UNIT-II
(Demand and Supply)
MODULE-7: ELASTICITY OF SUPPLY AND DETERMINATION OF EQUILIBRIUM PRICE.

CONTENTS

7.0: OBJECTIVES:

The objective of this module is to explain the meaning of elasticity of supply and its measurement. After studying this module you should be able to understand the:

Definition of elasticity of supply
Different degrees of elasticity of supply
Measurement of elasticity of supply
Determination of equilibrium price

7.01: Elasticity of supply:

In general elasticity refers to degree of responsiveness in dependent variable as a result of given proportionate change in the dependent variable. We can define elasticity of supply as the ratio

between proportionate change in supply of a commodity to a given proportionate change in price of that commodity.

NOTE-1

Elasticity of supply =

$$\frac{\textit{Proportionate change in supply of a commodity}}{\textit{Proportionate change in price of a commodity}}$$

This we can write as

Elasticity of supply =

$$\frac{\textit{change in supply } (\Delta S)/\textit{Originalsupply } (S)}{\textit{change in price} (\Delta P)/\textit{OriginalPrice} (P)}$$

$$= \frac{\Delta S}{\Delta P} \text{ X } \frac{P}{S}$$

Here $\frac{\Delta S}{\Delta P}$ is equal to the slope of supply curve or rate of change in supply. $\frac{P}{S}$ is the ratio between price and supply.

7.02: Degrees of Elasticity of Supply:

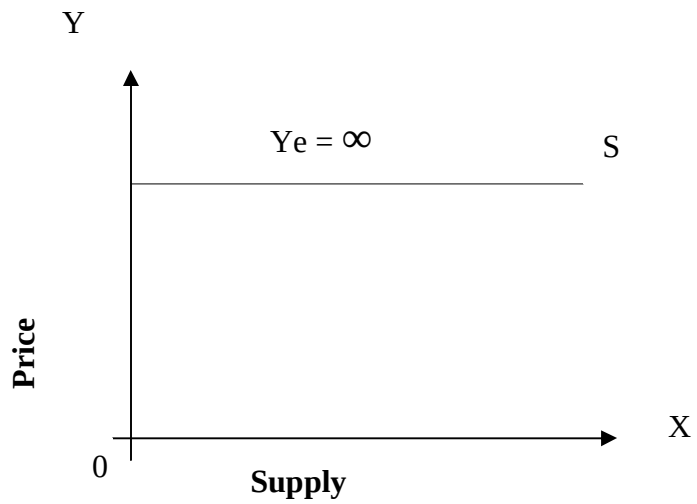
Based on the value of elasticity of supply, it is divided into different degrees. They are:

1. Perfectly Elastic supply

If the proportionate change in the supply of a commodity is infinite or so large with reference to an insignificant or zero percentage change in price, it is known as perfectly elastic supply.

In this case, the value of elasticity will be equal to infinity and the supply curve will be parallel to horizontal axis as shown below.

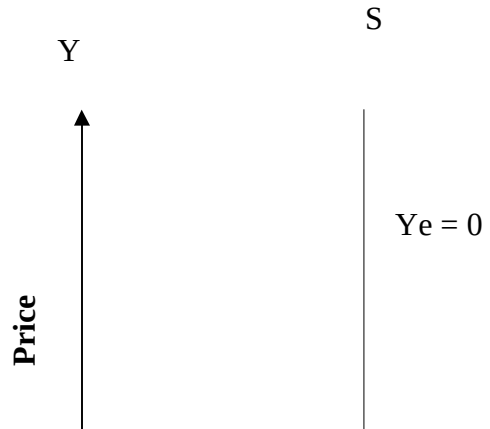
GRAPH-1



Perfectly Inelastic Supply:

If the supply is totally non-responsive to a given percentage change in price, it is known as perfectly inelastic supply. In such a case the value of elasticity will be equal to zero and the supply curve is parallel to vertical axis as shown below.

