

## Economics Assignment

A.1 Economics is a science which studies human behaviour as a relationship between ends and scarce means which have alternative uses.

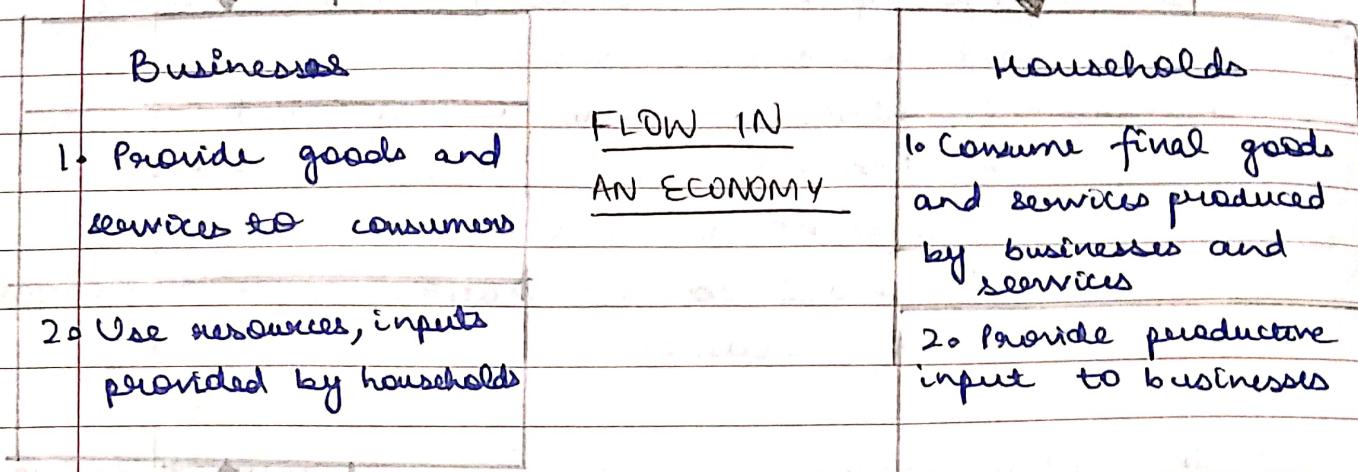
- Features →
- ① Wants of human are unlimited
  - ② Alternative use of scarce resources
  - ③ Efficient use of resources
  - ④ Needed for optimisation i.e. best allocation of resources

In modern economy, money acts a medium of exchange flow in an economy

- Households and businesses are two major entities in a simple economy. Business organisations use various economic resources like land, labour and capital which are provided by household to produce consumer goods and services which will be used by them
- Business organizations make payment of money to the households for receiving various resources. The households in turn make payment of money to business organizations for receiving consumer goods & services.
- This cycle shows interdependence b/w two major entities in a simpler economy
- The diagram is given in next page.

Money payments for consumer goods and services

### Consumer goods, services



Money payments for resources, rents, wages, salaries, interest & profit

Economic Resources: Land, Labour, Capital

$$A-2 \text{ a) } q = 90 - 3p$$

$$q = 0 = 90 - 3p$$

$$3p = 90$$

$$\Rightarrow p = 30$$

so at a price = 30 no one will be willing to buy any commodity

b) If commodity is given free  $\Rightarrow p = 0$

$$q = 90 - 3(0)$$

$$\boxed{q = 90}$$

Hence quantity demanded will be 90

Ans Higher the price of the commodity , the lower the demand of the commodity .

The inverse relationship between the quantity of commodity and its price given all other factors influence the demand which is called "law of demand"

Demand curve slopes downwards due to -

① Substitution Effect: This results from a change in relative price of a commodity .

Eg- Suppose a Pepsi and Coke can are both priced at £20 each . Now price of Coke increases to £25 but price of Pepsi remains same . This implies Pepsi will become relatively cheaper to Coke although absolute price of Pepsi has not changed . The change in relative price of commodity causes substitution effect .

