

# **ECONOMIC DECISION MAKING**

## **Chapter at a Glance**

Decision Making is the selection of one course of action from two or more alternatives courses of action. It is a choice making activity.

**Role:** (i) It is a selective process.

- (ii) It is a continuous process which goes on throughout the life of an organisation.  
(iii) Decisions are normally taken on the basis of past experiences and present circumstances for a future course of action.

### **Multiple Choice Type Questions**

- 1 Which of the following statements is correct? [WBUT 2014]  
a) engineering economics provides a set of methods by which economic worth of alternatives can be compared  
b) engineering economics never takes into account non-commercial considerations  
c) engineering economics does not take into consideration tax liabilities of the firm  
d) engineering economics is not applicable in the case of public sector undertakings

**Answer:** (a)

2. In decision making risk is measured by [WBUT 2014]  
a) expectation      b) mean      c) variance      d) median

**Answer:** (c)

3. The firm's decision to invest its funds in fixed and long term assets is known as [WBUT 2015]  
a) Assets Planning      b) Capital Budgeting  
c) Long Term Budgeting      d) Short Term Budgeting

**Answer:** (b)

4. Which of the following is not applicable to bottom-up approach to cost estimation? [WBUT 2016]

- a) The project under consideration is considered at the highest aggregate level  
b) The project under consideration is split into smaller parts and their respective components are identified  
c) Cost estimates are made for each component of each small part and added up  
d) Cost estimates are made for each component of each part of the project and are added up to arrive at the total

**Answer:** (a)

5. Defined as the creative problem solving process of planning, organizing, leading, and controlling an organization's resources to achieve its mission and objectives.

a) Management      b) Planning

## **[MODEL QUESTION]**

### c) Organizing

**d) Supervision**

**Answer:** (a)

6. Refers to the activity combining "technical knowledge with the ability to organize and coordinate worker power, materials, machinery, and money."

## a) Engineering Management

### c) Engineering Organization

**Answer:** (c)

[MODEL QUESTION]

## b) Engineering Materials

**d) Engineering Club**

7. The following are considered as functions of an engineer except

### a) Testing

### b) Construction

### c) Sales

[MODEL QUESTION]

#### **d) Physical Education**

**Answer:** (a) & (b)

## **Short Answer Type Questions**

- 1. Discuss the economic problems faced by an engineer with suitable examples.**

[WBUT 2018]

**Answer:**

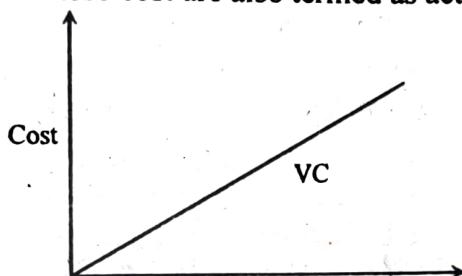
Some examples of engineering economic problems range from value analysis to economic studies. Each of these is relevant in different situations, and most often used by engineers or project managers. They are:

- **Value Analysis:** Proper value analysis finds its roots in the need for industrial engineers and managers to not only simplify and improve processes and systems, but also the logical simplification of the designs of those products and systems.
  - **Linear Programming** is the use of mathematical methods to find optimized solutions, whether they be minimized or maximized in nature.
  - **Interest and Money:** Time Relationships Considering the prevalence of capital to be lent for a certain period of time, with the understanding that it will be returned to the investor, money-time relationships analyze the costs associated with these types of actions. Capital itself must be divided into two different categories, *equity capital* and *debt capital*.
  - **Depreciation and Valuation:** The fact that assets and material in the real world eventually wear down, and thence break, is a situation that must be accounted for. Depreciation itself is defined by the decreasing of value of any given asset, though some exceptions do exist. Valuation can be considered the basis for depreciation in a basic sense, as any decrease in *value* would be based on an *original value*.
  - **Capital Budgeting** in relation to engineering economics, is the proper usage and utilization of capital to achieve project objectives. It can be fully defined by the statement; ... as the series of decisions by individuals and firms concerning how much and where resources will be obtained and expended to meet future objectives.

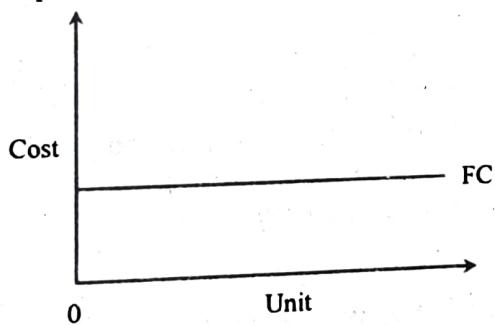
# ENGINEERING COSTS & ESTIMATION

## Chapter at a Glance

- **Variable cost:** The cost which tends to follow the level of activities is the variable cost. That is they are proportional with the level of output which may be expressed in terms of units, labour hours, machine hours. Example of variable cost might be direct material, direct labour and variable expenses (overhead). Here the word direct means variability and directly proportion to the production. These cost are also termed as activity cost.



- **Fixed cost:** It is the cost which is fixed in nature irrespective of volume of production within the manufacturing capacity and is fixed for a certain period. It accrues in relation to the passage of time and which within certain output and turnover limits, tends to be unaffected by variation in the levels of output or turnover. It is also termed as Period Cost.



- **Marginal cost:** It is the cost for producing one additional unit. This addition unit cost will be the variable cost because variable cost is incurred with every variation of output and fixed cost remains same. So the increase is only due to the variable cost. Marginal cost is useful for make or buys decision process.
- **Average cost:** Average cost is the average cost per unit of production. It is ascertained as total cost of production for per unit of production. As in the above example the average cost would be

For 1000 units produced = Rs. 6000 / 1000 units = Rs. 6 per unit

For 1001 units produced = Rs. 6005 / 1001 units = Rs. 5.99 per unit

- **Sunk cost:** It is the cost which is already being incurred in past and is not relevant to any decision making process. e.g., Any survey or market research cost to decide whether any job to be undertaken or not is a sunk cost.
- **Opportunity cost:** Opportunity cost is the benefit that could be derived from choosing any other alternative by utilizing the resources. It is also termed as foregone cost or opportunity loss.

## POPULAR PUBLICATIONS

- **Recurring and non-recurring costs:** Recurring expenses are almost predetermined expenses which are incurred in regular intervals. These expenses part the operating expenses for running the business process. e.g., salary expenses, repairs and maintenance.
- **Incremental cost:** For any managerial decision making process of selecting between two more alternatives it is required to have cost benefit analysis of different alternatives.
- **Life-cycle cost:** In economic engineering analysis the assets are compared with the life of human beings, like growing through various phases, reaching maturity and ultimately declining termed as the life cycle. At every stages cost are associated for maintenance. Similarly every product and services produced also moves through phases in life cycle and each phase incurs various costs. It includes cost associated with acquiring, using, caring, feasibility study, design and development, production, maintenance, replacement and disposal, support, training and operation.
- **Types of Cost Estimate – Models**
  1. Per-unit Model
  2. Segmenting Model
  3. Cost Indexes Model

### **Multiple Choice Type Questions**

1. Costs reflected in accounting system only are called  
a) Cash cost      b) Overhead cost      c) Book cost  
**Answer: (c)**

[WBUT 2012]  
d) Direct cost

2. The opportunity cost of a good is  
a) the time lost in finding it      [WBUT 2012, 2014, 2017, 2019]  
b) the quantity of other goods sacrificed to the another unit of that good  
c) the expenditure on the good  
d) the loss of interest in using saving?

**Answer: (b)**

3. To compute the construction cost per square foot of a building  
a) Per unit model will be used  
b) Segmenting model will be used      [WBUT 2012, 2017]  
c) Learning curve estimation process will be used  
d) None of these

**Answer: (a)**

4. Which one is fixed cost?  
a) Depreciation of fixed assets  
b) Excise duty  
c) Cost of advertising      [WBUT 2012, 2017]  
d) Sales tax

**Answer: (c)**

5. What is the relationship between Marginal cost (MC) and Average cost (AC) curves?  
a) AC cuts the MC from below  
b) MC cuts the AC from below      [WBUT 2013]  
c) AC and MC do not cut each other  
d) there is no fixed relationship

**Answer: (b)**

6. To compute the updated cost of a boiler of the same capacity in a power plant, we use  
a) per unit model  
b) segmenting model  
c) cost index model  
d) none of these [WBUT 2013]

Answer: (c)

7. The value of the Power-Sizing Exponent ( $E$ ) indicates Diseconomies of Scale when  
a)  $0 \leq E < 1$       b)  $E > 1$       c)  $E < 0$       d)  $E = 1$  [WBUT 2014]

Answer: (b)

8. Learning Curve is applicable to the industries with  
a) low labour turn over  
b) high labour turn over  
c) huge mechanization  
d) high variable cost [WBUT 2014]

Answer: (b)

9. If in a power sizing model the power sizing index is greater than 1, then  
a) Per unit price increases with increase in quantity  
b) Per unit price decreases with increase in quantity  
c) Per unit price remains constant with increase in quantity  
d) Per unit price remains constant with decrease in quantity [WBUT 2016]

Answer: (a)

10. A portion of the learning curve is  
a) Parallel to  $y$  axis  
b) Parallel to  $x$  axis  
c) Cuts the  $x$  axis  
d) Cuts the  $y$  axis [WBUT 2016]

Answer: (c)

