SHREE DATTA POLYTECHNIC COLLEGE, DATTANAGAR

Maharashtra State Board of Technical Education

Question paper with Model Answer Class Test No.- I

Course Name: Mechanical Engineering   CourseCode:ME6E

Semester: Sixth

Subject: Production Technology (12243)   Marks: 25

Q1 Explain any three .   3x3

   a) Define "Production" .List different types of production system.
   b) Define productivity. How it different from production?
   c) Write down the relaxation provided for backward areas by the government.
   d) What is Group Technology? Give suitable example.
   e) What is assembly? Explain various types of assembly.

Q2 Explain any two .   4x2

   a) Define process planning. Explain various steps in process planning.
   b) Compare product layout & process layout.
   c) State different types of plant layout. Explain fixed position layout with suitable example

Q3 Explain any two .   4x2

   a) Explain concept of Break Even Analysis. Draw break even chart indicating BEP, various cost, margin of safety, Profit and loss.
   b) Define
       a) Plant capacity   b) plant efficiency
       c) Machine capacity   d) scrap factor
   c) The fixed costs for the year 1975-76 are Rs.80,000.The estimated sales for the period are valued at Rs.200000. The variable cost per unit for single product made Rs.4.If each unit sells at Rs.20,and the number of units involved coincides with expected volume of output, construct the Breakeven chart.
     I) Determine the BEP.
  II) Above how many units,the company should produce in order to seek profit.
 III) Determine profit earned at turnover of Rs.160000.
 IV) Find margin of safety.

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a) Define "Production" .List different types of production system.

Ans- Production is an organized activity of transforming raw materials into finished products. It is an intentional act of producing something useful.

Types of production system-

  1) Job production system   3) Line production system

  2) Batch production system   4) Process production system

b) Define productivity. How it different from production?

Ans-1) Productivity is nothing but the reduction in wastage of resources such as labor, machines,

  materials, power, space, time, capital, etc.

  2) Productivity can also be defined as human effort to produce more and more with less and less inputs of resources so that the products can be purchased by a large number of people at affordable price.

<div align="center">DIFFERENCE BETWEEN PRODUCTION AND PRODUCTIVITY</div>

  Production is an organized activity of transforming raw materials into finished products which have higher value. Production of any commodity or service is the volume of output irrespective of the quantity of resources employed to achieve the level of output. Production in an industry can be increased by employing more labor, installing more machinery, and putting in more materials, regardless of the cost of production.

   But increase of production does not necessarily mean increase in productivity. Higher productivity results when we put in production system an element of efficiency with which the resources are employed. The combined input of a number of factors such as land, materials, machines, capital, and labor gives an output in an industry. The ratio between output and one of these factors of input is usually known as productivity of the factor considered. Productivity may also be considered as a measure of performance of the economy as a whole. Mathematically, Productivity = Output Value/Input Value

c) Write down the relaxation provided for backward areas by the government.

    1) Subsidies on water, land, electricity etc.

    2) Concession on various taxes.

    3) Lower rate of interest on loans.

    4) Promotion or benefits of different govt. schemes

    5) Relaxation on sales tax

    6) Assistance for domestic & export marketing.

    7) Provision for training facilities.

d) What is Group Technology? Give suitable example.

  1) Processes are grouped into cells using a technique known as group technology.

  2) Group Technology or GT is a manufacturing technique in which the parts having similarities in Geometry, manufacturing process and/or functions are assembled together