② Income Effect: This is effect of a change in total purchasing power of the money income of the consumer

Eg- As the price of mango falls the purchasing power of the consumer rises . Thus he can buy more mangoes with the same income . This is called

"Income Effect" - A commodity with positive income effect is called a 'normal good' . It shows a positive or direct relation b/w income & quantity demanded.

Ans Demand function  $D_x = f(P_x; P_y, P_z, M, T)$  where  $T$  is taste of the consumer . Hence a change in taste leads to a movement along demand curve . If a consumer has developed a taste for particular

commodity, he/she will demand more of that commodity. Similarly if a consumer has changed his taste against a particular commodity less of it will be demanded at a particular price. This may also depend on seasons.

A.5 This is due to law of supply.

A producer aims to maximise profits, the diff b/w total revenue and total cost. Total revenue is price of product multiplied by its quantity sold. Total cost is the cost of production

$$\text{Profit} = \text{TR} - \text{TC}$$

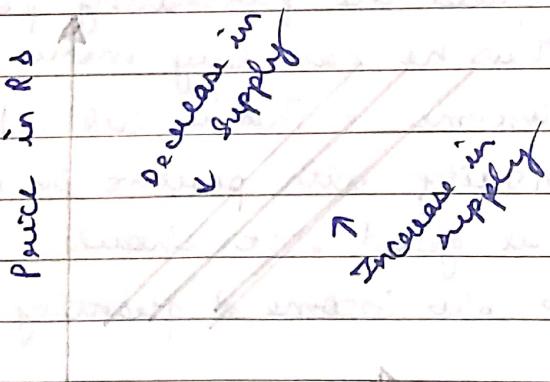
TR = Total Revenue ( $q \cdot p$ )

TC = Total Cost ( $q \cdot AC$ )

where AC is average cost

A higher price would mean more profits. The producer will supply more at a higher price. Similarly a producer will supply smaller quantity at a lower price. There is a direct relationship b/w price & quantity supplied of a commodity and is called law of supply

A.6



There is ~~in short~~ a rise in supply implies a rightward shift of the supply curve showing that producers are willing to supply more at each price.

Quantity in thousands

so quantity of good or service supplied increases as price increases. This is because higher prices encourage producers to make more of good or service to earn higher profits.

## A.7 The factors affecting demand & supply are -

Demand -

- ① Prices of commodity in question
- ② Prices of other related commodities
- ③ Income of the consumers
- ④ Taste of the consumers
- ⑤ Size of population - Greater the size of population more commodity will be demanded
- ⑥ Income Distribution - Larger share of national income goes to the rich, demand for luxury goods may rise & rise in income share of the poor will increase demand for the wage goods.

Supply -

- ① Price of commodity supplied - A person/firm will make quick check whether the costs will be covered by the price. As price goes up, the firm/person will be willing to sell larger quantity.

- ② Prices of factors of production or cost of production - Rise in prices of factors of production discourages the production & supply of the commodity.
- ③ Prices of other goods : As prices of commodities increase they become more attractive to produce for profit maximising firm. Hence supply of commodity whose price is unchanged will decline
- ④ The state of technology : Improved technology leads to lower costs of production thereby increasing output
- ⑤ Goals of the producer : The objective with which the producer undertakes production also influences his production & supply decisions.

### A-8 Economic Efficiency

- ① It is the ratio of output to input of a business system.

$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}} \times 100$$

$$= \frac{\text{Worth}}{\text{Cost}} \times 100$$

### Technical efficiency

- ① It is the ratio of output to input of a physical system. The physical system may be a diesel engine, furnace etc.

$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}} \times 100$$

$$= \frac{\text{Heat equivalent of mech energy produced}}{\text{Heat equivalent of fuel used}} \times 100$$

- ② Technical efficiency can never be more than 100% due to frictional loss & incomplete combustion of fuel.

