

- Improved service is obtained by giving more business to fewer suppliers, and placing long-term purchase orders.
- Major feature of JIT purchasing is that suppliers are not selected on the basis of price alone.
- Performance on quality, delivery as needed and commitment to JIT are vital.

Other advantages of JIT

- **Include:**
 - significant quantity discounts
 - Savings in time from negotiating with fewer suppliers.
 - Reduction in clerical work from issuing long-term orders.
- By seeking to ensure that production and purchases are timed to coincide with demand, the determination of EOQ and re-order point are no longer required.

Example – Relevant Costs and Optimum Batch-size

- Ferozee Ltd manufactures an item called badam, the annual demand is 4000 units spread evenly throughout the year.
- Production takes place 4 times a year in batches of 1000 units.
- One raw material input for badam is the unnab, also manufactured by Ferozee.
- Unnab is produced in large quantities and there is sufficient production capacity.

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The standard costs of producing badams and unnabs are:

Badam	Unnab
Raw materials	13 8
Unnab standard cost	22
Labor – unskilled	7 4
- skilled	9 5
Variable overheads	5 3
Fixed overheads	<u>4</u> <u>2</u>
Standard Cost	<u>60</u> <u>22</u>

Included in fixed costs for badam are the set up costs for each production run.

Cost per set up are:

Labor costs – skilled labor	66
machine parts	<u>70</u>
total	<u>136</u>

There are no set up costs of unnab.

Example – Relevant Costs and Optimum Batch-size

- The cost of financing stocks of badams is 15%.
- Each unit requires 0.40 square meters of storage space. Warehouse rent is Rs 20 p.a. per sq m. Ferozee only pays for storage space actually used.
- Idle payment is made to all except unskilled labor, these are paid only for work carried out.
- *Required (a) Show optimum batch size for badam. Calculate savings if different from current policy.*

Solution

- Optimum batch size $Q = \frac{2DS}{H}$
- Relevant cost of production of badam is:

– Raw materials	13
– Unnab std cost – raw mat	8
– unskilled lab	4
– variable overheads	<u>3</u> 15
– Unskilled labor	7
– Variable overheads	<u>5</u>
Incremental cost of production	40

- Annual demand of badams is 4000 units
- Set up cost = Rs 70 (skilled labor Rs 66 is fixed)
- Annual holding cost is Rs 14 (storage Rs 8 + capital tied up in stock Rs 6).
- Storage: .4 sq m x Rs 20 = Rs 8
- Capital cost: 15% x Rs 40 = 6
- Applying the formula:

$$Q = \text{square root of } \frac{2 \times 4000 \times 70}{14} = 200 \text{ units}$$

Cost savings

- Current policy:
 - Set up cost (4 x 70) 280
 - Holding cost (1000/2 x 14) 7000 7280

Optimum policy:

Set up cost (4000/200 x 70) 1400

Holding cost ($200/2 \times 14$)	<u>1400</u>	<u>2800</u>
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Annual savings 4480

Example (cont) Quantity discount

- The second stock item is the product jamun, this is purchased for resale and annual demand of 10000 units is spread evenly throughout the year.
- Incremental ordering costs are Rs 100 per order and normal unit cost is Rs 20.
- Suppliers of jamun are offering quantity discounts as follows:
- Qty ordered – upto 999 20
- 1000 – 1999 19.8
- 2000 and above 19.6
- Holding costs for jamun are Rs 8 per unit per year.
- Required (b) What is the correct order size for jamun

Solution

$$Q = 2DO / H$$

$$= \frac{2 \times 10000 \times 100}{10000} = 500 \text{ units}$$

Comparison with savings from discounts at 19.80

- Savings in price: $(10000 \times .2)$	2000
- Savings in ordering cost: $\frac{1000}{(10000/1000 \times 100)-(10000/500 \times 100)}$	
total savings	3000

Additional holding cost: $1000 - 500/2 \times 8 = 2000$

Savings from order size of 1000 at 19.8 = 1000

Quantity discount

- Discount for 2000 units at 19.60
 - Savings in price ($10000 \times .4$) 4000
 - Savings in order cost 1500 $(10000/2000 \times 100) - (10000/500 \times 100)$
 - Total savings 5500
 - Additional holding cost:
 $(2000 - 500)/2 \times 8 = 6000$

Additional cost is higher than savings.

Ferozee should purchase batches of 1000 at a price of Rs 19.80

LECTURE # 41

Application of Linear programming*

- We established that where a scarce resource exists, the contribution per unit of the scarce resource should be calculated.
- The resource should then be allocated to different products on the basis of this contribution per unit. This will maximize profits.
- Where more than one scarce resource exists, the optimum production program cannot be easily established by the above process.

Example – 2 scarce resources

The ZB company produces 2 products. The standards per unit of product are as follows:

Product BB Product MB

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Standard selling price

Less variable standard costs:

- Materials (BB - 8@4; MB 4@4)
- Labor (BB 6hrs@10; MB 8hrs@1
- Variable overhead (BB 4hr@1; N

Variable cost

Contribution

VU MSB

ERROR: syntaxerror
OFFENDING COMMAND: %ztokenexec_continue

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