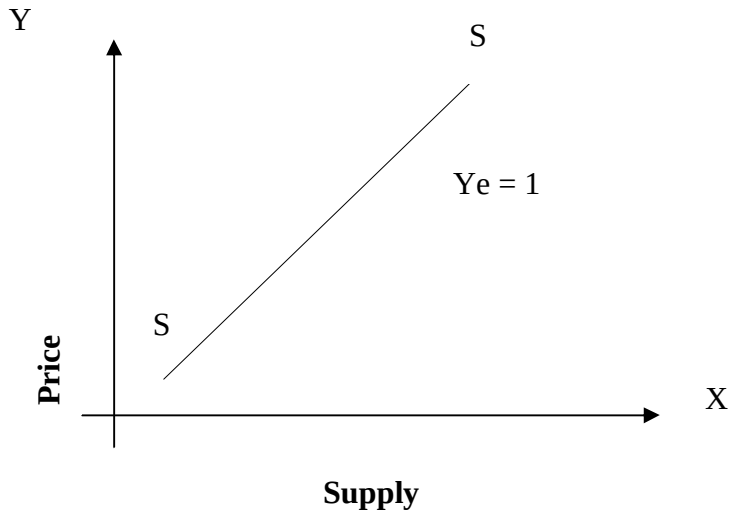
GRAPH-2



Unitary Elastic Supply:

If the proportionate change in the supply of a commodity is equal to proportionate change in price, it is known as unitary elastic supply. In this case, the value of elasticity will be equal to one and the supply curve is a straight line passing through the origin as shown below.

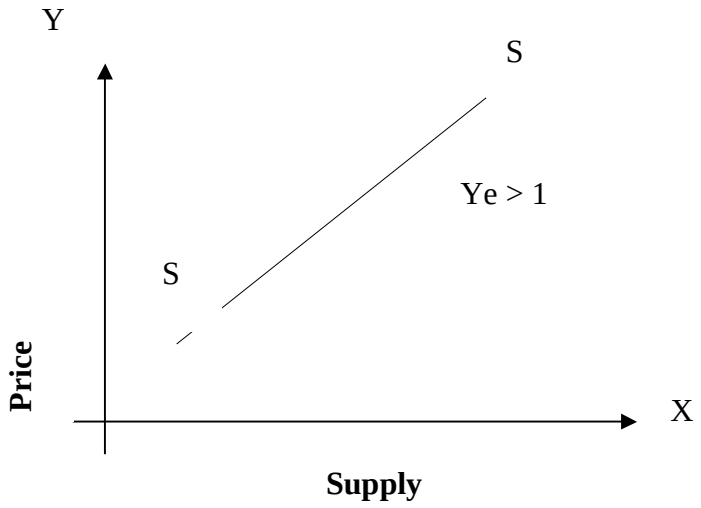
GRAPH-3



Relatively Elastic Supply:

If the proportionate change in the supply of a commodity is more than the given proportionate change in price, it is known as relatively elastic supply. In this case, the value of elasticity will be equal greater than one (1) and the supply curve is as shown below.

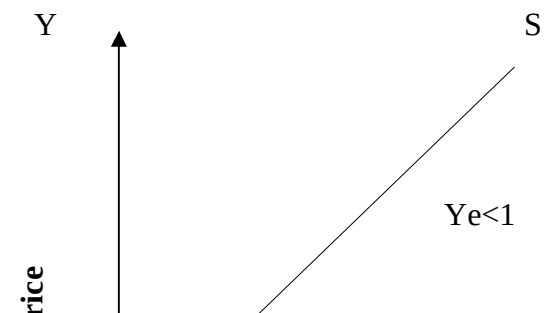
GRAPH-4



Relatively Inelastic Supply:

If the proportionate change in the supply of a commodity is less than the proportionate change in price, it is known as relatively inelastic supply. In this case, the value of elasticity will be less than one and the supply curve is as shown below.

GRAPH-5



ACTIVITY-1

1. Define elasticity of supply.
2. Define unitary elastic supply.

7.03: Measurement of Elasticity of Supply:

Two methods are generally used to measure supply elasticity. They are;

1. Mathematical Method
2. Graphic Method.

Mathematical Method:

By using this method it is possible to find out the exact value supply elasticity. We can understand this method with the help of following example.

At price Rs.5, suppliers offered 100 units for sale and at price Rs 10 they offered 300 units. Supply elasticity is

NOTE-2

S = 100 units
ΔS = 300 – 100
= 200 units
P = Rs 5
ΔP = 10 – 5
= Rs 5

$$\text{Elasticity of supply} = \frac{\textit{Proportionate change in supply}}{\textit{Proportionate change in price}}$$

$$= \frac{\Delta S}{\Delta P} \mathbf{X} \frac{P}{S}$$

By substituting the values in the above principle we can get the value of supply elasticity.

