

## \* Scarcity of Resources:

Refers to the limited availability of resources relative to the unlimited wants and needs of individuals & society.

## \* Relevance of Economics for Engineers:

- Resource Allocation
- Cost-Benefit Analysis
- Project Management
- Innovation and Technological Advancements.

## \* Managerial Economics:

The integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management.

## → Scope of Managerial Economics:

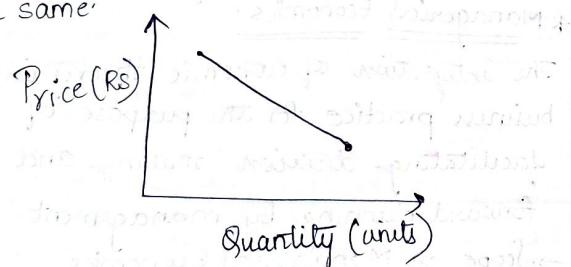
- 1) Demand Analysis.
- 2) Cost Analysis
- 3) Production and Supply Analysis
- 4) Pricing Decisions, Policies and Practices.
- 5) Profit Management
- 6) Capital Management

### \* Demand:

It is the quantity bought by an individual at a given point of time at a given price.

### \* Law of demand:

It states that higher is the price; lower the demand and vice versa; when all other factors except price remain the same.



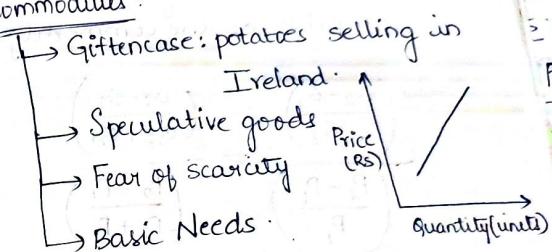
### → Assumptions:

- \* Inverse Relationship
- \* Price and <sup>(IV)</sup> quantity (D.V)
- \* All other demand determinants remain same except for price.

### → Exceptions for law of demand:

- \* Price ↑es; Quantity ↑es (or) remains same.
- \* Price ↓es; Quantity ↓es (or) remains same.

### \* Commodities:



### → Elasticity of demand:

The degree of responsiveness of quantity demanded to a change in the variables namely, price of the commodity, income of the consumer, price of substitute product and advertisement expenditure.

### → Price Elasticity:

It is the measure of responsiveness of quantity demanded of a commodity to a given change in the price of a commodity.

$$\text{Elasticity} = \frac{\Delta Q}{P_2 - P_1} / \frac{\Delta P}{P_2 + P_1}$$

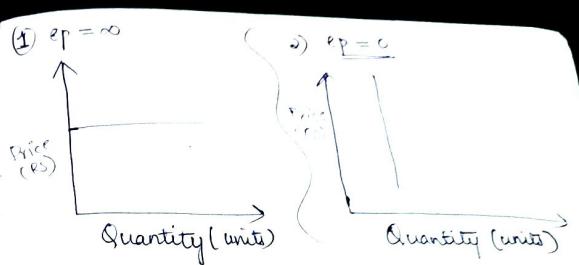
$e_p$  = Proportionate change in quantity demanded of a commodity

Proportionate change in the price of the commodity.

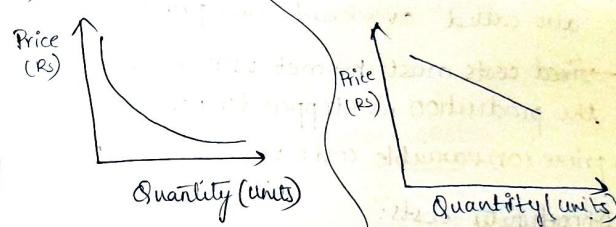
$$= \frac{\left(\frac{Q_2 - Q_1}{Q_1}\right)}{\left(\frac{P_2 - P_1}{P_1}\right)} = \frac{\left(\frac{Q_2 - Q_1}{Q_2 + Q_1}\right)}{\left(\frac{P_2 - P_1}{P_2 + P_1}\right)}$$