- ② Economic efficiency should be more than 100% for survival & growth of business. It is also called as productivity.

$$\text{A-9 Total Cost} = \text{Total variable cost} + \text{Fixed cost}$$

$$= Q * v + FC$$

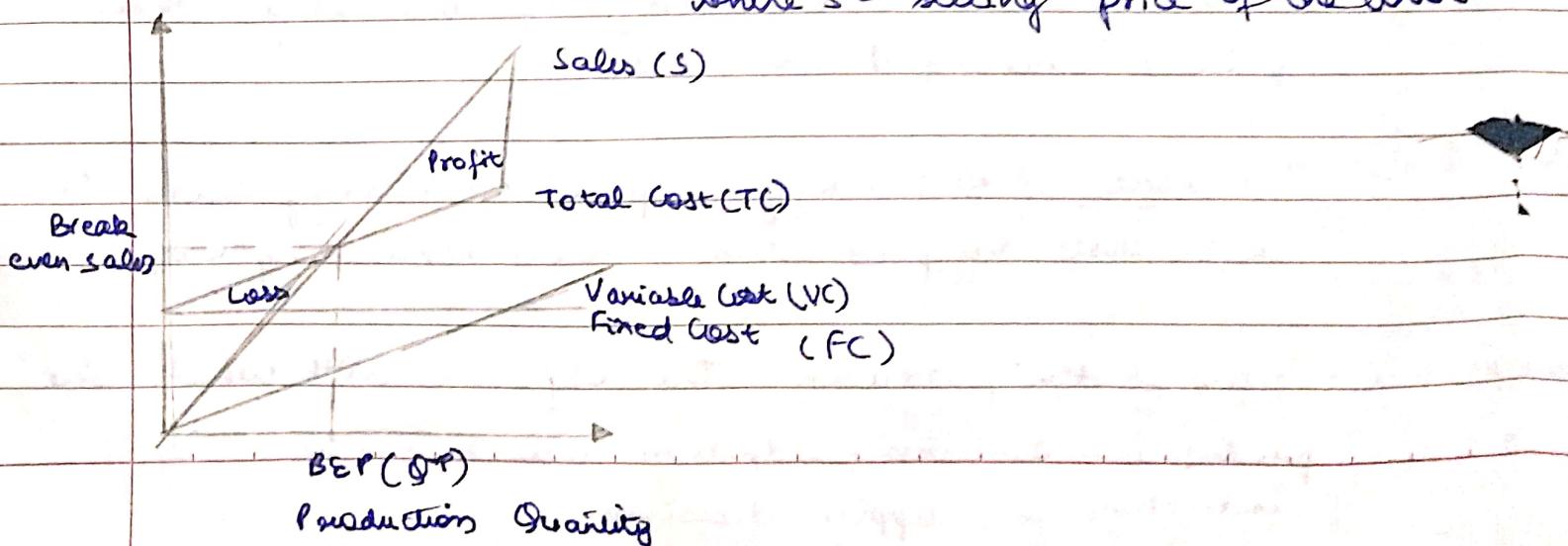
where  $v$  = variable cost per unit

$FC$  = fixed cost per period

$Q$  = volume of production

$$\text{Total sales revenue of the firm} = S = P * Q$$

where  $S$  = selling price of the unit



- The linear plots of sales & total cost is shown in the figure. The intersection point of the total sales revenue line and total cost line is called as break even point.
- The corresponding volume of the production on X-axis is known as break even sales quantity.
- At the intersection point the total cost is equal to the total revenue. This point is also called no-loss or no-gainsitter.
- For any production quantity which is less than break-even quantity, the total cost is more than total revenue. Hence firm will be making loss.
- For any production quantity which is more than total the break even quantity, the total revenue will be more than total cost. Hence firm will be making profit.

$$\text{Profit} = \text{Sales} - (\text{Fixed cost} + \text{Variable costs}) \\ = s^*Q - (FC + v^*Q)$$