11. What is the relation between the slopes of Total Cost (TC) and Total Revenue (TR) curves?  
a) Slope of  $TR >$  Slope of  $TC$   
b) Slope of  $TR <$  Slope of  $TC$   
c) Slope of  $TR =$  Slope of  $TC$   
d) No fixed relation [WBUT 2016]

Answer: (d)

12. Sunk cost is  
a) Original investment + depreciation – repairing expenses  
b) Original investment – depreciation + repairing expenses  
c) Original investment + depreciation + repairing expenses  
d) Original investment – depreciation – repairing expenses [WBUT 2016]

Answer: (c)

13. Which of the following is not applicable to bottom-up approach to cost estimation?  
a) The project under consideration is considered at the highest aggregate level  
b) The project under consideration is split into smaller parts and their respective components are identified [WBUT 2016]

- c) Cost estimates are made for each component of each small part and added up
- d) Cost estimates are made for each component of each part of the project and are added up to arrive at the total

**Answer:** (a)

**14. Cost reflected in accounting system only is called**

- a) Cash cost
- b) Overhead cost
- c) Book cost
- d) Direct cost

[WBUT 2017]

**Answer:** (c)

**15. The following value(s) of the Power-Sizing Exponent (E) indicates Economies of scale**

- a)  $0 < E < 1$
- b)  $E > 1$
- c)  $E = 0$
- d)  $E = 1$

[WBUT 2018]

**Answer:** (a)

**16. Marginal cost curve cuts the Average Variable cost from**

- a) Above at its minimum point
- b) Below at its falling part
- c) Below at its minimum point
- d) None of these

[WBUT 2019]

**Answer:** (a)

**17. To compute the updated cost of a boiler with same capacity in a power plant, we use**

- a) Per Unit Cost Model
- b) Cost Index Model
- c) Power Sizing Model
- d) Segmenting Model

[WBUT 2019]

**Answer:** (b)

### **Short Answer Type Questions**

**1. Labour cost index value was at Rs. 124, ten years ago and is Rs. 188 today. Annual labour costs for similar facility were Rs. 5,75,500 ten years ago. Develop the cost estimates of annual labour cost for today.**

[WBUT 2013]

**Answer:** According to cost index model,

$$\frac{\text{Cost at current time}}{\text{Cost at past time}} = \frac{\text{Index value at current time}}{\text{Index value at past time}}$$

$$\therefore \frac{\text{Annual labour cost today}}{\text{Annual labour cost ten years ago}} = \frac{\text{Labour cost index today}}{\text{Labour cost index ten years ago}}$$

$$\Rightarrow \frac{\text{Annual labour cost today}}{5,75,500} = \frac{188}{124}$$

$$\Rightarrow \text{Annual labour cost today} = \boxed{8,72,532 \text{ Rs.}}$$

# CASH FLOW, INTEREST AND EQUIVALENCE

## Chapter at a Glance

- Time value of money:** It is known to all that Rs. 100 on hand now is more valuable than Rs. 100 receivable after one year. Differently speaking, we will not part with Rs. 100 now in return for a firm assurance that the same sum will be repaid after a year. But we might part with Rs. 100 now if we are assured that something more than Rs. 100 will be paid at the end of the first year. This extra compensation required for parting with Rs. 100 now is called 'interest' or the time value of money.  
**Money has time value for the following reasons:**
  - Money can be employed productively in order to generate real returns. e.g., if Rs. 100 is invested in material and labour produces finished goods worth Rs. 105, we can say that the investment of Rs. 100 has earned a return of Rs. 5 per cent.
  - During inflation, value of a rupee today is more (higher purchasing power) than a rupee in future.
  - As because future is uncertain, people like current consumption more than future consumption.
- Effective vs. Nominal Rate of Interest:** The general relationship between the effective and nominal rates of interest is as follows:

$$r = \left(1 + \frac{k}{m}\right)^m - 1$$

where,  $r$  = Effective rate of interest

$k$  = Nominal rate of interest

$m$  = Frequency of compounding per year.

### Multiple Choice Type Questions

1. A person if deposits Rs. 50,000 in a bank at an interest of 10% compounded annually, then the future value at the end of 5 years will be [WBUT 2016]

a) 80,525      b) 70,525      c) 85,525      d) 90,525

Answer: (a)

2. A deposit of Rs. 1,10,000 was made for 31 days. The net interest after deducting 20% withholding tax is Rs. 890.36. Find the rate of return annually. [WBUT 2016]

a) 12.25      b) 12.75      c) 11.75      d) 11.95

Answer: (d)

3. The present value of ₹ 1 to be received after 3 years compounded annually at 10% [WBUT 2018]

a) 0.909      b) 0.826      c) 0.751      d) None of these

Answer: (c)

4. A uniform series of payment occurring at equal interval of time is called \_\_\_\_\_.  
 [WBUT 2018]

- a) Annuity      b) Amortization      c) Depreciation

d) Bond

Answer: (a)

**Short Answer Type Questions**

1. A company wants to set up a reserve which will help it to have an annual amount equivalent to Rs. 1,00,000 for every year for the next 20 years towards its employees welfare measure. Find the single payment that has to be made now.  
 [Given  $i = 15\%$ ].

[WBUT 2012]

Answer:

The company sets up a reserve which will result in a annuity of Rs. 1,00,000 per year for 20 years. The single payment to be made at present should be equal to the present worth of Rs. 1,00,000 per annum for 20 years which can be calculated as follows:

Amount of single payment

$$= 1,00,000 \times PVIFA_{(15\%, 20 \text{yr})}$$

$$= 1,00,000 \times 6.259 = \boxed{6,25,900 \text{Rs.}}$$

2. A person has invested Rs. 10,000 in a bank at an interest of 10% p.a. How much amount will receive after 2 years if the compounding is done:  
 [WBUT 2013]

- a) Annually
- b) Semi Annually
- c) Quarterly
- d) Monthly
- e) Daily.

Answer:

$$FV_n = PV \left( 1 + \frac{r}{m} \right)^{mn}$$

where,  $FV_n$  = Future value after  $n$  years

$n$  = number of years

$m$  = number of times compounding is done in a year.

$$(a) FV = PV \left( 1 + \frac{0.10}{1} \right)^{1 \times 2}$$

$$= 10,000 (1 + 0.10)^2 = 10,000 \times (1.10)^2 = \boxed{12,100 \text{Rs.}}$$

$$(b) FV = 10,000 \left( 1 + \frac{0.10}{2} \right)^{2 \times 2} = 10,000 (1 + 0.05)^4$$

$$= 10,000 \times (1.05)^4 = 10,000 \times 1.216 = \boxed{12,160 \text{Rs.}}$$

# CASH FLOW & RATE OF RETURN ANALYSIS

## Chapter at a Glance

- Net Present Value (NPV) Method:**

In this method all cash flows attributable to a capital investment projects are discounted by a chosen percentage e.g. the firms weighted average cost of capital to obtain the present value of the future cash flows. If the present value of the future cash flows is higher than the present value of the investments the proposal is accepted else rejected. In order to arrive at the net present value the present value of the future cash flows is deducted from the initial investment.

$$NPV = \frac{C_1}{(1+K)} + \frac{C_2}{(1+K)^2} + \frac{C_3}{(1+K)^3} + \dots + \frac{C_n}{(1+K)^n} - C_0$$

$$\text{i.e., } NPV = \sum_{t=1}^n \frac{C_t}{(1+K)^t} - C_0$$

where  $C_0$  = initial investment (cash out flows)

$C_t$  = cash inflows occurring at time  $t$

$K$  = Discount rate.

- Profitability Index Method (PI) / Benefit Cost Ratio (BCR):**

Another time adjusted method of evaluating the investment proposals is the Benefit Cost (B/C) ratio or Profitability Index (PI). Profitability Index is the ratio of the present value of cash inflows at the required rate of return, to the initial cash outflow of the investment. The formula for calculating benefit cost ratio or profitability index is as follows:

$$PI = PV \text{ of cash flows} / \text{Initial cash outlay} = PV(C) / O$$

- Internal rate of return method:**

Internal rate of return is a percentage discount rate used in capital investment appraisals which makes the present value of the cost of the projects equal to the future cash flows of the project. It is the rate of return which equates the present value of anticipated net cash flows with the initial outlay. The IRR is also defined as the rate at which the net present value is zero. The test of profitability of a project is the relationship between the internal rate of return (%) of the project and the minimum acceptable rate of return. The IRR can be determined by solving the following equation for  $r$  which is discount rate.

$$C_0 = \frac{C_1}{(1+r)} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} + \dots + \frac{C_n}{(1+r)^n}$$

$$\text{i.e., } C_0 = \sum_{t=1}^n \frac{C_t}{(1+r)^t}, \text{ i.e., } \sum_{t=1}^n \frac{C_t}{(1+r)^t} - C_0 = 0$$

The IRR equation is the same as the one used for the NPV method.

## **POPULAR PUBLICATIONS**

- **Sensitivity Analysis:**  
Costs include variable costs which depend on the sales volume. The NPV or IRR of the project is again determined by analysing the after-tax cash flows. We can understand that it is difficult to arrive at an unbiased and accurate forecast of each variable. If forecasts go wrong, the reliability of NPV or IRR is lost. Therefore each item of forecast is changed, one at a time, to at least three values – pessimistic, expected and optimistic. NPV is re-calculated for all the three assumptions. This method of re-calculating NPV or IRR for each forecast is called sensitivity analysis.
  - **Break-Even analysis:**  
In sensitivity analysis we ask what will happen to the project if sales decline or costs increases or something else happens. As a financial manager, you will also be interested in knowing how much should be produced and sold at a minimum to ensure that the project does not 'lose money'. Such an exercise is called break-even analysis and the minimum quantity at which loss is avoided is called the break-even point. The break-even point may be defined in accounting terms or financial terms.