#### \* Types of price elasticity:

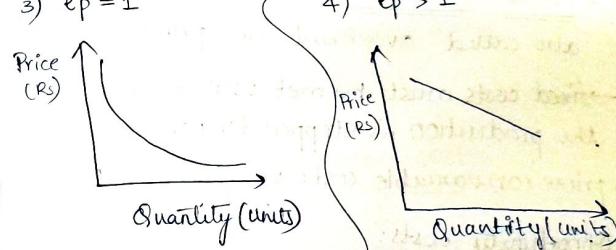
- 1) perfectly elastic demand ( $e_p = \infty$ )
- 2) Perfectly inelastic demand ( $e_p = 0$ )
- 3) Unitary elastic demand ( $e_p = 1$ )
- 4) Relatively elastic demand ( $e_p > 1$ )
- 5) Relatively inelastic demand ( $e_p < 1$ )



3)  $e_p = 1$



4)  $e_p > 1$



5)  $e_p < 1$



Revenue =  $\frac{P_1}{P_1 + P_2} \times \text{Revenue}$

## UNIT-2

Cost: Refers to monetary value of resources used for producing goods or services.

costing involves the process of classifying, recording and allocating costs to products or services.

### Types of costs

- ① Fixed costs: costs that remain constant irrespective of level of production & sales.  
Ex: Rent, salaries.
- ② Variable Costs: costs that vary with level of production and sales.  
Ex: Raw materials, direct labour.
- ③ Direct costs: costs attributed to specific product or service  
Ex: Direct materials
- ④ Indirect (or) Overhead costs: costs that cannot be easily traced.  
Ex: Factory overhead, administrative overhead.

⑤ Explicit costs: Tangible, measurable costs involving monetary payments.

Ex: Payments for raw material, salaries.

⑥ Implicit costs: Non-monetary costs.

Ex: Time worked in business without salary.

⑦ Controllable costs: Costs that can be controlled by a specific managerial decision.

Ex: Research & development tools.

⑧ Uncontrollable costs: costs that cannot be controlled by managerial decisions.

Ex: changes in tax rates; economic conditions.

⑨ Marginal costs: additional cost incurred by producing one more unit of a product or service.

Ex: Additional freight.

Sunk costs: Costs that are already incurred & cannot be recovered.

Ex: Money spent on advertising a product.

i.e. not being produced.

⑩ Opportunity costs: Value of next best alternative forgone when a decision is made.

Ex: Choosing to invest in project A than in project B; where potential return from project B is O.C.

⑪ Average costs: total cost / No. of units sold / produced.

⑫ Total costs = Fixed costs + Variable costs

⑬ Incremental costs: additional costs incurred as a result of specific decision or action.

⑭ Avoidable costs: Costs that can be eliminated or avoided by choosing a different action.

⑮ Replacement costs: prices that have to be paid currently.

1(7) Historical costs: Cost of an asset at a price originally paid

\* Cost Accounting: classifying, recording & appropriate allocation of expenditure for determination of costs of products/services.

(\* Cost Accountancy: is the application of costing and cost accounting principles, methods & techniques to science, art & practice of cost control)

\* Cost sheet: statement designed to show O/P of a particular accounting period along with break up costs.

\* Assumptions of break even analysis:

- Costs can be perfectly classified as FC & VC
- SP does not change as volume changes.
- No closing stock.
- Product mix remains same.

\* Managerial significance of BEA:

- Ascertainment of profit on a particular level of sale volume.
- Calculation of sales required to earn a particular profit.
- Estimation of volume of sales required to maintain present level of profit.

\* Limitations of BEA:

- If FC, VC changes, BEP changes.
- All costs are not perfectly classifiable.
- Total cost & revenue lines are not always straight.

## UNIT-3 ACCOUNTING:

→ Financial accounting is a language of business.

→ Accounting Cycle:

- ① Journalizing transactions → Recording transactions in a chronological order.
- ② Posting to ledger: Transferring the info. from the journal to individual accounts in the ledger.
- ③ Balancing: Calculate diff b/w total debit amount and total credit amount of from a ledger account.
- ④ Trial balance: Balance of each and every account i.e. sum of debit balances = sum of credit balances.
- ⑤ Income Statement: Trading and P&L accounts for accounting period.
- ⑥ Position statement: Balance sheet.