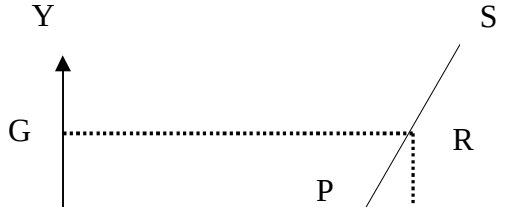
$$\text{Elasticity of supply} = \frac{200}{5} \text{ X } \frac{5}{100} = 2$$

Value of elasticity 2 means 1% change in price causes 2% change in supply. This is a case of relatively elastic supply.

Graphic Method:

By using this method, we can say whether the elasticity is high or low. Measurement of elasticity, using graphic method is explained below.

GRAPH- 6



In the above diagram AS is the supply curve. The measurement of elasticity of supply at point P is shown below.

NOTE- 3

Elasticity of supply at point P = $\frac{\Delta S}{\Delta P}$ X $\frac{P}{S}$

$$=\frac{QS}{GH} \text{ X } \frac{OH}{OQ}$$

Since QS = PT and GH = RT we can write this as

$$= \frac{PT}{RT} \text{ X } \frac{OH}{OQ}$$

AQP and PTR are similar triangles, have the ratio or proportion of sides are equal that is to say

$$\frac{PT}{RT} = \frac{AQ}{PQ} = \frac{AQ}{OH}$$

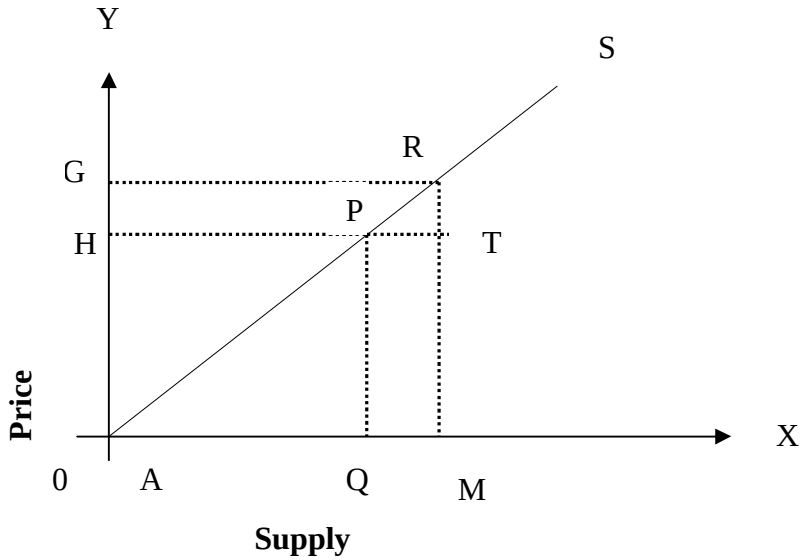
Therefore elasticity of supply = $\frac{AQ}{OH}$ X $\frac{OH}{OQ}$

$= \frac{AQ}{OQ}$

The value of $\frac{AQ}{OQ}$ indicates the elasticity of supply at point 'P' on AS. In the above diagram

AQ < OQ. Therefore $\frac{AQ}{OQ}$ < 1. This is a case of relatively inelastic supply at price OH.

GRAPH- 7

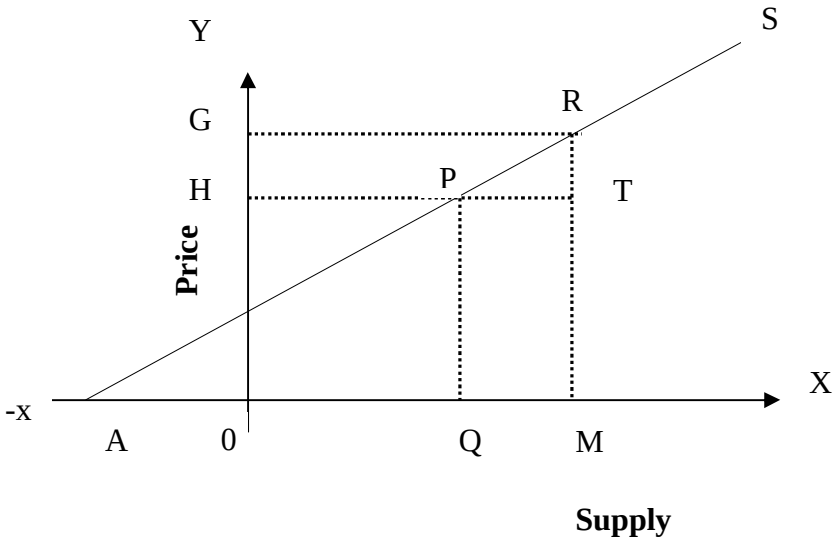


In the above graph, the elasticity of supply at point 'P' = $\frac{AQ}{OQ}$. According to the Diagram AQ is equal to OQ. Therefore $\frac{AQ}{AQ}$ i.e the value of elasticity

OQ

is equal to one(1). This is a case of unitary elastic supply.