## **Multiple Choice Type Questions**

1. At the break-even point [WBUT 2013]  
a) revenue > cost  
b) revenue < cost  
c) revenue = cost  
d) no relation between revenue and cost

Answer: (c)

2. For a project to be financially viable the value of Benefit-Cost Ratio should be [WBUT 2013]  
a) greater than 1  
b) less than 1  
c) in between 0 and 1  
d) negative

Answer: (a)

3. The period required for the project's profit or other benefits to equal the project's cost is called [WBUT 2013]  
a) investment period  
b) equalization period  
c) pay back period  
d) none of these

Answer: (c)

4. Internal rate of return is an indicator of [WBUT 2013]  
a) loss of an investment  
b) profit of an investment  
c) efficiency of an investment  
d) depreciation of an asset

Answer: (c)

5. Annualized capital recovery cost is defined as [WBUT 2015]  
a)  $C(A/P, i, n) + S(A/F, i, n)$   
b)  $-C(A/P, i, n) + S(A/F, i, n)$   
c)  $-C(A/P, i, n) - S(A/F, i, n)$   
d)  $C(A/P, i, n) - S(A/F, i, n)$

Answer: (d)

6. IRR stands for the rate of return for which

- a)  $NPV = 0$
- b)  $NPV = 1$

Answer: (a)

- c)  $NPV = -1$

[WBUT 2012]

- d) NPV is maximum

7. At Break-even point

- a) Total revenue = Total Cost

- c) Total revenue = Total Variable Cost

Answer: (a)

[WBUT 2018, 2019]

- b) Total revenue = Total Fixed Cost

- d) All of these

### Short Answer Type Questions

1. Discuss in detail the concept of Sensitivity Analysis.

[WBUT 2012]

OR,

What is sensitivity Analysis? Discuss the merits and demerits of sensitivity analysis.

[WBUT 2014]

OR,

State the concept of Sensitivity Analysis.

[WBUT 2017]

Answer:

Sensitivity analysis: *Refer to Chapter at a Glance.*

#### *Advantages:*

1. It is a very popular method of assessing risk because it shows how robust or vulnerable a project is to changes in values of underlying variables.
2. It indicates whether further work is necessary because if NPV is highly sensitive to changes in some factor, it may be worthwhile to explore how the variability of the critical factor may be reduced.
3. It is intuitively very appealing because if articulates the concerns the project evaluators normally have.

#### *Disadvantages:*

1. It does not provide any idea of the probability of the change in the variable – only shows what happens to NPV if there is a change in that variable.
2. In the real world many variables change together whereas in sensitivity analysis only one variable is changed at a time.
3. The results of sensitivity analysis may be interpreted by different decision-makers differently – one may accept the project – another may reject.

2. Assuming that the cost structure and selling price remain same in 2014 and 2015, find out
  - i) P/V ratio;
  - ii) Break Even point of sales;
  - iii) Profit when sales are of Rs. 3,00,000;
  - iv) Sales required to earn a profit of Rs. 60,000 and
  - v) Margin of safety in 2015

[WBUT 2015]

# **INFLATION AND PRICE CHANGE**

## **Chapter at a Glance**

- **Inflation** may be defined as a general rise in the prices in a persistent manner. It causes a loss in the purchasing power of a currency. It happens when many prices increase simultaneously. Inflation causes money to lose purchasing power. What a rupee hundred can buy today will be less in coming in coming days. Thus the rupee hundred loses the purchasing power due to the price rise, that is inflation. In engineering economic analysis it requires cost benefit analysis of any investment that requires comparison be made on an equivalent basis. On the contrary, when the purchasing power increases the situation is deflation. But this situation does not exist.
- **Control of inflation:** There is no single remedy to combat the inflation rather monetary and non-monetary fronts have to be considered to have control on it. The aim is to reduce aggregate monetary expenditure. Anti-inflationary measures can be classified as
  - a. **Monetary measures:** The best remedy for fighting inflation is to reduce the aggregate spending. Monetary policy can help in reducing the pressure on demand by increasing cost of borrowing from banks thus reducing the demands for funds.
  - b. **Fiscal measures:** It includes spending both in private and government level. Government reduces expenditures and private expenditure is reduced by increasing tax.
  - c. **Physical and non-monetary measures:** Measures like increasing output / imports, decrease exports so as to increase the available supply of goods in short supply, so as to bring the demand and supply at parity and thus the prices tend to be controlled.
- **Price changes with indexes:** The term "inflation" refers to a rise in a broad price index representing the overall price level for goods and services in the economy. Inflation is measured by price index numbers. As we know, a price index measures the general level of prices in reference to some base period. The **Consumer Price Index (CPI)**, the **Personal Consumption Expenditures Price Index (PCEPI)** and the **GDP deflator** are some examples of broad price indices. "inflation" may also be used to describe a rising price level within a narrower set of assets, goods or services within the economy, such as commodities (including food, fuel, metals), tangible assets (such as real estate), financial assets (such as stocks, bonds), services (such as entertainment and health care), or labour. The **Reuters-CRB Index (CCI)**, the **Producer Price Index**, and **Employment Cost Index (ECI)** are examples of narrow price indices used to measure price inflation in particular sectors of the economy.

### **Multiple Choice Type Questions**

1. Inflation makes

- a) Future rupees less valuable than present rupees
- b) Future rupees more valuable than present rupees
- c) Future rupees equal to present rupees
- d) None of these

Answer: (a)

[WBUT 2012, 2017]

## POPULAR PUBLICATIONS

2. Which one of the following is helpful for measuring inflation? [WBUT 2012, 2017]
- a) Learning curve
  - b) Segmentation model
  - c) Consumer price index
  - d) MARR (Minimum attractive rate of return)

Answer: (c)

3. If the inflation rate is 6% per year and the market interest rate is known to be 15% per year. What is the implied real interest rate in this inflationary economy? [WBUT 2012, 2016, 2017]
- a) 11.45%
  - b) 9.00%
  - c) 8.49%
  - d) 8%

Answer: (c)

### 4. What is inflation?

- a) it is the term used to describe a decline in purchasing power evidenced in an economic environment of rising prices
- b) it is the term used to describe a decline in purchasing power evidenced in an economic environment of rising prices
- c) it is the term used to describe an increase in purchasing power evidenced in an economic environment of rising prices
- d) it is the term used to describe a reversal in purchasing power evidenced in an economic environment of rising prices

Answer: (a)

5. The index which measures prices of a selection of goods and services purchased by a given consumer class is [WBUT 2014]
- a) Consumer Price Index
  - b) Commodity Price Indices
  - c) Composite Price Indices
  - d) Producer Price Indices

Answer: (a)

6. If Index Number for a certain period is equal to 100, then [WBUT 2016]
- a) Prices are increasing
  - b) Prices are decreasing
  - c) Prices remain constant
  - d) Change in prices cannot be predicted

Answer: (c)

7. Demand-pull inflation may be caused by [WBUT 2018]
- a) An increase in costs
  - b) A reduction in government spending
  - c) A reduction in interest rates
  - d) An outward shift in aggregate supply

8. If the inflation rate is 7% per year, market interest rate is 15%, then the real interest rate will be [WBUT 2019]
- a) 7%
  - b) 10%
  - c) 3%
  - d) 12%

Answer: (a)

9. Which one of the following is involved to measure inflation  
a) Nominal Interest Rate  
b) MARR  
c) Consumer Price Index  
d) None of these

[WBUT 2019]

Answer: (c)

### Short Answer Type Questions

1. Give the causes of inflation and its controlling measures.

[WBUT 2014]

Answer:

1<sup>st</sup> Part:

The main causes of inflation are as follows:

- Inflation occurs when the aggregate demand for products exceeds the aggregate supply of products. Prices usually increase when aggregate demand is higher than aggregate supply. Put in other words, factors such as increase in money supply, the government budget deficit, increase in export earnings, etc. create new demand, and if supply does not match this increased demand, demand-pull inflation arises. In this type of inflation, the unemployment level is at a minimal level. Such inflation is called **Demand-pull inflation**.
- Inflation may also occur due to increase in the cost of factors of production. The increase in the cost of factors of production results in a decrease in the supply of products by producers in the economy, or it makes producers push up the prices of their products to cover their higher costs of production. In cost-push inflation, the unemployment level may be high if high costs reduce production and thus, employment of factors of production including labor. Such inflation is called **Cost-push inflation**.

2<sup>nd</sup> Part:

**Measures to Control Inflation:** The measures to control inflation can be classified into monetary, fiscal and other measures.

**Monetary measures:** Monetary policy is framed by the central bank of a country. The central bank is required to regulate the money supply in the economy in order to control the rate of inflation. Quantitative and qualitative measures are used to control the money supply. Quantitative credit control measures are in the form of bank rate policy, open market operations and variable reserve ratio, which influences the cost and availability of credit in an economy. The cash reserve ratio is the most significant monetary control measure and a high cash reserve ratio requirement reduces the capacity of the banks to lend. Qualitative or the selective control measures include the regulation of consumer credit, directives, moral persuasion, publicity, etc. to control monetary expansion in the economy.