## \* Journal

- 1) First entry i.e. transactions are directly recorded in journal.
- 2) Chronological order i.e. according to time they took place.
- 3) Journal as a book of source entry has greater weight as legal evidence.
- 4) subsidiary books
- 5) classification unit in transaction
- 6) Recording financial transactions - Journalizing

## Ledger:

- 1) Second entry; i.e. transactions from journal are further processed and posted to ledger.
- 2) Analytical order; i.e. according to type of account they belong.
- 3) Ledger acts as a main source of information for accounting purposes.
- 4) Principal book of account.
- 5) classification unit is account.
- 6) Recording transactions - Posting

## Trading Account:

- Gives gross profit loss.

## Profit and Loss Account:

- Gives net profit or net loss.

## Types of Accounts:

### ① Real accounts (Assets)

- Debit: what comes in
- Credit: what goes out.

### ② Personal Accounts: (Natural persons | Organisations)

- Debit: the receiver
- Credit: the giver.

### ③ Nominal Accounts: (Expenses, Losses, Incomes & Gains)

- Debit: All expenses & losses
- Credit: All incomes & gains

## Trial Balance:

(Debit & Credit balances)

- 1) Check arithmetical accuracy of the books of accounts.
- 2) Contains 3 types of accounts: personal, real & nominal accounts.
- 3) Does not reveal financial position of business.
- 4) does not reveal profit
- 5) Format contains Date, particulars, debit, credit

## Balance Sheet

(LHS - Liabilities,  
RHS - Assets)

- 1) Ascertain the financial position of a business at a given date.
- 2) Contains only balances of real & personal accounts.
- 3) Reveals financial position of the business.
- 4) Reveals the profit.
- 5) Format contains assets & liabilities.

## \*→ UNIT-5

## Capital Budgeting:

↳ designing and carrying through a systematic investment.

## \*Need:

↳ Large sums of money are involved  
Decision regarding long investment in

## UNIT-4

### → Financial Statements:

These are formal records of the financial activities and position of a business, person or other entity.

They provide a summary of company's financial performance and position over a specific period of time.

- ① Balance Sheets: Provides information about a company's assets, liabilities and shareholder's equity as a snapshot in a time.

→ Assets: cash and cash equivalents, accounts receivable, inventory goods (finished/manufacturing goods, raw materials), Prepaid expenses, investments, property, plant & equipment → Capital assets

Trademarks, patents, good will and intangible assets → Long-term assets

→ Liabilities: Accounts payable, wages payable,

→ Shareholder's Equity / Stockholders equity

↳ total assets - total liabilities

② Income Statement: (Profit & Loss Statement)

Covers a range of time, which is a year for annual financial statements.

Provides info about revenues, expenses, net income and earnings per share

→ Revenue: inflows from trading and non-trading activities

• Operating revenue: revenue earned by selling a company's products or services. Generated from core business activities

• Non-operating revenue: Generated from non-core business activities

Ex: Interest on cash in bank, rental income from a property etc.

→ Expenses: Cost of goods sold, selling, general and administrative expenses, depreciation / amortization. → Primary.

• Typical expenses: employee wages, sales commissions and utilities (electricity & transport)

• Secondary expenses: interest paid on loans/debts, losses from the sale of an asset

→ Main purpose of income statement is to convey details of profitability & financial results of business activities.

③ Cash-Flow Statement

→ Measures how well a company generates cash to pay its debt obligations, fund its operating expenses and fund investments.

→ tracks cash inflows and outflows of a business over a specific period.

## \* Purpose of financial statements:

- Decision making
- Performance evaluation
- Creditworthiness
- Companies must produce financial statements to comply.

## \* Comparative financial statements:

- provides financial info for multiple periods
- Allows users to analyze the changes.
- Ex: Comparing revenue & expenses for consecutive years.

## \* Common size financial statements:

- Express each line item as a % of a base figure
- total revenue for the income statement and total assets for balance sheet

## UNIT-4

### → Ratios Analysis

process of determining & presenting the relationship of items and group of items in financial statements.

