. For example, vegetables, eggs etc.

5) **Rare goods :** The supply of rare goods cannot be increased or decreased according to its demand. Even if the price rises, supply remains unchanged. For example, rare paintings, old coins, antique goods etc.

Variations in Supply :

When quantity supplied of a commodity varies due to change in its price, other factors remaining constant, it is known as variations in supply. There are two types of variations in supply :

1) **Expansion of supply :** Expansion of supply refers to a rise in the quantity supplied due to a rise in the price of a commodity, other factors remaining constant. Expansion in supply leads to an upward movement on the same supply curve due to a rise in price. It is shown in figure 4.6

Expansion of supply

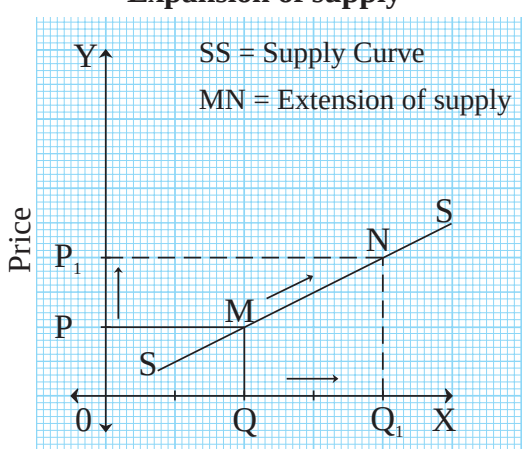


Fig. 4.6

In figure 4.6, quantity supplied is shown on the X axis and price on the Y axis. Quantity supplied rises from OQ to OQ_1, with a rise in price from OP to OP_1, resulting in an upward movement from M to N along the same supply curve SS. It is known as Expansion of supply.

2) Contraction of supply : Contraction of supply refers to a fall in the quantity supplied, due to fall in the price of a commodity, other factors remaining constant. In case of contraction of supply, there is a downward movement on the same supply curve. It is shown in figure 4.7

Contraction of supply

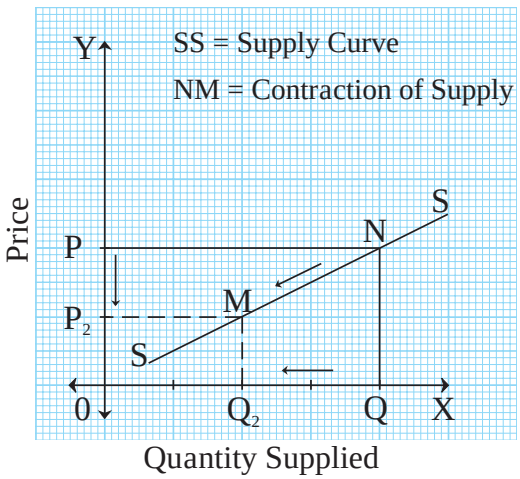


Fig. 4.7

In figure 4.7, quantity supplied is shown on the X axis and price on the Y axis. Quantity supplied falls from OQ to OQ_2 with a fall in price from OP to OP_2, resulting in a downward movement from N to M on the same supply curve SS. It is known as Contraction of supply.

Changes in Supply :

When other factors change and price remains constant, it is known as changes in supply. There are two types of changes in supply :

1) Increase in supply : Increase in supply refers to rise in the supply of a given commodity due to favourable changes in other factors such as fall in the price of inputs, fall in tax rates, technological upgradation etc., while price remains constant. The supply curve shifts to the right of the original supply curve. It is shown in figure 4.8

Increase in supply

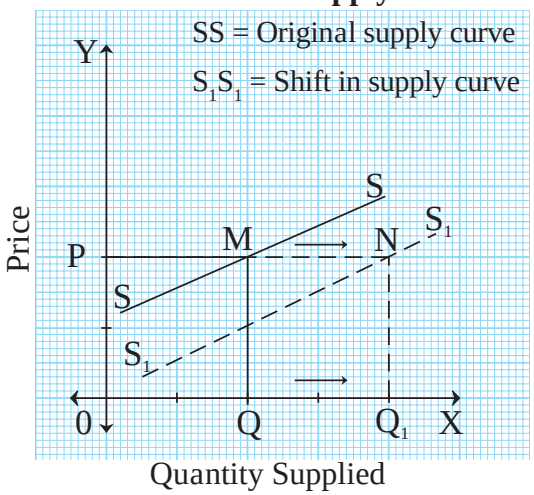


Fig. 4.8

In figure 4.8, quantity supplied is shown on the X axis and price on the Y axis. Supply rises from OQ to OQ_1 at the same price OP, resulting in an outward shift of the original supply curve to the right from SS to S_1S_1. It is known as Increase in supply.