**Fiscal measures:** Some of the fiscal measures to control inflation are public expenditure, taxation and public borrowing.

**Public expenditure:** A decrease in the public expenditure by the government can control the inflation rate. The public expenditure should not be reduced in productive areas, but should be cut in the non-productive areas.

# PRESENT WORTH ANALYSIS

## Chapter at a Glance

- **End of the year convention**

In the above the basic assumption taken as the receipt or disbursement is generally taken to be in the end of any year. Like if and project yields and revenue it is assumed to be in the end of next year. This is known as **End of the Year Convention**. This convention is used for considering the time value of money for preparation of the present worth (value) factor table or for compound interest factors e.g.,

As the compound interest formulae as derived is,  $A = P \times [1 + i]^n$

where  $A$  is the Future value of money invested at the end of the year (1,2,3,....., n)

$P$  = Principal amount invested or value of money at  $t = 0$

$i$  = Rate of return / Rate of return/ Cost of Capital for financing any project.

Here  $[1 + i]^n$  is the interest rate factor

- **Major Areas of Analysis – Economic view point**

- **Borrowed money view point:** Any investment requires a lot of funds to be invested at the beginning of even at in between the project life. This investment is required to be financed from various sources. The financing do incurs cost and is a vital factor for capital budgeting analysis. Thus we get an interest rate for financing which is used to determine the time value of money for the Present worth analysis.

From the above compound interest formulae we can get

$$P = A \times \frac{1}{[1 + i]^n}$$

Here,  $P$  = Present worth [Present value] of money. [Cash inflow from the investment made at present time]

$A$  = Returns / cash inflow in the  $n^{\text{th}}$  year

$i$  = is the interest rate or cost of borrowing for the financing.

Here,  $\frac{1}{[1 + i]^n}$  is the Present worth / Discounting rate factor.

- **Inflation and deflation:** Using of proper present worth rate / discount rate depends on whether the benefits and costs are measured in real or nominal terms. To be consistent and free from inflation bias, the cash flows should match with discount rate. This equivalence value means that an asset what cost today a certain sum of money can be expected to cost the same amount several years hence for the purpose analysis.
- **Taxes:** Tax is incorporated in the present worth analysis as the future return or cash inflow is after adjustment of tax. But it is assumed in a present worth analysis, done at present ( $t=0$ ), tax rate to be kept constant for the purpose of analysis only.
- **Depreciation:** Depreciation is the loss due to wear and tear of the purchased asset in use. It is used to calculate as to determine the cash flow after charging depreciation and tax. As per tax rules tax is applicable on profit after charging depreciation.

**Multiple Choice Type Questions**

1. Contribution margin is the

- a) excess of sale price over variable costs
- b) excess of sale price over fixed costs
- c) excess of sale price over both variable and fixed costs
- d) none of these

[WBUT 2015, 2019]

Answer: (a)

2. What is the full form of PVIF?

- a) Present Value Income Factor
- c) Profit Value Income factor

[WBUT 2015]  
b) Present Value Interest Factor  
d) None of these

Answer: (b)

3. If actual sales are Rs. 40,000 and BEP sales are Rs. 30,000, the Margin of Safety is Rs.

- a) 70,000
- b) 10,000

Answer: (b)

- c) 1,40,000

[WBUT 2015]  
d) 15,000

4.  $FVIF_{5\%, 3} =$

- a) 1.050
- b) 1.103

Answer: (c)

- c) 1.158

[WBUT 2015]  
d) 1.216

5. In NPV method, cash flow is generally calculated on the basis of

- a) present value
- b) future value

Answer: (a)

- c) annuity

[MODEL QUESTION]  
d) none of these

6. What could be the value of present sum for Rs. 10,000 at 8% interest for one year?

- a) Rs. 9,263
- b) Rs. 9,261

Answer: (d)

- c) Rs. 9,264

[MODEL QUESTION]  
d) none of these

**Short Choice Type Questions**

1. a) Define Break – even point. Represent the elements diagrammatically, and derive the BEP and BEP sales algebraically.  
b) The following data relates to ABC Co. for 2011:

Fixed Factory Overhead = Rs. 30,000

Fixed Selling Overheads = Rs. 6,000

Variable Manufacturing Cost per unit = Rs. 6.00

Selling Price Per unit = Rs. 12.00

Calculate

- Break-even point in terms of units and BE sales in terms of rupees.
- Number of units that need to be sold to make a profit of Rs. 45,000. [WBUT 2012]

# UNCERTAINTY IN FUTURE EVENTS

## Chapter at a Glance

- **Measurement of risk:** Risk refers to variability. It is a complex and multi-faceted phenomenon. A variety of measures have been used to capture different facets of risk. The more important ones are range, standard deviation, coefficient of variation and semi-variance.

Standard Deviation: The standard deviation of a distribution is –

$$\sigma = \left[ \sum p_i (X_i - \bar{X})^2 \right]^{\frac{1}{2}}$$

Where  $\sigma$  = standard deviation;  $p_i$  = probability associated with the  $i^{\text{th}}$  value;

$X_i$  =  $i^{\text{th}}$  value;  $\bar{X}$  = expected value

- **Simulation Analysis:** The steps involved in simulation analysis are as follows:
  1. Model of project, the model of the project shows how the net present value is related to the parameters and the exogenous variables (Parameters are input variables specified by the decision maker and held constant over all simulation runs. Exogenous variables are input variables which are stochastic in nature and outside the control of the decision maker).
  2. Specify the values of a parameters and the probability distributions of the exogenous variables.
  3. Select a value at random from the probability distributions of each of the exogenous variables.
  4. Determine the net present value corresponding to the randomly generated values of exogenous variables and pre-specified parameter values.
  5. Repeat Steps (3) and (4) a number of time to get large number of simulated net present values.
  6. Plot the frequency distribution of the net present value.
- **Decision tree Approach:** Many project decisions are complex investment decisions. Such complex investment decisions involve a sequence of decisions over time. Decisions tree can handle the sequential decisions of complex investment proposals. The decision of taking up an investment project is broken into different stages. At each stage the proposal is examined to decide whether to go ahead or not. The multi-stages approach can be handled effectively with the help of decision trees. A decision tree presents graphically the relationship between a present decision and future events, future decisions and the consequences of such decisions.
- **Risk and Return:** The returns from an investment cannot be thought of in isolation of the risk factor. Return and risk go together in investment. As the future is uncertain, there is always a probability that the returns will be either better or worse than predicted. The larger the variation in returns, the greater the presence of the risk factor. Everything an investor does is linked directly or indirectly to return and risk.
- **Risk vs. Return:**  
Risk: Risk can be defined as the chance that the actual outcome from an investment will differ from the expected outcome. So more the variability of possible outcomes that can occur, will results in greater risk involvement.

**Return:** Return is the motivating factor that motivate the investor in the form of rewards, for undertaking the investment. Investors are taking all the efforts of investment to maximise their expected return from investment.

**Multiple Choice Type Questions**

1. The present worth of an alternative is 0. What do we know about the value of the future worth? [WBUT 2012, 2017]

- a) FW < 0
- b) FW = 0
- c) FW > 0
- d) Cannot be determined without cash flows

Answer: (b)

2. If A and B are two independent events then P (A and B) [WBUT 2012, 2017]  
a)  $P(A) \times P(B)$       b)  $P(A) + P(B)$       c)  $P(A) / P(B)$       d)  $P(A) - P(B)$

Answer: (a)

3. In a decision tree arrows coming out of which node have probabilities [WBUT 2012, 2014, 2017]

- a) decision node
- b) random node
- c) both (a) and (b)
- d) none of these

Answer: (d)

4. If  $E_o$  = optimistic estimate [WBUT 2013]

$E_m$  = most likely estimate, and

$E_p$  = pessimistic estimate

then the average or mean value of a parameter for economic analysis is given by

- a)  $(E_o + E_m - E_p)$
- b)  $(E_o + E_m - E_p)/3$
- c)  $(E_o + 2E_m + E_p)/4$
- d)  $(E_o + 4E_m - E_p)/6$

Answer: (d)

5. Margin of safety is equal to [WBUT 2014]

- a) actual sales minus BEP sales
- c) actual sales minus Actual cost

Answer: (a)

- b) BEP sales minus Actual sales
- d) none of these

6. If A and B are two mutually non-exclusive events, then  $P(A \text{ or } B)$  is

- b)  $P(A) + P(B)$  [WBUT 2014]
- d)  $P(A)P(B) - P(A) - P(B)$

Answer: (b)

## POPULAR PUBLICATIONS



**Answer:** (b)

8. If  $A$  and  $B$  are two independent events then it can be expressed as [WBUT 2016]  
 a)  $P(A \cup B)$       b)  $P(A \times B)$       c)  $P(A) \times P(B)$       d) none of these

**Answer:** (c)



**Answer:** (b)

10. If A and B are two independent events then  $P(A \cap B) =$  [WBUT 2019]  
 a)  $P(A|B) \times P(B)$    b)  $P(A) \times P(B)$    c)  $P(A \cup B)$    d)  $P(A) + P(B)$

**Answer:** (b)

## **Short Answer Type Questions**

1. An aqueduct is needed to bring water into the city. It can be built at a reduced size now for Rs. 3 lakhs and enlarged 25 years later at Rs. 3.5 lakhs. The other option is to construct the full size aqueduct for Rs. 4 lakhs. Use Present Worth to find the better choice. [Given  $i = 6\%$ ] [WBUT 2012, 2016, 2018]

### **Answer:**

[WBUT 2012, 2016, 2018]

**Option 1:** Build at reduced size now and enlarged later

$$\begin{aligned}
 \text{PW} &= 3,00,000 \times \text{PVIF}_{(6\%, 0 \text{yr})} + 3,50,000 \times \text{PVIF}_{(6\%, 25 \text{yr})} \\
 &= (3,00,000 \times 1) + (3,50,000 \times 0.233) \\
 &= 3,00,000 + 81,550 = 3,81,550
 \end{aligned}$$

**Option 2:** Construct full-size

$$PW = 4,00,000 \times PVIF_{(6\%, 10\text{ yrs})} = 4,00,000 \times 1 = 4,00,000 \text{ Rs.}$$

Since present worth of 1<sup>st</sup> option results in lower amount/cost, therefore the option to built it reduced size now and thereafter enlarge after 25 years should be followed.