#### \* Advantages:

- Simple analysis
- Easy comparison
- Helps to identify the trend followed in terms of assets & liabilities (or profit or loss).
- Assists in assessing a company's financial health, efficiency & profitability.

#### \* Disadvantages:

- Limited scope i.e. only partial view of company's operations
- Different accounting policies of different companies affects while comparing.
- Ratios may not fully account for impact of inflation on financial statements
- Lack of info. regarding quality manipulation.

## UNIT-2

### Cost:

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## \* Economics and Finance For engineers:

### → UNIT-5 : CAPITAL BUDGETTING:

#### ① Long term sources of finance:

##### ① Debt financing :

Involves raising capital by borrowing funds which need to be repaid over a specified period with interest.

##### Advantages:

- Interest payments are tax deductible
- Fixed repayment provide financial stability
- No dilution of ownership

Ex: Bank loans, debentures.

##### Disadvantages:

- Strict repayment
- Interest can be financial burden

##### ② Equity financing:

Involves raising capital by selling shares of ownership in the company.

##### Advantages:

- No obligation for fixed payments
- Shared risk
- Potential for business expertise from investors

Ex: Common stock, venture capital.

##### Disadvantages:

- Dilution of ownership
- Potential conflicts with shareholders
- Dividend payments may be expected

##### ③ Hybrid instruments:

Combine features of both debt & equity financing.

##### Advantages:

- Flexibility in financial structure
- Potential for conversion to equity

##### Disadvantages:

- Complexity in valuation
- Have both interest payments & equity dilution

Ex: Convertible preference shares.

##### ④ Startup finances:

Refers to the capital and funding sources used by new businesses to establish and grow.

Advantages:

- Access to capital for new businesses
- Potential for mentorship and guidance

Disadvantages:

- High risk for investors
- Loss of control for founders

Ex: Seed funding; venture capital

### ⑤ Crowd funding:

Method of raising small amounts of capital from a large no. of individuals typically through online platforms.

#### Advantages:

- Access to large pool of investors

- Public validation & market testing

- Reward-based

- Equity based

Ex: Kickstarter; GoFundMe

Disadvantages:

- Platform fees are significant
- High competition for attention

### ⑥ Peer to Peer Lending platforms:

Connecting individual lenders with borrowers

#### Advantages:

- Direct access to loans
- Lower interest rates
- Diverse lending & borrowing opportunities

Ex: Zopa; Lending club

#### Disadvantages:

- Default risk for lenders
- Reliance on platform's technology & reputation

## UNIT-4

### Financial Statements:

These are formal records of the financial activities and position of a business, person or other entity.

They provide a summary of company's financial performance and position over a specific period of time.

① Balance Sheets: Provides information about a company's assets, liabilities and shareholder equity as a snapshot in a time.

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Quant

ep > 1

Q.

<u>Trial Balance:</u> (Debit & Credit balances)	<u>Balance Sheet</u> (LHS - Liabilities, RHS - Assets)
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5) Format contains Date, particular, debit, credit	5) Format contains assets & liabilities.

### \*→ UNIT-5

## Capital Budgetting:

↳ designing and carrying through a systematic investment

### \*Need:

↳ Large sums of money are involved  
Decision regarding long investment in

long term projects.

- Analyze the proposal for expansion / creating additional capacities.
- To decide replacement of permanent assets.
- Long term effect on profitability and long term commitment of funds.

### \*→ Limitations

- Future uncertainty
- Time consuming → analysis & evaluation
- Complex while taking decisions
- Ignores External factors.
- Some techniques prioritize short term debts.