  3) The group of similar parts is known as part family and the group of machineries used to process an individual part family is known as machine.
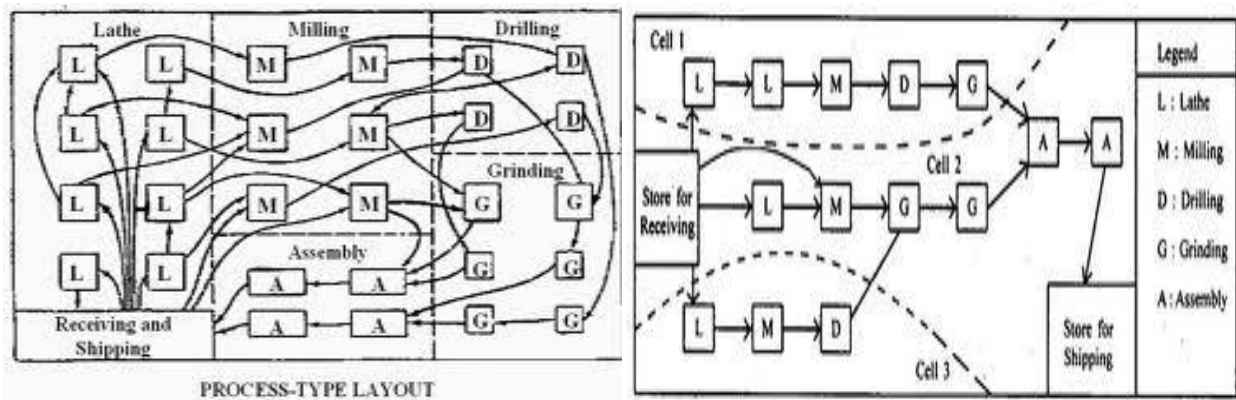
Before GT   After GT

e) What is assembly? Explain various types of assembly.

Assembly- when two or more parts or subassemblies joined together to form a complete machine, structure or article, it is known as assembly.

Various types of assembly-

    a) According to type of layout

        1) Fixed assembly

        2) Progressive assembly

    b) According to medium of assembly

        1) Manual assembly

        2) Semi automatic assembly

        3) Automatic assembly

Q2 a) Define process planning. Explain various steps in process planning.

Process planning-It is defined as the systematic determination of methods by which a product is to be manufactured economically & competitively.

Steps involved in Process Planning -:

1) Study of part drawings and its specifications. (part print analysis)

2) To decide about make or buy about the part under planning. This decision is called make or buy decision.

3) Selection of most appropriate process which is competitive and economical.

4) Deciding the sequence of operations which comprises the selected process. Operations are combined wherever possible.

5) Determination of blank size of raw material and list of material is prepared.

6) As per the capacity and capability, the suitable machines with accessories are selected.

7) Determination of inspection points or stages on product manufacturing line.

8) Selection of labour, tools, measuring and inspection devices.

9) Estimation of process and manufacturing cost of product.

10) Preparation of route and operation sheet which is also called as process sheet.

b) Compare product layout & process layout.

| Sr.no	product layout	process layout
1	Facilities arranged in sequence	Similar facilities are grouped together.
2	Steady & continues flow of material	Discontinuous flow of material
3	Applicable in mass production	Useful in job or batch production
4	Higher initial investment	Less initial investment
5	Less labor force required	Higher labor force with higher skill are respected

c) State different types of plant layout. Explain fixed position layout with suitable example

Ans-

Types of plant layout

    1) Product or line

    2) Process or functional

    3) Project or fixed position layout

Fixed position layout with suitable example
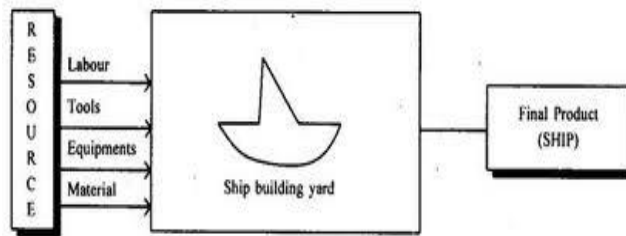
In this type of layout, the major product being produced is fixed at one location. Equipment labour and components are moved to that location. All facilities are brought and arranged around one work center. This type of layout is not relevant for small scale entrepreneur.

Advantages: Fixed position layout provides the following benefits

a) It saves time and cost involved on the movement of work from one workstation to another.

b) The layout is flexible as change in job design and operation sequence can be easily incorporated.

c) It is more economical when several orders in different stages of progress are being executed simultaneously.

d) Adjustments can be made to meet shortage of materials or absence of workers by changing the sequence of operations.