- ## 2. Find the Equal Annual Worth (EAW)

**Initial Cost = Rs. 40,000**

**Salvage Value = Rs. 5,000**

**Revenue/year ≈ Rs. 10,000**

**Life = 10 years**

i = 15%

[WBUT 2012]

# DEPRECIATION

## ☞ Chapter at a Glance

- **Depreciation concepts and Terminology:**

Depreciation is the decrease in value of physical properties with the passage of time and use. More specifically Depreciation is an accounting concept that establishes an annual deduction against before - tax income such that the effect of time and use on an asset's value can be reflected in a firm's financial statements.

Depreciation is noncash cost that is intended to 'match' the yearly fraction of value used by an asset in the production of income over the asset's life. The actual amount of depreciation can never be established until the asset is retired from service. Because depreciation is a noncash cost that affects income taxes, we must consider it properly when making after-tax engineering economy studies.

- **Meaning of Depreciation:**

On the basis of Fundamental Accounting Assumption of Going Concern, assets are classified as Fixed Assets and Current Assets. Fixed assets are used in the business to drive benefits for more than one accounting period. Periodic profit is measured by charging cost against periodic revenue. Since fixed assets are used to generate periodic revenue, an appropriate proportion of the cost of fixed assets, which is believed to be used or expired for generation of periodic revenue, needs to be charged as cost. Such an appropriate proportion of the cost of fixed assets is termed as Depreciation.

Generally, the term 'depreciation' is used to denote decrease in value but in accounting, this term is used to denote decrease in the book value of a fixed asset. Depreciation is the permanent and continuous decrease in the book value of a fixed asset due to use, efflux of time, obsolescence, expiration of legal rights or any other cause.

- **Straight line method of depreciation:**

$$\text{Step 1: Amount of Depreciation} = \frac{\text{Original cost less Residual value}}{\text{Expected useful life of the asset}}$$

$$\text{Step 2: Rate of Depreciation} = \frac{\text{Amount of Depreciation}}{\text{Original Cost}} \times 100$$

### Written Down Value Method (WDV)

In this method rate of depreciation falls on WDV of the assets and the rate of depreciation is calculated by the following formula:

$$r = 1 - \sqrt[n]{\frac{S}{C}}$$

where

$r$  = W.D.V rate of Depreciation

$S$  = Salvage value

$C$  = Original cost of the asset.

- **Recovery Rate:** A percentage (expressed) in decimal form for each year of the MACRS

- recovery period that is utilized to compute an annual depreciation deduction.
- **Salvage Value (SV):** The estimated value of a property at the end of its useful life. It is the expected selling price of a property when the asset can no longer be used productively by its

owner. The term net salvage value is used when the owner will incur expenses in disposing of the property and these cash outflows must be deducted from the cash inflows to obtain a final net SV. Under MACRS the SV of a depreciable property is defined to be zero.

### Multiple Choice Type Questions

1. If tax life is  $N$  years then for double depreciation, depreciation rate then would be given by  
a)  $2 \times N$       b)  $200\% / N$       c)  $100\% / N$       d)  $N^2$  [WBUT 2013]

Answer: (b)

2. Depreciation charged on plant and machinery is [WBUT 2019]  
a) Discretionary Cost      b) Committed Cost  
c) Conversion Cost      d) Future Cost

Answer: (b)

2. Which of the following is correct? [MODEL QUESTION]  
a) Depreciation is the permanent and continuous decrease in the market value of a fixed asset due to use, defluxion of time, obsolescence, expiration of legal rights or any other cause.  
b) Depletion refers to the economic deterioration by the exhaustion of natural (e.g. ore deposits in mines) resources.  
c) Obsolescence refers to the physical deterioration by (i) invention of improved technique or equipment (ii) market decline due to change in taste and fashion etc. (iii) inadequacy of existing plant to meet the increased business.  
d) Amortization refers to the physical deterioration by the expiration of intangible assets (e.g. Goodwill, Patents)

Answer: (a)

3. Type of depreciation that arises out of economic factors like suppression, obsolescence and inadequacy is called [MODEL QUESTION]  
a) physical depreciation      b) functional depreciation  
c) accidental depreciation      d) non-functional depreciation

Answer: (b)

4. Which of the following assets does not depreciate? [MODEL QUESTION]  
a) Machinery and Equipment      b) Patents  
c) Land      d) Furniture

Answer: (c)

5. Depletion refers to [MODEL QUESTION]  
a) Wastage of output in process industries  
b) Gradual exhaustion of wasting assets  
c) Loss of value of an asset due to new technology  
d) None of these

Answer: (b)

6. The main cause of depreciation includes

- a) Physical wear & tear
- c) Changes in economic development
- e) All of these

b) Passage of time

[MODEL QUESTION]  
d) Expiration of legal Rights

Answer: (e)

**Short Answer Type Questions**

1. From the following information calculate the annual depreciation based on historical and replacement cost respectively and show the amount of additional depreciation that should be provided in each year.

Cost of machinery Rs. 20,000

Estimated life 4 years

Residual Value NIL

Inflation factor 10% p.a

Use straight-line method for computing depreciation.

Answer:

Nominal depreciation per annum

$$= \frac{\text{Original cost} - \text{Residual value}}{\text{Estimated life in years}} = \frac{20,000 - \text{Nil}}{4} = 5,000 \text{ Rs. per annum}$$

Current value of asset after inflation =  $20,000 \times 1.10 = 22,000$  Rs.

Additional depreciation to be charged per annum

$$= \frac{22,000 - \text{Nil}}{4} - 5,000 = 5,400 - 5,000 = 400 \text{ Rs.}$$

2. Distinguish between Depreciation and Obsolescence.

Solve:

[WBUT 2015]

A company purchased a machine on 1<sup>st</sup> April 2012 for Rs. 2,60,000; Shipping and forwarding charges: Rs. 10,000; Import duty: Rs. 12,000; Installation charges: Rs. 10,000; Depreciation is to be charged under diminishing balance method at 1<sup>st</sup> year – 10% p.a.; 2<sup>nd</sup> year – 20% p.a., 3<sup>rd</sup> year – 30% p.a.  
Calculate the amount of depreciation each year.

Answer:

1<sup>st</sup> part:

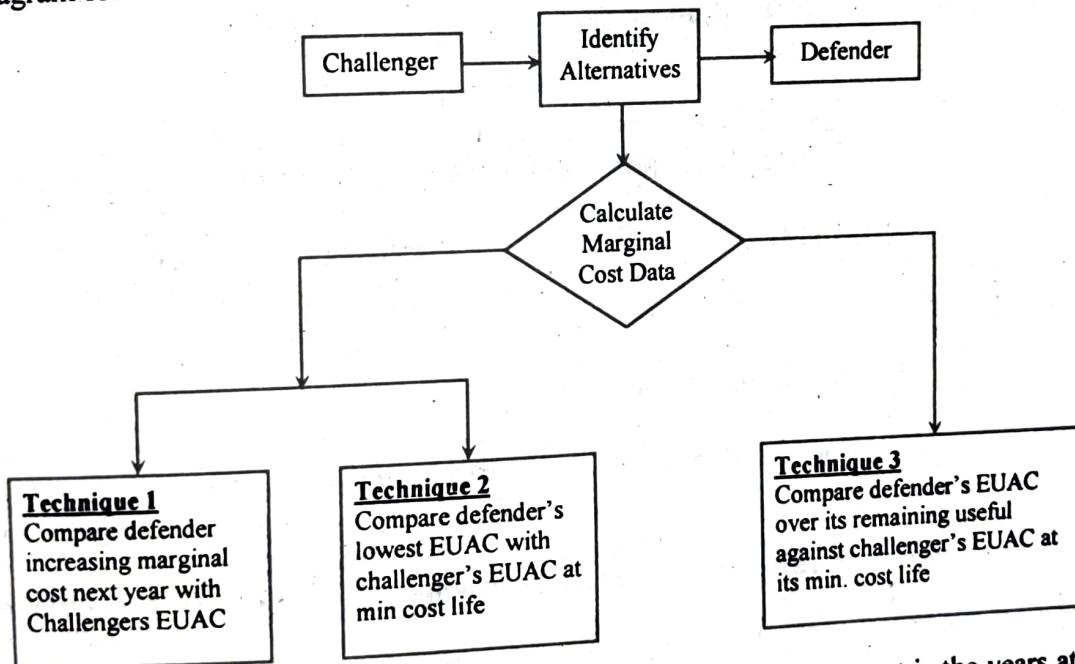
Depreciation is the decrease of worth of fixed assets with the passage of time and use. It is derived from the Latin word depretium, which means declining worth. Depreciation may be found in form of physical depreciation, economic depreciation and accounting depreciation etc.