### \*→ Nature:

- long term investment decision
- irreversible in nature
- requires large amounts of funds.
- involves an element of risk as investment

→ Liquidity Ratios: Current Liabilities / Current Assets

①  $\text{Net - Working Capital} = \text{Current Assets} - \text{Current Liabilities}$

CA: Cash in hand, bank balance, short term invest.  
= marketable securities; debtors, bills receivable, stock, pre-paid

CL: trade creditors, creditors for expenses /  
outstanding expenses, bills payable, bank overdraft  
doubtful debt, cash credit from bank

② Current Ratio: =  $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

Ideal  $\Rightarrow (2:1)$

③ Liquid / Quick Ratio / Acid test =

$$\frac{\text{Quick Assets}}{\text{Liquid Assets}} = \frac{\text{Quick Assets}}{\text{Liquid Liabilities}}$$

LQ&A: Current Assets - (Stock + prepaid)

LQ&L: Current Liabilities - Bank overdraft

→ Solvency Ratios: (Long-term solvency)

↳ periodic payment of interest &  
repayment of long-term loan

① Leverage Ratios / Capital Structure

↳ long term sources of capital of a business firm

↳ relation b/w owned & borrowed capital

① Debt-Equity Ratio: = Long term debt  
Shareholder's equity

Long term

debt = Debenture + Long term loans  
capital from banks + Public deposits.

Shareholder's equity = Equity share capital + Reserves &  
surpluses + preference share capital

② Debt - Total Capital Ratio: = Long term debt  
Total capital

Total capital = Shareholder's equity + Long term  
debt

③ Total debt - Equity Ratio:

= Long term debt + Current Liabilities  
Shareholder's equity

④ Proprietary Ratio = Net worth / Shareholder's equity  
Total assets

⑤ Coverage Ratios: no. of times a fixed expense  
is covered by the Net profit before tax.

⑥ Interest Coverage Ratio:

= Estimated profit before tax & interest  
Interest charges.

⑦ Dividend Coverage Ratio:

= Net profit after tax  
Preference/Equity dividend paid

## Operational Efficiency (or) Turnover (or) Activity Ratios:

(a) Stock Turnover ratio: =  $\frac{\text{Cost of goods sold}}{\text{Average stock}}$

$$\begin{aligned} \text{Cost of goods sold} & \\ &= \frac{\text{Opening stock} + \text{Purchases} + \text{All direct expenses}}{- \text{closing stock}} \\ \text{Avg stock} &= \frac{\text{OS} + \text{CS}}{2} \end{aligned}$$

(b) Debtors Turnover ratio =  $\frac{\text{Cost of credit sales}}{\text{Avg debtors}}$

(c) Avg Collection Period =  $\frac{\text{No. of months/days in year}}{\text{debtors turnover ratio}}$

(d) Working capital turnover ratio =

$$= \frac{\text{Cost of sales}}{\text{Net working capital}}$$

(e) Fixed turnover ratio =  $\frac{\text{Cost of sales}}{\text{Net fixed assets}}$

(f) Capital employed turnover ratio =  $\frac{\text{cost of sales}}{\text{Capital employed}}$

(g) Total assets turnover ratio =  $\frac{\text{Cost of sales}}{\text{Total assets}}$

(h) Creditor's turnover ratio =  $\frac{\text{Credit purchases}}{\text{Avg creditors}}$

## → Profitability Ratios:

① In relation to sales: (Selling price / Sale)

a) Gross Profit Margin =  $\frac{\text{Gross Profit}}{\text{Sales}} \times 100$

Sales = Cost of goods sold + gross profit.

b) Net Profit Margin / Ratio =

=  $\frac{\text{Net profit after tax/before tax}}{\text{Sales}} \times 100$

c) Operating Profit Ratio

=  $\frac{\text{Operating Profit}}{\text{Sales}} \times 100$

Operating Profit = Sales - (cost of goods sold  
+ Selling, Distribution,  
General & Administrative  
overheads + depreciation)

d) Operating Expense Ratio:

=  $\frac{(\text{Cost of goods sold} + \text{Operating expenses})}{\text{Sales}} \times 100$

except dep.