 E.g. Ship building industries, aircraft production, assembly operation industries.

Q3

A) Explain concept of Break Even Analysis. Draw break even chart indicating BEP, various cost, margin of safety, Profit and loss.

Ans- 1) breakeven analysis implies that at some point in the operations, total revenue equals total cost.

 2) Breakeven analysis is concerned with finding the point at which revenues and costs agree exactly.

 3) The breakeven point is the volume of output at which neither a profit is made nor a loss is incurred. This analysis helps to find the price of an article to give the desired profit, to determine variable cost per unit, to compute costs and revenues for all possible volumes of output.
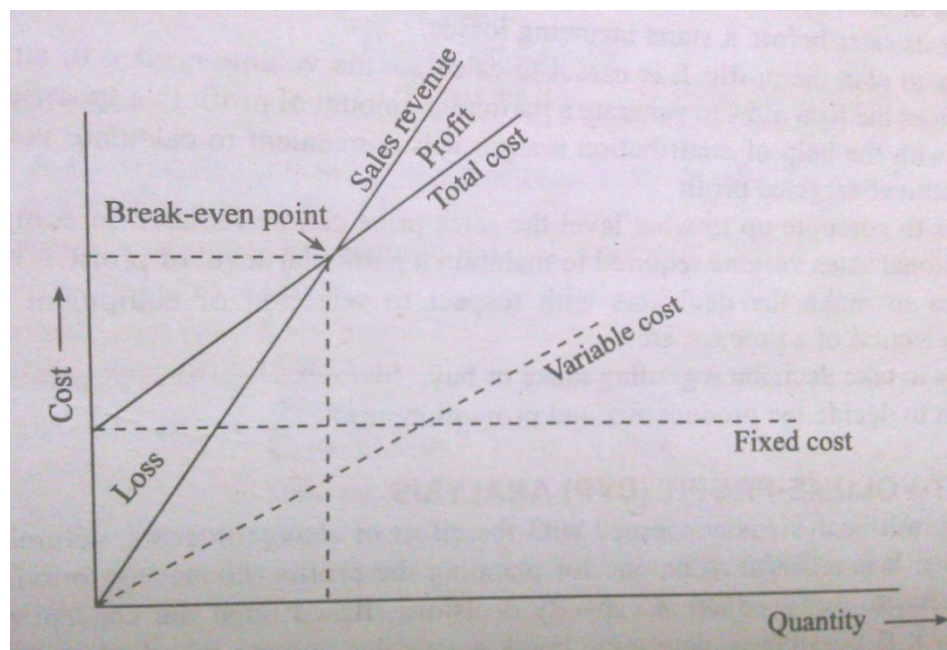
Break even chart

b) Define

    a) Plant capacity   b) plant efficiency

    c) Machine capacity   d) scrap factor

Ans-

    a) **Plant capacity** –
        - Plant capacity is the amount of finished product or find product produced per hour
        - Generally plant capacity is expressed as amount of final product produced per Annum.

    b) **Plant efficiency-**
        - It is the ratio of the working hours utilized by the plant per day or per shift or per
          week or per year to the working hours of the plant for the same period
        - Plant efficiency factor = actual work hour in sp. Period / available work hour for sp.
                                                Period
    c) **Machine capacity-**
        -An available time for work on a machine expressed in machine hours.
        - Eg. Machine hrs per week, machine hrs per shift.

    d) **Scrap factor**
        -The percentage of rejected components created during the operation of a process is
          called as scrap factor.
        - scrap factor=$\dfrac{defective/scrapped\ components}{\text{Total no.of components produced}}$

c) The fixed costs for the year 1975-76 are Rs.80,000.The estimated sales for the period are valued at Rs.200000. The variable cost per unit for single product made Rs.4.If each unit sells at Rs.20, and the number of units involved coincides with expected volume of output, construct the Breakeven chart.

    I) Determine the BEP.