2) Decrease in supply : Decrease in supply refers to a fall in the supply of a given commodity due to unfavourable changes in other factors such as increase in the prices of inputs, increase in tax rate, outdated technology, strikes by worker, while price remains constant. The supply curve shifts to the left of the original supply curve. It is shown in figure 4.9

Decrease in supply

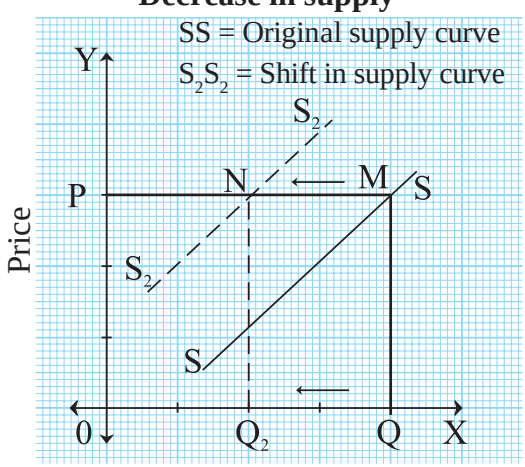


Fig. 4.9

In figure 4.9, quantity supplied is shown on the X axis and price on the Y axis. Supply falls from OQ to OQ_2 at the same price OP, resulting in an inward shift of the original supply curve to the left from SS to S_2S_2. It is known as Decrease in supply.

You should know :

1) Supply : Supply is a micro-economic concept. Supply refers to quantity of a commodity that a seller is willing and able to offer for sale at a particular price, during a certain period of time.

2) Aggregate supply : It is a macro-economic concept. It refers to the minimum amount of sales proceeds which entrepreneurs expect to receive from the sale of output at a given level of employment.

Concepts of Cost and Revenue :

A) Cost Concepts :

When an entrepreneur undertakes an act of production, he has to use various inputs like raw material, labour, capital etc. He has to make payments for such inputs. The expenditure incurred on these inputs is known as the cost of production. Cost of production increases with an increase in need of output. There are three types of costs which are as follows :

1) **Total Cost (TC) :** Total cost is the total expenditure incurred by a firm on the factors of production required for the production of goods and services. Total cost is the sum of total fixed cost and total variable cost at various levels of output.

TC = TFC + TVC

TC = Total cost

TFC = Total Fixed Cost

TVC = Total Variable Cost

Total Fixed Cost (TFC) : Total fixed costs are those expenses of production which are incurred on fixed factors such as land, machinery etc.

Total Variable Cost (TVC) : Total variable costs are those expenses of production which are incurred on variable factors such as labour, raw material, power, fuel etc.

2) **Average Cost (AC) :** Average cost refers to cost of production per unit. It is calculated by dividing total cost by total quantity of production.

$$AC = \frac{TC}{TQ}$$

AC = Average cost

TC = Total cost

TQ = Total quantity

For example, If the total cost of production of 40 units of commodity is ₹ 800 then the average cost is :

$$AC = \frac{TC}{TQ}$$

$$= \frac{800}{40}$$

= ₹ 20 per unit

3) **Marginal cost (MC) :** Marginal cost is the net addition made to total cost by producing one more unit of output.

$MCn = TC_n - TC_{n-1}$

n = Number of units produced

MC_n = Marginal cost of the n^{th} unit

TC_n = Total cost of n^{th} unit

TC_{n-1} = Total cost of previous units

If previous total cost of producing 4 units is ₹ 200 and total cost of producing 5 units is ₹ 250, then :

$MC_n = TC_n - TC_{n-1}$

= ₹ 250 – ₹ 200

= ₹ 50

Find out :

If a firm produces 600 units of a commodity in a day and incurs a total cost of ₹ 30,000. Calculate the Average Cost.

