Lecture-1 : Introduction

Introduction

1. Economics and money: Economics is an art of managing resources in the circumstances of scarcity. Since resources are quantified in terms of money, economics is an art of managing money.

2. Importance of money in life
    a. Provides basic necessities of life
    b. Provides education and healthcare
    c. Provides security
    d. Provides power
    e. Provide social status

3. **Value of the money is not fixed**
    It is important to note that value of money is measured in terms of its buying power. Buying power depends on availability of resources. It decreases when resource becomes scarce. If there is a greater demand for a given resources, its prices increases and buying power of money with respect to that resource decreases.

4. **Why invest money**
    a. Value of money decreses with time due to inflation.
    b. Invest money so that it can grow. Rate of earning from investment should be greater than rate of inflation

5. **Passive investment :**
    a. bank deposits
    b. bonds,
    c. stocks
    d. hedge fund
    e. Precious metals

6. **Active investment :**
    a. Manufacture goods having higher price than raw materials
    b. Buy goods from places where they are plenty and sell at places where they are scarce.
    c. Running a company to provide services

7. **Pros and cons of investing in chemical industry**
    a. It is capital intensive venture
    b. Small scale manufacturing is no more profitable

c. When manufacturing capacity sufficiently high, and the operation is efficient, return on investment is high (30-50%)
d. There is an inception period before plant attains its design capacity.
e. More prone to accidents. Unsafe conditions must be well understood and avoided.
f. Chemical industry is generally thought to be polluting industry. Hence, it is necessary to follow stringent environmental norms
g. Climate protection, sustainability and energy conservation have become increasingly important and company must take cognisance of these aspects.
h. Company needs to compete with manufacturers producing the same product so as to keep increasing their market share.
i. In order to achieve this, company needs to improve the process using research and development
j. Company needs to expand and/or diversify in order to improve its weight and creditworthiness in the industry
k. They need to be careful to see that they do not infringe on intellectual property belonging to another company or individual.

8. **Why engineer should have knowledge of economics**?

a. **Repair, replacement, or modernization of plant equipment:** The engineer working in a plant should know roughly what is the comparative performance, costs, and payout periods for different types of equipment needed to perform a given duty. He can then suggest either modification or replacement of that piece of equipment.

b. **Plant changes to reduce energy, reduce pollution, reduce hazardous waste** For the engineer to make intelligent recommendations, he should design and do economic calculations on the alternatives before making even preliminary recommendations.

c. **Changes in plant based on competitors' processing methods or management suggestions:** Companies have information network to find what their competitors are doing and how they are performing. Engineer should be able to assimilate this information and check how to use it to improve the plant operation.

d. **Testing novel ideas.** During the analytical phase of creative thinking many of the ideas will require a quick cost estimation and economic analysis to provide a better idea of their merit. Even though supervisors or others may be assigned to do this work, the chances of conceiving good ideas and having them accepted increases immensely if some economic screening can be done by the originator.

e. **R&D studies**: Many times R&D studies are done by chemists. There are always many stumbling points, or alternative directions that may be taken in attempting to solve the problems. This this conceptual design, brief cost estimates and economic analyses in order to decide which are the most promising directions to pursue.

f. **Pilot scale studies** After an early or intermediate stage of an R&D program has been successful, new funding requests usually are required to continue the study. These requests can always benefit from having potential preliminary economic analyses. Later, in the final stages of a successful project the engineer may be part of a team assigned to provide a more definitive preliminary economic projection and analysis.

g. **Management skills** : In dealing with production, sales, or management personnel one can usually gain more respect, and be considered more practical and less "theoretical" by having a reasonable knowledge of the costs and economics of the projects under study, and general industry economics.

h. **Sales:** A general knowledge of company costs, profits, and competition are very helpful for more effective salesmanship. Salesmen often recommend new products, improvements, or pricing ideas to their management. A cost and economic estimate for these ideas should be helpful in the proposal report. Salesmen sometimes perform market surveys. Again, a general economic knowledge of the industries and companies surveyed may be essential, and is always useful. Salesmen, as the other chemical engineering occupational categories, may move into management, where economic knowledge is a major part of the job.

i. In many plant engineering companies, Engineering departments or companies usually have very well-developed in house methods and data that must be used for cost estimation. But all chemical engineers are assumed to know the rudiments of cost estimating, economic evaluation, and the economics. A high percentage will find this knowledge useful or necessary throughout their careers.

9. Course outline

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