② In Relation to Investment:

a) Return on Investment

① Return on Shareholder's equity

=  $\frac{\text{Profit after tax}}{\text{Shareholder's Equity}} \times 100$

Return on capital employed

$$= \frac{\text{Profit before interest & tax}}{\text{Capital Employed}} \times 100$$

(3) Return on total assets

$$= \frac{\text{Profit before Interest & Tax}}{\text{Total assets}} \times 100$$

(b) Return on equity share capital

$$= \frac{\text{NPAT} - \text{Preference dividend}}{\text{Equity share capital}} \times 100$$

(c) Earnings Per share =  $\frac{\text{NPAT after tax and preference dividend}}{\text{No. of equity shares}}$

(d) Dividend per share =  $\frac{\text{Equity dividend declared}}{\text{No. of equity shares}}$

(e) Dividend pay-out ratio =  $\frac{\text{Dividend per share}}{\text{Earnings per share}}$

Absolute Liquid Assets Ratio

$\frac{(\text{Cash} + \text{marketable})}{\text{Current Liabilities}}$

## UNIT-5 : Capital Budgeting

$$\textcircled{1} \quad \text{NPBT} = \text{CFBT} - \text{Dep}$$

$\text{dep} = \frac{\text{Investment} - \text{Salvage Value}}{\text{Estimated life}}$

$$\text{CFAT} = \text{Dept} + \text{NPAT}$$

$$\text{NPAT} = \text{NPBT} - \text{Tax}$$

$$\text{Tax} = 50\% \text{ of NPBT}$$

$$PV = \frac{1}{(1+k)^n} \quad n \rightarrow {}^n \text{th year}$$

$$k \rightarrow \text{cost of capital}$$

$$\textcircled{2} \quad \underline{\underline{ARR = \frac{\text{Average Annual Net Profit}}{\text{Average Investment}}}}$$

$$\text{Avg Investment} = \frac{1}{2} (\text{Initial Investment} - \text{salvage}) + \text{salvage value} + \text{AWC}$$

$$\text{Avg Annual net profit} = \frac{\sum \text{NPAT}}{\text{No. of yrs.}}$$

$$\textcircled{3} \quad \underline{\underline{PBP \text{ for even cash flows}}}$$

$$PBP = \frac{\text{Investment}}{\text{Estimated CFAT}}$$

$$\textcircled{4} \quad NPV = \sum PVCI - \sum PVCO$$

$$\sum PVCI = \text{CFAT} \times AF + S.V \times PVF + AWC \times PVF$$

$$\sum PVCO = \text{Investment} + AWC$$

PBP for uneven cash flows

Estimated PBP > Calculated PBP  $\rightarrow$  Accept  
else  $\rightarrow$  Reject

$$\textcircled{6} \quad \underline{\text{Fake PBP}} = \frac{\text{Initial Investment}}{\text{Avg CFAT}}$$

$$\textcircled{7} \quad \text{PI} = \frac{\sum \text{PVCI}}{\sum \text{PVCO}}$$

$$\textcircled{8} \quad \text{IRR} = r - \left[ \frac{\sum \text{PVCO} - \sum \text{PVCI}}{\Delta \sum \text{PVCI}} \right] * \Delta r$$

↓  
only formula & theory  
no sums.

\* Intangible assets = reputation, goodwill,  
intellectual property

\* Tangible assets = land, furniture,  
vehicles

\* Proprietary funds = share capital,  
free reserves, net of  
losses,

## \* Break Even point:

① Per unit info is given:

- Contribution per unit = SP per unit - VC per unit
- Break even point = Fixed cost / Contribution per unit
- Sales to earn a desired profit  
$$= \frac{(FC + \text{desired profit})}{\text{Contribution per unit}}$$

② When info is given for total output:

- P/V ratio =  $\frac{\text{contribution}}{\text{Sales}} \times 100$ .
- Break even point = Fixed cost / P/V ratio
- Margin of Safety = Actual sales - Break even sales  
$$= \frac{\text{Profit}}{\text{P/V ratio}}$$

③ When 2 periods info is given

$$\text{P/V ratio: } \frac{\text{Change in profits}}{\text{change in sales}} \times 100$$

## \* Price Elasticity:

$ep$  = Proportionate change in quantity demanded of commodity

Proportionate change in the price of commodity.

$$\text{Point Elasticity} = \frac{Q_2 - Q_1}{Q_1} \quad \left\{ \begin{array}{l} \text{Arc Elasticity} = \frac{Q_2 - Q_1}{Q_2 + Q_1} \\ \text{Elasticity} = \frac{P_2 - P_1}{P_2 + P_1} \end{array} \right.$$