GRAPH-8



In the above graph, the elasticity of supply at point 'P' = AQ/OQ . According to the

AQ

Diagram AQ is greater than the OQ. Therefore ------ i.e the value of elasticity

OQ

Is greater than one (1). This is a case of relatively elastic supply.

ACTIVITY-2

1. Show the relatively elastic supply with graphic method.

7.04: Estimation of Elasticity of Supply:

Using the linear supply function Qs = a + bPx, we can find out elasticity of supply at any given price. For example the estimated supply function is

Qs=5 +.5 Px. At price Rs 10 find out supply elasticity.

NOTE-4

7.05: Determination of equilibrium price:

Equilibrium price is determined at a point where demand is equal to supply. This we can understand with the following example.

The given estimated demand function is Qd = 10 - .5 Px, Where as the given supply function is Qs= 5 + .5Px. When Qd = Qs then we can identify the equilibrium price. Now we shall equate Qd with Qs to identify price.

10- .5Px = 5+ .5Px

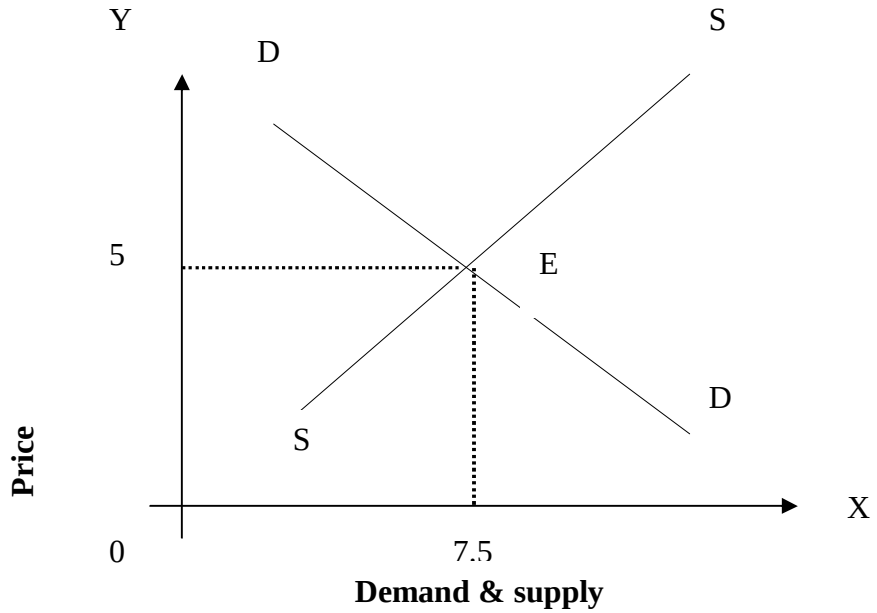
10 – 5 =. 5Px + .5 Px

5 = Px

So the equilibrium price is Rs 5. Equilibrium price implies the price that equates demand with supply. Given the demand and

supply functions at price Rs 5, the demand = 7.5 units and the supply = 7.5 units.

GRAPH- 9



ACTIVITY -3

1. Given the Qd = 20 - .5Px and Qs = 10 + .5Px, find out equilibrium price. Estimate equilibrium demand and supply.

7.06: Summary:

Elasticity of supply refers to degree of responsiveness in supply as a result of given proportionate change in price. It is the ratio between proportionate changes in supply to proportionate change in price. Mathematical and graphical methods can be used to estimate elasticity of supply. The equality between demand for and supply of a commodity determines the equilibrium price.

7.07: References:

1. R.L Varshney and Maheswari : *Managerial economics.*
2. Mote,V.L; Samuel Paul and G.S.Gupta : *Managerial Economics, concepts and cases.*
3. Koutsoyiannis : *Modern Micro Economics*
4. Stonier and Hague: *A Text Book of Economic Theory.*
5. H.L.Ahuja :*Advance Economic Theory*

7.08: Self Assessment Test:

1. Define and discuss elasticity of supply.
2. How do you measure supply elasticity using graphic method?