Depreciation is a permanent continuing and gradual shrinkage in the book value of fixed asset. It is charged on the fixed assets only. The institute of Chartered Accountants of India defines depreciation as a measure of the wearing out consumption or other loss of a value of a depreciable asset arising from use, efflux of time or obsolescence through technology and market changes.

# REPLACEMENT ANALYSIS

## Chapter at a Glance

- **Replacement Analysis:** Replacement analysis is the systematic and economically evaluating decisions of either retaining the existing asset/equipment or acquiring new equipment by replacing the existing equipment. The existing facility is the termed as **defender** and that of replacing the existing facility by choosing the best course of action among the alternative available is the **challenger**. Replacement Analysis deals with evaluation of defender and challenger. Various replacement analysis techniques are applied depending different circumstances for existing installed asset / defender against the best current available asset / challenger.
- **Decision mapping:** A replacement analysis decision map can be expressed in flow chart diagram for ease in decision making.



- **Minimum Cost life Analysis:** The minimum cost life of any new asset is the years at which the EUAC is minimized. This cost life should be lesser than the actual / physical life of an asset, due to the increase of operating & maintenance cost in the later years of asset.
  - Generally cost of operation & maintenance of a machine increases due to passage of time.
  - The replacing machine [defender] time should be fixed.
  - Replacement policy for gradual deterioration
  - Salvage value to be determined prior to the decision making.
  - Time value of replacing asset.

As discussed the replacement decision would be at which the EUAC is minimum. This calculation can be made in two aspects.

EUAC = Price of equipment – value of machine after life  
[i.e., salvage value] + Maintenance cost for the years.

## POPULAR PUBLICATIONS

The process:  $TC = (C - SV) + \sum_{t=1}^n M(t)$  and

$$\text{Average } TC[\text{EUAC}] = \left[ \left( C - SV + \frac{\sum_{t=1}^n M(t)}{n} \right) \right]$$

Here,  $C$  = Cost of the machine,  $S.V.$  = Salvage value and

$\sum_{t=1}^n M(t)$  = cumulative maintenance cost.

### Multiple Choice Type Questions

1. A machine worth Rs. 1,00,000 is purchase by paying Rs. 20,000 down payment and 12 monthly installments of Rs. 8,000 each. The book cost at time of purchase is

- a) Rs. 1,00,000      b) Rs. 8,000      c) Rs. 80,000      d) Rs. 12,000

Answer: (a)

2. A replacement decision is a choice between the present asset, sometimes called the ..... , and currently available replacement alternatives, sometimes called ..... .

[WBUT 2013]

- a) defender, challenger  
c) defender, protector  
b) challenger, defender  
d) protector, defender

Answer: (a)

3. The example of Replacement problem is

- a) Obsolescence  
c) Deterioration due to aging  
b) Depletion  
d) All of these

[WBUT 2015]

Answer: (d)

4. In Replacement Analysis, the existing asset which is considered for replacement is called ..... asset.

[WBUT 2015]

- a) challenger      b) striker      c) winger      d) defender

Answer: (d)

5. Which are the determinants of economic life of an asset?

[WBUT 2016]

- a) Capital recovery cost  
b) Average operating and maintenance cost  
c) Sum of capital recovery cost  
d) all of these

Answer: (d)

6. In replacement analysis old machines are known as

[WBUT 2018]

- a) Defender  
c) Both (a) and (b)  
b) Challenger  
d) None of these

Answer: (a)

# ACCOUNTING

## Chapter at a Glance

- **Accounting** is means of communicating the results of the business operation to various parties interested in or connected with the business, like owner, creditors, investors, government, financial institution and other parties. This is done by systematic recording of the events and transactions as per accounting process guidelines, principles and format. The American Accounting Association defines accounting as the "*Process of identifying, measuring and communicating economic information top permit informed judgments and divisions by the user of the information.*"
- **Balance Sheets:** It is a statement of financial position consisting of assets and liabilities of any business enterprise in a particular date. Balance sheet summarises and reveals the financial position on an enterprise. Balance sheet is prepared following few concepts like – Money Measurement Concept, Entity Concept Cost Concept and dual aspect concept. The basic equation followed is **Assets = Liabilities + Owner's Equity**

<b>Balance Sheet</b>	Asset Side	All fixed and currents assets, investments and fictitious assets
	Liability Side	Liabilities including capital, Loans, currents liabilities & provisions.

- **Ratio analysis:** Ratio analysis is one of the techniques of financial analysis to evaluate the financial condition and performance of a business concern. Ratios are calculated from current year numbers and are then compared to previous years, other business, the industry, or even the economy to judge the performance of the business.
- **Formula in Practice:**

**Liquidity Ratios (Denoted As X: Y)**

$$\text{i) Current Ratio} = \frac{\text{CURRENT ASSETS}}{\text{CURRENT LIABILITIES}}$$

ii) Quick / Liquid Ratio

or

$$\text{Acid Test Ratio} = \frac{\text{QUICK ASSET}}{\text{CURRENT LIABILITIES}} = \frac{\text{CURRENT ASSET} - \text{STOCK} - \text{PREPAID EXP}}{\text{CURRENT LIABILITIES} - \text{BANK OVER DRAFT}}$$

**Solvency Ratios**

$$\text{i) Debt-Equity Ratio} = \frac{\text{DEBENTURES} - \text{LOANS} - \text{CURRENT LIABILITY}}{\text{EQ SHARE} + \text{PREF SHARE} + \text{R&S} - \text{FICT ASSET}}$$

or

$$\text{ii) Debt Equity Ratio} = \frac{\text{DEBENTURES} - \text{LOANS}}{\text{EQUITY SHARE} + \text{PREF SHARE} + \text{R & S} - \text{FIC ASSETS}}$$

$$\text{iii) Proprietary Ratio} = \frac{\text{TOTAL ASSETS (EXCLUDING FIC ASSET)}}{\text{TOTAL ASSET (EXCLUDING FICT ASSET)}}$$

$$\text{vi) Total Asset to Debt Ratio} = \frac{\text{LONG TERM DEBTS}}{\text{PREF SHARE} + \text{DEBENTURES}}$$

$$\text{vii) Capital Gearing Ratio} = \frac{\text{PREF SHARE} + \text{DEBENTURES}}{\text{EQ SH CAPITAL} + \text{R&S} - \text{Fic Asset}}$$



5. In Double Entry System of Book Keeping every business transaction affects  
a) two accounts  
b) two sides of same account

[WBUT 2015]

- c) the same account on two different dates  
d) all of these

Answer: (a)

6. Which of the following balance appears on the debit side of the Trial Balance?

- a) A loss      b) An expenditure      c) An Asset      d) All of these

Answer: (d)

7. Accounting Equation is

[WBUT 2015]

- a) Capital = Assets – Liabilities  
c) Assets = Capital – Liabilities

- b) Liabilities = Capital – Assets  
d) none of these

Answer: (a)

8. If Current Ratio is 2.2 and Current Liability is Rs. 80,000 then the amount of current asset will be

[WBUT 2015]

- a) Rs. 1,76,000      b) Rs. 1,34,000      c) Rs. 1,60,000      d) Rs. 1,72,000

Answer: (a)

9. Goodwill is a

[WBUT 2018]

- a) Fixed asset  
c) Fictitious asset

Answer: (a)

10. Gross Profit is the difference between

[WBUT 2019]

- a) Net Sales and Cost of goods sold  
c) Net Sales and Net purchase

Answer: (a)

11. Debt to Equity Ratio comes under

[WBUT 2019]

- a) Leverage Ratio  
c) Profitability Ratio

Answer: (a)

10. Current Ratio: 2.5, Current Liabilities: Rs.50000, Acid test Ratio: 1.5  
The value of current Assets is –

[MODEL QUESTION]

- a) Rs. 100000      b) Rs. 125000

c) Rs.150000

d) Rs. 175000

Answer: (b)

11. Overhead is the other name of

[MODEL QUESTION]

- a) all direct cost  
c) opportunity cost

- b) sunk cost  
d) indirect cost

Answer: (d)

## **QUESTION 2015**

### **Group - A (Multiple Choice Type Questions)**

1. Answer any ten questions:

- i) Contribution margin is the
- a) excess of sale price over variable costs
  - b) excess of sale price over fixed costs
  - c) excess of sale price over both variable and fixed costs
  - d) none of these
- ii) The firm's decision to invest its funds in fixed and long term assets is known as
- a) Assets Planning
  - b) Capital Budgeting
  - c) Long Term Budgeting
  - d) Short Term Budgeting
- iii) Which of the following balance appears on the debit side of the Trial Balance?
- a) A loss
  - b) An expenditure
  - c) An Asset
  - d) All of these
- iv) In Double Entry System of Book Keeping every business transaction affects
- a) two accounts
  - b) two sides of same account
  - c) the same account on two different dates
  - d) all of these
- v) In this method we start with the higher rate of depreciation in the first year of the life of the assets and reduce this rate in succeeding periods till its year of salvage.
- a) Straight line method
  - b) Reducing balance method
  - d) Sinking fund method
- vi) Annualized capital recovery cost is defined as
- a)  $C(A/P, i, n) + S(A/F, i, n)$
  - b)  $-C(A/P, i, n) + S(A/F, i, n)$
  - c)  $-C(A/P, i, n) - S(A/F, i, n)$
  - d)  $C(A/P, i, n) - S(A/F, i, n)$
- vii) A numerical description of the outcome of an experiment is called a
- a) Descriptive statistic
  - b) Probability Function
  - c) Variance
  - d) Random Variable
- viii) The example of Replacement problem is
- a) Obsolescence
  - b) Depletion
  - c) Deterioration due to aging
  - d) All of these
- ix) What is the full form of PVIF?
- a) Present Value Income Factor
  - b) Present Value Interest Factor
  - c) Profit Value Income factor
  - d) None of these