    II) Above how many units, the company should produce in order to seek profit.

    III) Determine profit earned at turnover of Rs.160000.

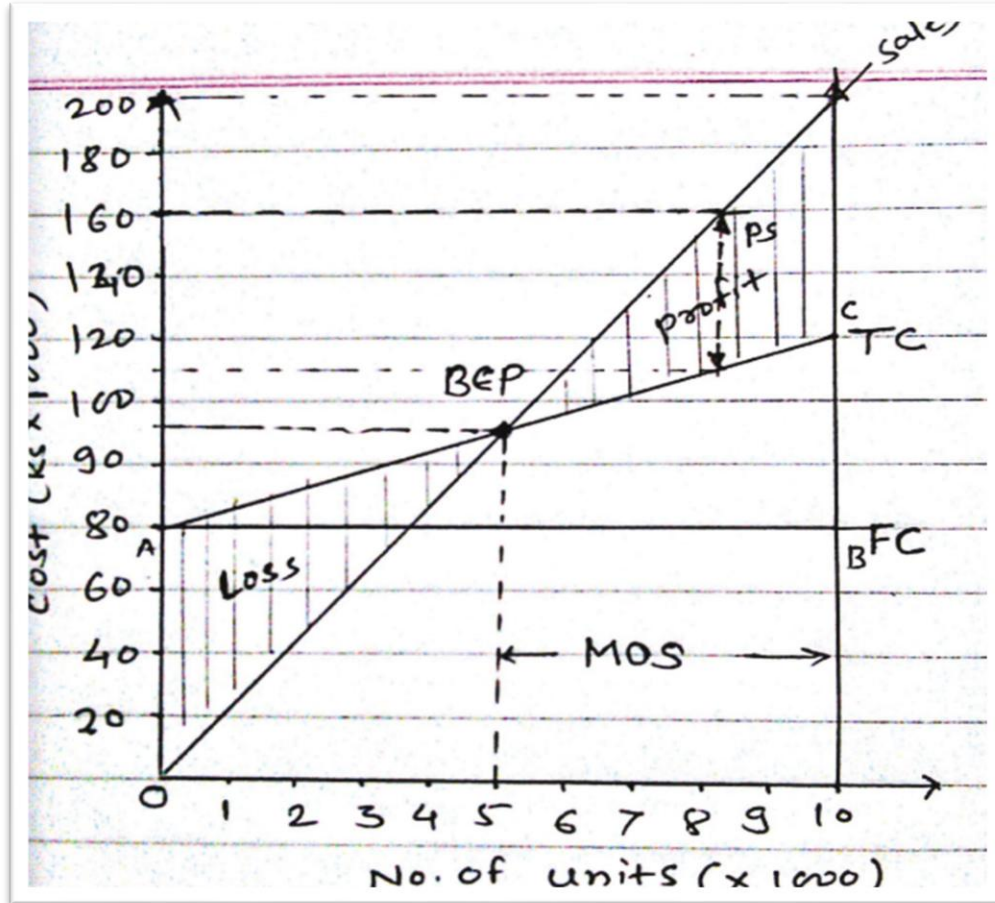   **IV) Find margin of safety.**

Ans-   Given data,

  F- Rs 80000
  V- Rs 4 (per unit)
  P-Rs 20 (selling price per unit)

Estimated sales- S- Rs 200000

No. of unit sold= S/P=200000/20= 10000 unit

1) Draw fixed cost line (AB) at Rs 80000.

2) Variable cost= No. of units x variable cost per unit

$$= 10000 \times 4$$

$$= Rs\ 400000$$

3) BEP= FC/ (SP-VC)

$$= 80000/ (20-4)$$

$$= 5000\ units\ \ or\ \ Rs\ 100000$$

4) The company should produce & sell more the 5000 units to seek profit (from fig.)

5) Total profit earned at turnover Rs 1, 60000 is Ps= Rs 48000 (from fig.)

6) MOS= Total sales-Sales at BEP

$$= 200000-100000$$

$$= Rs\ 100000.$$