

**VPM's**  
**DR VN BRIMS, Thane**  
**Programme: MMS (2015-17) (Operations)**  
**Fourth Semester Examination April 2017**

<b>Subject</b>	<b>World Class Manufacturing</b>		
<b>Roll No.</b>		<b>Marks</b>	<b>60 Marks</b>
<b>Total No. of Questions</b>	<b>7</b>	<b>Duration</b>	<b>3 Hours</b>
<b>Total No. of printed pages</b>		<b>Date</b>	<b>11.04.2017</b>

**Note: Q1 is compulsory and solve any FOUR from the remaining SIX questions.**

**Q1) 20 Marks (Compulsory)**

**HOME-STYLE COOKIES**

**The Company**

The Lew-Mark Baking Company is located in a small town in western New York State. The bakery is run by two brothers, Lew and Mark, who formed the company after they purchased an Archway Cookie franchise. With exclusive rights in New York and New Jersey, it is the largest Archway franchise. The company employs fewer than 200 people, mainly blue collar workers, and the atmosphere is informal.

**The Product**

The company's only product is soft cookies, of which it makes over 50 varieties. Larger companies, such as Nabisco, Sunshine, and Keebler, have traditionally produced biscuit cookies, in which most of the water have been baked out, resulting in crisp cookies. Archway cookies have no additives or preservatives. The high quality of the cookies has enabled the company to develop a strong market niche for its product.

**The Customers**

The cookies are sold in convenience stores and supermarkets throughout New York and New Jersey. Archway markets its cookies as "good food" no additives or preservatives and this appeals to a health-conscious segment of the market. Many customers are over 45 years of age, and prefer a cookie that is soft and not too sweet. Parents with young children also buy the cookies.

**The Production Process**

The company has two continuous band ovens that it uses to bake the cookies. The production process is called a batch processing system. It begins as soon as management gets orders from distributors. These orders are used to schedule production. At the start of each shift, a list of the cookies to be made that day is delivered to the person in charge of mixing. That person checks a master list, which indicates the ingredients needed for each type of cookie, and enters that information into the computer. The computer then determines the amount of each ingredient needed, according to the quantity of cookies ordered, and relays that information to storage silos located outside the plant where the main ingredients (flour, sugar, and cake flour) are stored. The ingredients are automatically sent to giant mixing machines where the ingredients are combined with proper amounts of eggs, water, and flavorings. After the ingredients have been mixed, the batter is poured into a cutting machine where it is cut into individual cookies. The cookies are then dropped onto a conveyor belt and transported through one of two ovens. Filled cookies, such as apple, date, and raspberry, require an additional step for filling and folding. The non-filled cookies are cut on a diagonal rather than round. The diagonal-cut cookies require less space than straight-cut cookies, and the result is a higher level of productivity. In addition, the company recently increased the length of each oven by 25 feet, which also increased the rate of production. As the cookies emerge from the ovens, they are fed onto spiral cooling racks 20 feet high and 3 feet wide. As the cookies come off the cooling racks, workers place the cookies into boxes manually, removing any broken or deformed cookies in the process. The boxes are then wrapped, sealed, and labeled automatically.

**Inventory**

Most cookies are loaded immediately onto trucks and shipped to distributors. A small percentage is stored temporarily in the company's warehouse, but they must be shipped shortly because of their limited shelf life. Other inventory includes individual cookie boxes,

shipping boxes, labels, and cellophane for wrapping. Labels are reordered frequently, in small batches, because FDA label requirements are subject to change, and the company does not want to get stuck with labels it can't use. The bulk silos are refilled two or three times a week, depending on how quickly supplies are used.

Cookies are baked in a sequence that minimizes downtime for cleaning. For instance, light colored cookies (e.g., chocolate chip) are baked before dark-colored cookies (e.g., fudge), and oatmeal cookies are baked before oatmeal raisin cookies. This permits the company to avoid having to clean the processing equipment every time a different type of cookie is produced.