## POPULAR PUBLICATIONS

- x) If actual sales are Rs. 40,000 and BEP sales are Rs. 30,000, the Margin of Safety is Rs.  
a) 70,000      ✓ b) 10,000      c) 1,40,000      d) 15,000
- xi)  $FVIF_{5\%, 3} =$   
a) 1.050      b) 1.103      ✓ c) 1.158      d) 1.216
- xii) In Replacement Analysis, the existing asset which is considered for replacement is called  
..... asset.  
a) challenger      b) striker      c) winger      ✓ d) defender

### **Group - B**

#### **(Short Answer Type Questions)**

2. Assuming that the cost structure and selling price remain same in 2014 and 2015, find out  
i) P/V ratio;  
ii) Break Even point of sales;  
iii) Profit when sales are of Rs. 3,00,000;  
iv) Sales required to earn a profit of Rs. 60,000 and  
v) Margin of safety in 2015

Period	Sales (Rs.)	Profit (Rs.)
2014	3,60,000	27,000
2015	4,20,000	39,000

See Topic: CASH FLOW & RATE OF RETURN ANALYSIS, Short Answer Type Question No. 2.

3. Distinguish between Depreciation and Obsolescence.

Solve:

A company purchased a machine on 1<sup>st</sup> April 2012 for Rs. 2,60,000; Shipping and forwarding charges: Rs. 10,000; Import duty: Rs. 12,000; Installation charges: Rs. 10,000; Depreciation is to be charged under diminishing balance method at

1<sup>st</sup> year – 10% p.a.; 2<sup>nd</sup> year – 20% p.a., 3<sup>rd</sup> year – 30% p.a.

Calculate the amount of depreciation each year.

See Topic: DEPRECIATION, Short Answer Type Question No. 2.

4. a) Define IRR (Internal Rate of Return).

- b) What is the present value of the following cash flow, assuming a discount rate of 8%?

ear	Cash flow
1	30000
2	20000
3	10000
4	10000

See Topic: CASH FLOW & RATE OF RETURN ANALYSIS, Short Answer Type Question No. 3.

See Topic: PRESENT WORTH ANALYSIS, Short Answer Type Question No. 6.

5. Write a short note on recurring and nonrecurring cost.

See Topic: ENGINEERING COSTS & ESTIMATION, Short Answer Type Question No. 3.

11. Write short notes on any *three* of the following:

- a) Relevance of Capital budgeting
- b) Sunk cost and variable cost
- c) Causes and effects of inflation
- d) Significance of cost accounting
- e) Sensitivity analysis

a) See Topic: CASH FLOW & RATE OF RETURN ANALYSIS, Long Answer Type Question No. 6(b).

b) See Topic: ENGINEERING COSTS & ESTIMATION, Long Answer Type Question No. 8(c).

c) See Topic: INFLATION AND PRICE CHANGE, Long Answer Type Question No. 3(d).

d) See Topic: ACCOUNTING, Long Answer Type Question No. 7(c).

e) See Topic: CASH FLOW & RATE OF RETURN ANALYSIS, Long Answer Type Question No. 6(c).

## **QUESTION 2016**

### **Group – A**

#### **(Multiple Choice Type Questions)**

1. Choose the correct alternatives for any ten of the following:

i) Accounting Equation is

- a) Capital = Assets – Liabilities
- b) Liabilities = Capital – Assets
- c) Assets = Capital – Liabilities
- d) none of these

ii) A person if deposits Rs. 50,000 in a bank at an interest of 10% compounded annually then future value at the end of 5 years will be

- a) 80,525
- b) 70,525
- c) 85,525
- d) 90,525

iii) If in a power sizing model the power sizing index is greater than 1, then

- a) Per unit price increases with increase in quantity
- b) Per unit price decreases with increase in quantity
- c) Per unit price remains constant with increase in quantity
- d) Per unit price remains constant with decrease in quantity

iv) If  $A$  and  $B$  are two independent events then it can be expressed as

- a)  $P(A \cup B)$
- b)  $P(A \times B)$
- c)  $P(A) \times P(B)$
- d) none of these

- v) Which are the determinants of economic life of an asset?
- a) Capital recovery cost
  - b) Average operating and maintenance cost
  - c) Sum of capital recovery cost
  - ✓ d) all of these
- vi) What is the relation between the slopes of Total Cost (TC) and Total Revenue (TR) curves?
- a) Slope of TR > Slope of TC
  - b) Slope of TR < Slope of TC
  - c) Slope of TR = Slope of TC
  - ✓ d) No fixed relation
- vii) A portion of the learning curve is
- a) Parallel to y axis
  - b) Parallel to x axis
  - ✓ c) Cuts the x axis
  - d) Cuts the y axis
- viii) If the inflation rate is 6% per year and the market interest rate is known to be 15% per year, what is the implied real interest rate in this inflationary economy?
- a) 11.45%
  - b) 9.00%
  - ✓ c) 8.49%
  - d) 8%
- ix) Sunk cost is
- a) Original investment + depreciation – repairing expenses
  - b) Original investment – depreciation + repairing expenses
  - ✓ c) Original investment + depreciation + repairing expenses
  - d) Original investment – depreciation – repairing expenses
- x) Which of the following is not applicable to bottom-up approach to cost estimation?
- ✓ a) The project under consideration is considered at the highest aggregate level
  - b) The project under consideration is split into smaller parts and their respective components are identified
  - c) Cost estimates are made for each component of each small part and added up
  - d) Cost estimates are made for each component of each part of the project and are added up to arrive at the total
- xi) A deposit of Rs. 1,10,000 was made for 31 days. The net interest after deducting 20% withholding tax is Rs. 890.36. Find the rate of return annually.
- a) 12.25
  - b) 12.75
  - c) 11.75
  - ✓ d) 11.95
- xii) If Index Number for a certain period is equal to 100, then
- a) Price are increasing
  - b) Prices are decreasing
  - ✓ c) Prices remain constant
  - d) Change in prices cannot be predicted

#### Group - B

##### (Short Answer Type Questions)

2. An aqueduct is needed to bring water into the city. It can be built at a reduced size now for Rs. 3 lakh and enlarged 25 years later at Rs. 3.5 lakh. The other option is to construct the full size aqueduct now for Rs. 4 lakh. Use present worth to find the better choice.

[Given,  $i = 6\%$  and  $(P/F, 6\%, 25) = 0.2330$ ]

See Topic: UNCERTAINTY IN FUTURE EVENTS, Short Answer Type Question No. 1.

## POPULAR PUBLICATIONS

- i) Should the company make or buy? Present the case, when the firm cannot utilize the capacity elsewhere, profitably and when the capacity can be utilized, profitably.

- ii) What would be your decision, if the supplier has offered the component at Rs. 4.50 each

See Topic: ENGINEERING COSTS & ESTIMATION, Long Answer Type Question No. 5(a) & (b).

11. Write short notes on any *three* of the following:

- a) Cost push vs. Demand pull inflation.
- b) NPV vs. IRR
- c) Current asset and fixed asset
- d) Conditional probability
- e) Segmenting Model

a) See Topic: INFLATION AND PRICE CHANGE, Long Answer Type Question No. 3(c).

b) See Topic: CASH FLOW & RATE OF RETURN ANALYSIS, Long Answer Type Question No. 6(d).

c) See Topic: ACCOUNTING, Long Answer Type Question No. 7(d).

d) See Topic: UNCERTAINTY IN FUTURE EVENTS, Long Answer Type Question No. 10(c).

e) See Topic: ENGINEERING COSTS & ESTIMATION, Long Answer Type Question No. 8(d).

## QUESTION 2017

### **Group – A**

#### **(Multiple Choice Type Questions)**

1. Choose the correct alternatives for any *ten* of the following:

i) Cost reflected in accounting system only is called

- a) Cash cost
- b) Overhead cost
- c) Book cost
- d) Direct cost

ii) The opportunity cost of a good is

- a) the time lost in finding it
- b) the quantity of other goods sacrificed to the another unit of that good
- c) the expenditure on the good
- d) the loss of interest in using saving

iii) Which one is the right Accounting Equation?

- a) Assets – Liabilities = Capital
- b) Assets + Liabilities = Capital
- c) Assets + Capital = Liabilities
- d) None of these

iv) Inflation makes

- a) future rupees less valuable than present rupees
- b) future rupees more valuable than present rupees
- c) future rupees equal to present rupees
- d) none of these

v) If A and B are two independent events then  $P(A \text{ and } B)$  is

- a)  $P(A) \times P(B)$
- b)  $P(A) + P(B)$
- c)  $P(A)/P(B)$
- d)  $P(A) - P(B)$

- vi) To compute the construction cost per square foot of a building

  - ✓ a) per unit model will be used
  - b) segmenting model will be used
  - c) learning curve estimation process will be used
  - d) none of these

vii) Which one is fixed cost?