A.10 Given  $FC = ₹ 40,00,000$

$$v = ₹ 300$$

$$s = ₹ 500$$

$$(a) \text{break even quantity} = \frac{FC}{s-v} = \frac{4000000}{500-300} = 20000 \text{ units}$$

$$(b) \text{break even sales} = \frac{FC}{s-v} \times s = 20000 \times 500 = ₹ 10,00,000$$

$$(c) \text{(i) Contribution} = \text{Sales} - \text{variable cost}$$

$$= 500 (120000) - 300 (120000) \\ = ₹ 24,00,000$$

### Method I

$$\begin{aligned}
 (ii) MS &= \text{Sales} - \text{break even price sales} \\
 &= 120000 * 500 - 100,00,000 \\
 &= 60,00,00,000 - 100,00,000 \\
 &= ₹ 5,00,00,000
 \end{aligned}$$

### Method II

$$MS = \frac{\text{Profit}}{\text{Contribution}} \times \text{Sales}$$

$$\begin{aligned}
 \text{Profit} &= \text{Sales} - (FC + v * Q) \\
 &= 120000x - (4000000 + 300 * 120000) \\
 &= 60000000 - (40000000) \\
 &= ₹ 20000000
 \end{aligned}$$

$$\begin{aligned}
 MS &= \frac{20000000}{24000000} \times 60000000 \\
 &= ₹ 50000000
 \end{aligned}$$

$$MS \text{ as a \% of sales} = \frac{50000000}{60000000} \times 100 = 83.33\%$$

A.11 The time value of money (TVM) is a fundamental financial principle that states that available at present time is worth more than same amount of money in the future. This helps us to make ~~opt~~ apt financial decisions such as investments, loans & savings. TVM is based on several factors, including:

- (1) Earning potential : Money in the present can be invested to earn a return, such as interest or dividends. This means value of money grows over time making it more valuable in the present.
- (2) Inflation - Purchasing power of money dec over time due to inflation.
- (3) Uncertainty - There is uncertainty associated with receiving money in the future.

The formula to find future worth is -

$$F = P (1+i)^n$$

P = principal amount invested at time 0

F = future amount

i = interest rate compounded annually

n = period of deposit

### A.1) Types of Interest and their Applications -

① simple

Interest - It is calculated based on initial deposit for every interest period.

$$I = PRT$$

Eg - If you borrow £1000 at an interest rate of 5%. for one year you would pay £50 in interest

②

Single Payment Compound Amount - To find single future sum (F) of initial payment (P) at time 0 after n periods at an interest rate i compounded every period.

$$F = P (1+i)^n$$

(Time value of money)

Application - A person has received a prize. But the prize can be given in either of two modes?

(i) Spot payment of £ 24.72 or

(ii) £100 after 10 years from now (based on 15%. interest rate compounded annually)

If the person has no better choice that can yield more than 15%. interest compounded annually & if 15%. compounded annually is common interest rate paid in all finance companies then it makes no diff whether he receives £ 24.72 now or after 10 years £ 100.

### (3) Single Payment Present Worth Amount

$$P = \frac{F}{(1+i)^n}$$

App - A person wishes to have future sum of ₹ 100000 for his son's education after 10 years from now.

The single payment that he should deposit now should be ₹ 24720. The interest rate is 15% pa.

### (4) Equal payment Series Compound Amount

$$F = \frac{A(1+i)^n - 1}{i} = A(F/A, i, n)$$

App - A person who is now 35 years plans to invest equal sum of ₹ 10000 at the end of every year from next the end of next year. The bank gives 20% interest compounded annually. The maturity of his account when he is 60 years old is ₹ 47,19810

### (5) Equal payment series Sinking Fund

$$A = F \frac{i}{(1+i)^n - 1}$$

App - A company has to replace a present facility after 15 years at an outlay of ₹ 500000. It plans to deposit an equal amount at end of every year for next 15 years at interest of 18% compounded annually. The equivalent amount that must be deposited at end of each year is ₹ 8200

### (6) Equal payment series Present Worth Amount

$$P = \frac{A(1+i)^n - 1}{i(1+i)^n}$$

App - A company wants to set up a reserve which will help the company to have annual eq. amount of ₹ 100000 for next 20 years towards its employees with 15% p.a. Single payment that must be made now as reserve amount is ₹ 62,59,300

