Industrial Management and Engineering Economy

For 5th year Mechanical and Industrial Engineering students

Individual Assignment 2

1. Fincha hydroelectric power station has decided to build a new sub district somewhere in Addis Ababa town so as to provide a speedy service for its customers. In order to choose a site, it has decided to evaluate all options against a number of criteria, as follows:

- ❖ The cost of the site;
- ❖ The rate of local property taxation;
- ❖ The availability of suitable skills in the local labor force;
- ❖ The site's access to the motorway network;
- ❖ The site's access to the airport;
- ❖ The potential of the site for future expansion.

After consultation with its property agents, Finch hydroelectric power station identifies three sites which seem to be broadly acceptable. These are known as sites A, B and C. The station also investigates each site and draws up the weighted-score in table shown below. It is important to remember that the scores shown in the table below are those which the manager has given as an indication of how each site meets Finch hydroelectric power station's need specifically. Nothing is necessarily being implied regarding any intrinsic worth of the locations. Likewise, the weightings are an indication of how important the station finds each criterion in the circumstances it finds itself. Which site is best for the district to locate & provide a speedy service for its customers in Addis Ababa town? Why?

Criteria	*Importance weighting*	*Scores*		
		Sites		
		A	*B*	*C*
Cost of the site	4	80	65	60
Local taxes	2	20	50	80
Skills availability	1	80	60	40
Access to motorways	1	50	60	40
Access to airport	1	20	60	70
Potential for expansion	1	75	40	55
Total weighted scores		585	580	605*

2. a. The following table contains figures on the monthly volume and unit costs for a random sample of 16 items from a list of 2,000 inventory items at a health care facility. Develop an A-B-C classification for these items:

Item	Unit Cost	Usage	Item	Unit Cost	Usage
K34	$10	200	F99	20	60
K35	25	600	D45	10	550
K36	36	150	D48	12	90
M10	16	25	D52	15	110
M20	20	80	D57	40	120
Z45	80	200	N08	30	40
F14	20	300	P05	16	500
F95	30	800	P09	10	30

b. Given the monthly usages in the following table, classify the items in A, B, and C categories according to dollar usage:

Item	Usage	Unit Cost
4021	90	$1,400
9402	300	12
4066	30	700
6500	150	20
9280	10	1,020
4050	80	140
6850	2,000	10
3010	400	20
4400	5,000	5

c. Determine the percentage of items in each category and the annual dollar value for each category for part b.

3. A bakery buys flour in 25 pound bags. The bakery uses 1,215 bags a year. Ordering cost is $10 per order. Annual carrying cost is $75 per bag.

a. Determine the economic order quantity.

b. What is the average number of bags on hand?

c. How many orders per year will there be?

d. Compute the total cost of ordering and carrying flour.

e. If holding costs were to increase by $9 per year, how much would that affect the minimum total annual cost?

4. A large law firm uses an average of 40 boxes of copier paper a day. The firm operates 260 days a year. Storage and handling costs for the paper are $30 a year per box, and it costs approximately $60 to order and receive a shipment of paper.

a. What order size would minimize the sum of annual ordering and carrying costs?

b. Compute the total annual cost using your order size from part a.

c. Except for rounding, are annual ordering and carrying costs always equal at the EOQ?

d. The office manager is currently using an order size of 200 boxes. The partners of the firm expect the office to be managed “in a cost-efficient manner.” Would you recommend that the office manager use the optimal order size instead of 200 boxes? Justify your answer.