### **Quality**

The bakery prides itself on the quality of its cookies. Quality control inspector samples cookies randomly as they come off the line to assure that their taste and consistency are satisfactory, and that they have been baked to the proper degree. Also, workers on the line are responsible for removing defective cookies when they spot them. The company has also installed an X-ray machine on the line that can detect small bits of metal filings that may have gotten into cookies during the production process. The use of automatic equipment for transporting raw materials and mixing batter has made it easier to maintain a sterile process.

### **Scrap**

The bakery is run very efficiently and has minimal amounts of scrap. For example, if a batch is mixed improperly, it is sold for dog food. Broken cookies are used in the oatmeal cookies. These practices reduce the cost of ingredients and save on waste disposal costs. The company also uses heat reclamation: The heat that escapes from the two ovens is captured and used to boil the water that supplies the heat to the building. Also, the use of automation in the mixing process has resulted in a reduction in waste compared with the manual methods used previously.

### **New Products**

Ideas for new products come from customers, employees, and observations of competitors' products. New ideas are first examined to determine whether the cookies can be made with existing equipment. If so, a sample run is made to determine the cost and time requirements. If the results are satisfactory, marketing tests are conducted to see if there is a demand for the product.

### **Potential Improvements**

There are a number of areas of potential improvement at the bakery. One possibility would be automated packing the cookies into boxes. Although labour costs are not high, automating the process might save some money and increase efficiency. So far, the owners have resisted making this change because they feel an obligation to the community to employ the 30 women who now do the boxing manually. Another possible improvement would be to use suppliers who are located closer to the plant. That would reduce delivery lead times and transportation costs, but the owners are not convinced that local suppliers could provide the same good quality. Other opportunities have been proposed in recent years, but the owner rejected them because they feared that the quality of the product might suffer.

Questions:

1. What are two ways that the company has increased productivity? Why did increasing the length of the ovens result in a faster output?
2. Do you think that the company is making the right decision by not automating the packing of cookies? Explain your reasoning. What obligation does a company have to its employees in a situation such as this? What obligation does it have to the community? Is the size of the town a factor? Would it make a difference if the company was located in a large city? Is the size of the company a factor? What if it was a much larger company?
3. What factors cause Lew-mark to carry minimal amounts of certain inventories? What benefits results from this policy?
4. As a consumer, what things do you consider in judging the quality of cookies you buy in a supermarket?

**Attempt Any FOUR from the Remaining SIX Questions**

**Q2) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks**

- a) Explain the matrix of competitors & Markets of Local and Global **CH1**
- b) Explain the following with an example:
  - i. Cycle Time
  - ii. Changeover Time
  - iii. Takt Time
  - iv. Lead Time
  - v. VSM
- c) Explain Basic two types of Kanban with a diagram. **ch4**

**Q3) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks**

- a) Define SMED and explain stepwise with an example. **Ch3**
- b) Which are seven QC tools? Explain in details. **Ch4**
- c) Explain AMBITE System. **CH7**

**Q4) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks**

- a) What are the Manufacturing Strategies for change? **ch7**
- b) What are the steps for strategic planning methodology for WCM? **Ch7**
- c) What are the World Class Purchasing Steps by Maskell? **Ch3**

**Q5) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks**

- a) Explain MANSI Matrix. **Ch6**
- b) Why management tools are important and how 'Information Tools' are effective for implementation of WCM?
- c) Explain Classification by breadth of IT infrastructure and depth of manufacturing applications. **Ch6**

**Q6) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks**

- a) Explain Building blocks of FMS. **Ch4**
- b) What are the issues in strategic planning for WCM? **Ch7**
- c) what is "Cost of Quality"? Explain in Detail.

**Q7) Any two from (a) or (b) or (c) ————— (5x2) = 10 Marks**

- a) Draw & Explain Gunn's Manufacturing for competitive Advantage Framework. **CH2**
- b) What are the challenges of Information Age? **CH 1**
- c) What is Demming's approach for Quality Management? **Ch3**