(7) Equal - Payment series Capital Recovery Amount

$$A = P \frac{i(1+i)^n}{(1+i)^n - 1}$$

App - A bank gives loan to a company to purchase an equipment worth ₹ 100000 at 18% compounded annually. This amount should be repaid in 15 yearly equal instalments. The instalment amount that company has to pay to the bank is ₹ 196,400.

$$A \cdot 13 \quad P = ₹ 100000$$

$$i = \frac{15}{100} = 0.15$$

$$n = 6$$

$$f \text{ or } F = P(1+i)^n$$

$$= 100000 (1.15)^6 \quad \text{Hence future amount}$$

$$F = ₹ 231306.07 \quad \text{of deposited money} = ₹ 231306$$

$$A \cdot 14 \quad P = \underline{\underline{F}}$$

$$(1+i)^n$$

$$= \frac{200000}{(1.18)^{15}}$$

$$P = ₹ 16704.25$$

Hence the amount of money he should deposit now is ₹ 16704.25

A<sub>015</sub>  $F = \frac{A}{i} (1+i)^n - 1$

$$= \frac{10000}{0.15} (1+0.15)^{30} - 1$$

$$= ₹ 43474$$

Hence the maturity value of his account when he is 60 years old is ₹ 43474

A<sub>016</sub>  $F = \frac{A}{i} (1+i)^n - 1$

$$= \frac{5000000}{0.18} (1+0.18)^5 - 1$$

$$= ₹ 3,57,50,000$$

The expected money required for expansion programme is ₹ 5,00,00,000.

so the accumulated sum in the account would not be sufficient to meet the fund for expansion programme

$$\text{Difference in amount} = ₹ 5,00,00,000 - ₹ 3,57,50,000$$

$$= ₹ 1,42,50,000$$

A<sub>017</sub>  $A = F \frac{i}{(1+i)^n - 1}$

$$= 1500000 \frac{0.18}{(1+0.18)^{10} - 1}$$

$$= ₹ 51625.23$$

Hence the annual equivalent amount that person should invest is ₹ 51625.23

A° 18

$$A = \frac{f_i}{(1+i)^n - 1}$$

$$= \frac{40000000 \times 0.15}{(1.15)^5 - 1}$$

$$= \text{£} 59,34,718$$

Hence the company should deposit £ 59,34,718 equivalent amount at end of each year

A° 19

$$P = \frac{A(1+i)^n - 1}{i(1+i)^n}$$

$$= 1500000 \frac{(1.15)^{20} - 1}{0.15 (1.15)^{20}}$$

$$= 1500000 \times \frac{15.366}{2.454}$$

$$= \text{£} 93,924,20.53$$

Hence £ 93,92,420 must be made as single-payment as the reserve amount

A° 20

$$F = A \frac{(1+i)^n - 1}{i}$$

$$= 25000 \frac{(1.18)^{15} - 1}{0.18}$$

$$= \text{£} 1524131$$

Alternatively down payment of £ 150000

Hence the customer should choose <sup>down</sup> payment of £ 150000 since it costs less.

A.21

$$A = \frac{P i (1+i)^n}{(1+i)^n - 1}$$

$$= \frac{2000000 \times 0.12 \times (1+12)^{20}}{(1+12)^{20} - 1}$$

$$= \frac{2000000 \times 0.12 \times 9.64}{8.64}$$

$$= ₹ 267777$$

Hence equal instalment of ₹ 267,777 should be paid for next 20 years

A.22

$$A = \frac{P i (1+i)^n}{(1+i)^n - 1}$$

$$= \frac{500000 \times 0.18 (1+18)^{25}}{(1+18)^{25} - 1}$$

$$= \frac{500000}{\frac{11.28}{61.66}}$$

$$= ₹ 91472.2$$

Hence amount of ₹ 91472 must be given by instalment company to the bank.