  - a) Depreciation of fixed assets
  - b) Excise duty
  - ✓ c) Cost of advertising
  - d) Sales tax

viii) Which one of the following is helpful for measuring inflation?

  - a) Learning curve
  - b) Segmentation model
  - ✓ c) Consumer price index
  - d) MARR (Minimum Attractive Rate of Return)

ix) In a decision tree arrows coming out of which node have probabilities?

  - a) Decision node
  - b) Random node
  - c) Both (a) and (b)
  - ✓ d) None of these

x) The present worth of an alternative is 0. What do we know about the value of the future worth?

  - a)  $FW < 0$
  - ✓ b)  $FW = 0$
  - c)  $FW > 0$
  - d) Cannot be determined without cash flows

xi) If the inflation rate is 6% per year and the market interest rate is known to be 15% per year, what is the implied real interest rate in this inflationary economy?

  - a) 11.45%
  - b) 9.00%
  - ✓ c) 8.49%
  - d) 8%

xii) A machine worth Rs. 1,00,000 is purchased by paying Rs. 20,000 down payment and 12 monthly installments of Rs. 8,000 each. The book cost at the time of purchase is

  - ✓ a) Rs 1,00,000
  - b) Rs. 8,000
  - c) Rs. 80,000
  - d) Rs. 12,000

## **Group – B**

### **(Short Answer Type Questions)**

## 2. What are the different methods of calculating depreciation?

**See Topic: DEPRECIATION, Short Answer Type Question No. 3.**

3. If Rs. 100 is invested at a compound interest @ 10% p.a. for 3 years, what will be the respective future value for consecutive 3 years?

**See Topic: CASH FLOW, INTEREST AND EQUIVALENCE** Short Answer Type Question No. 6

4. What is 'Simulation Model'? How is the same practically applicable in decision making process?  
See Topic: UNCERTAINTY IN BUSINESS ELEMENTS, Chapter 10.

**Topic: UNCERTAINTY IN FUTURE EVENTS, Short Answer Type Question No. 5.**

5. Define Learning Curve. What are the limitations of Learning Curve?

**See Topic: ENGINEERING COSTS & ESTIMATION, Short Answer Type Question No. 5**

#### **6. State the concept of Sensitivity Analysis**

**See Topic: CASH FLOW & RATE OF RETURN ANALYSIS Short Answer Type Questions**

- c) See Topic: **ENGINEERING COSTS & ESTIMATION**, Long Answer Type Question No. 8(b).  
d) See Topic: **ENGINEERING COSTS & ESTIMATION**, Long Answer Type Question No. 8(a).  
e) See Topic: **CASH FLOW, INTEREST & EQUIVALENCE**, Long Answer Type Question No. 1(a).

## **QUESTION 2018**

### **Group – A**

#### **(Multiple Choice Type Questions)**

1. Choose the correct alternatives for any *ten* of the following:
- i) What is true about the relationship between AC and MC?  
a) AC cuts MC from below      ✓b) MC cuts AC from below  
c) MC and AC do not cut each other      d) AC equals MC when AC is at its maximum
- ii) If Current Ratio is 2.2 and Current Liability is Rs. 80,000 then the amount of current asset will be  
✓a) Rs. 1,76,000      b) Rs. 1,34,000      c) Rs. 1,60,000      d) Rs. 1,72,000
- iii) In replacement analysis old machines are known as  
✓a) Defender      b) Challenger      c) Both (a) and (b)      d) None of these
- iv) At Break-even point  
✓a) Total revenue = Total Cost      b) Total revenue = Total Fixed Cost  
c) Total revenue = Total Variable Cost      d) All of the above
- v) Demand-pull inflation may be caused by  
a) An increase in costs      b) A reduction in government spending  
✓c) A reduction in interest rates      d) An outward shift in aggregate supply
- vi) Goodwill is a  
✓a) Fixed asset      b) Current asset      c) Fictitious asset      d) Wasting asset
- vii) A large angle of incidence indicates  
a) A low rate of profit      ✓b) A high rate of profit  
c) No profit, no loss      d) None of the above
- viii) A card is drawn from a deck of 52 cards. Find the probability that it is either a red king or a black queen.  
a) 2/13      ✓b) 1/13      c) 5/13      d) 8/13
- ix) IRR stands for the rate of return for which  
✓a)  $NPV = 0$       b)  $NPV = 1$       c)  $NPV = -1$       d)  $NPV$  is maximum
- x) The present value of ₹ 1 to be received after 3 years compounded annually at 10%  
a) 0.909      b) 0.826      ✓c) 0.751      d) None of these

## POPULAR PUBLICATIONS

- xi) A uniform series of payment occurring at equal interval of time is called \_\_\_\_\_  
✓ a) Annuity      b) Amortization      c) Depreciation      d) Bond
- xii) The following value(s) of the Power-Sizing Exponent ( $E$ ) indicates Economies of scale  
✓ a)  $0 < E < 1$       b)  $E > 1$       c)  $E = 0$       d)  $E = 1$

### Group - B

#### (Short Answer Type Questions)

2. An asset purchased at Rs. 17,000 has a life time of 5 years and salvage value of Rs. 2,000. If depreciation is computed using straight line method, calculate the book value of the asset at the end of 3 years.

See Topic: DEPRECIATION, Short Answer Type Question No. 4.

3. An aqueduct is needed to bring water into the city. It can be built at a reduced size now for Rs. 3 lakhs and enlarged 25 years later at Rs. 3.5 lakhs. The other option is to construct the full size aqueduct for Rs. 4 lakhs. Use Present Worth to find the better choice. [Given  $i = 6\%$ ].

See Topic: UNCERTAINTY IN FUTURE EVENTS, Short Answer Type Question No. 1.

4. A box contains 6 white and 4 black balls. Two balls are drawn at random one after another without replacement. Prepare the joint probability distribution table.

See Topic: UNCERTAINTY IN FUTURE EVENTS, Short Answer Type Question No. 6.

5. Discuss the economic problems faced by an engineer with suitable examples.

See Topic: ECONOMIC DECISION MAKING, Short Answer Type Question No. 1.

6. What is ratio analysis? Discuss any three ratios and point out their limitations, if any, for analyzing the financial health of a company.

See Topic: ACCOUNTING, Short Answer Type Question No. 4.

### Group - C

#### (Long Answer Type Questions)

7. a) What do you understand by replacement analysis? Explain 'Economic life' of an asset.

See Topic: REPLACEMENT ANALYSIS, Long Answer Type Question No. 2(a).

b) A firm has purchased an equipment at Rs. 20,000. When should the asset be replaced, if the following is given.

End of year	Operation cost in (Rs.)	Maintenance cost in (Rs.)	Resale value in (Rs.)
1	2,000	200	10,000
2	3,000	300	9,000
3	4,000	400	8,000
4	5,000	500	7,000
5	6,000	600	6,000
6	7,000	700	5,000
7	8,000	800	4,000
8	9,000	900	3,000

## **QUESTION 2019**

## **Group - A**

### **(Multiple Choice Type Questions)**

1. Choose the correct alternatives for any ten of the following:

## POPULAR PUBLICATIONS

- x) If A and B are two independent events then  $P(A \cap B) =$
- a)  $P(A/B) \times P(B)$       ✓b)  $P(A) \times P(B)$   
c)  $P(A \cup B)$       d)  $P(A) + P(B)$
- xi) To compute the updated cost of a boiler with same capacity in a power plant, we use
- a) Per Unit Cost Model      ✓b) Cost Index Model  
c) Power Sizing Model      d) Segmenting Model
- xii) Contribution margin is the
- ✓a) excess of sale price over variable cost  
b) excess of sale price over fixed cost  
c) excess of sale price over both variable cost and fixed cost  
d) none of these

### **Group – B**

#### **(Short Answer Type Questions)**

2. Write a brief note on Per Unit Cost method of estimation.

See Topic: **ENGINEERING COSTS & ESTIMATION**, Short Answer Type Question No. 6.

3. Distinguish between Consumer Price Index (CPI) and Wholesale Price Index (WPI).

See Topic: **INFLATION AND PRICE CHANGE**, Short Answer Type Question No. 3.

4. A machine needed for 3 years can be purchased for Rs. 77,662 and sold at the end of period for about Rs. 25,000. A comparable machine can be leased for Rs. 30,000 per year. If a firm expects return of 20% on investments, should it buy or lease the machine? Capital recovery factor (20%, 3 years) = 0.4747. Sinking fund factor (20%, 3 years = 0.2747).

See Topic: **CASH FLOW & RATE OF RETURN ANALYSIS**, Short Answer Type Question No. 7.

5. Define inflation. What are the causes of inflation?

See Topic: **INFLATION AND PRICE CHANGE**, Short Answer Type Question No. 4.

6. A student has taken a loan of Rs. 3,00,000 for 3 years at 9% per annum. Calculate how much needs to be repaid at the end of 3 years under compound interest rate.

See Topic: **CASH FLOW, INTEREST AND EQUIVALENCE**, Short Answer Type Question No. 7.

### **Group – C**

#### **(Long Answer Type Questions)**

7. A firm whose cost of capital is 10%, considering two mutually exclusive projects X and Y, the details are as follows:

Year	Project A	Project B
0	(70,000)	(7,00,000)
1	10,000	50,000
2	20,000	40,000
3	30,000	20,000