B) Revenue Concepts :

The term 'revenue' refers to the receipts obtained by a firm from the sale of certain quantities of a commodity at given price in the market. The concept of revenue relates to total revenue, average revenue and marginal revenue.

1) Total Revenue (TR) : Total revenue is the total sales proceeds of a firm by selling a commodity at a given price. It is the total income of a firm. Total revenue is calculated as follows :

Total revenue = Price × Quantity

For example, if a firm sells 15 units of a commodity at ₹ 200 per unit TR is calculated as :

$TR = P \times Q$

$= ₹ 200 \times 15$

$= ₹ 3000$

2) Average Revenue (AR) : Average revenue is the revenue per unit of output sold. It is obtained by dividing the total revenue by the number of units sold.

$$AR = \frac{TR}{TQ}$$

AR = Average Revenue
TR= Total Revenue
TQ =Total Quantity

For example, if the total revenue of 15 units, is ₹ 3000, then average revenue is calculated as :

$$AR = \frac{TR}{TQ}$$

$$= \frac{3000}{15}$$

$= ₹ 200$

3) Marginal Revenue : Marginal revenue is the net addition made to total revenue by selling an extra unit of the commodity.

$MR_n = TR_n - TR_{n-1}$

MR_n = Marginal revenue of n^{th} unit

TR_n = Total revenue of n^{th} unit

TR_{n-1} = Total Revenue of previous units

n = Number of units sold

For example, if the previous total revenue from the sale of 20 tables is ₹ 4000 and that from the sale of 21 tables is ₹ 4200, marginal revenue is calculated as :

$MR_n = TR_n - TR_{n-1}$

$= 4200 - 4000$

$= ₹ 200$ per table

Find out :

If a firm sells 400 units of a commodity at ₹ 10 unit. Calculate the TR and AR.

EXERCISE

Q. 1. Complete the following statements :

1) When supply curve is upward sloping, it's slope is .....
   a) positive
   b) negative
   c) first positive then negative
   d) zero

2) An upward movement along the same supply curve shows .....
   a) contraction of supply
   b) decrease in supply
   c) expansion of supply
   d) increase in supply

3) A rightward shift in supply curve shows .....
   a) contraction of supply
   b) decrease in supply
   c) expansion of supply
   d) increase in supply

4) Other factors remaining constant, when less

quantity is supplied only due to a fall in price, it shows .....

a) contraction of supply
b) decrease in supply
c) expansion of supply
d) increase in supply

5) Net addition made to the total revenue by selling an extra unit of a commodity is .....

a) total Revenue
b) marginal Revenue
c) average Revenue
d) marginal Cost

Q. 2. Complete the Correlation :

1) Expansion of supply : Price rises :: Contraction of supply : [ ]
2) Total revenue : [ ] :: Average revenue : TR/TQ
3) Total cost : TFC + TVC :: Average cost : [ ]
4) Demand curve : [ ] :: Supply curve : Upward
5) [ ] : Change in supply :: Other factors constant : Variation of supply

Q. 3. Give economic terms :

1) Cost incurred on fixed factor.
2) Cost incurred per unit of output.
3) Net addition made to total cost of production.
4) Revenue per unit of output sold.

Q. 4. Distinguish between :

1) Stock and Supply.
2) Expansion of Supply and Increase in Supply.
3) Contraction of Supply and Decrease in Supply.
4) Average Revenue and Average Cost.

Q. 5. Observe the following table and answer the questions :

A) Supply schedule of chocolates

Price in ₹	Quantity supplied in units
10	200
15	[ ]
20	300
25	350
30	[ ]
35	[ ]
40	[ ]

1) Complete the above supply schedule.
2) Draw a diagram for the above supply schedule.
3) State the relationship between price and quantity supplied.

B) Observe the market supply schedule of potatoes and answer the following questions.

Price in ₹	Firms			Market supply (kg)
	"A"	"B"	"C"	
1	[ ]	20	45	100
2	37	30	45	[ ]
3	40	[ ]	55	135
4	44	50	[ ]	154

1) Complete the quantity of potato supplied by the firms to the market in the above table.
2) Draw the market supply curve from the schedule and explain it.

Q. 6. Answer the following questions :

1) Explain the concept of total cost and total revenue.
2) Explain determinants of supply.

Q. 7. Answer in detail :

1) State and explain law of supply with exceptions.

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