

## CHAPTER 24 MANAGING PRODUCTIVITY AND MARKETING EFFECTIVENESS

### CONCEPT:

Sustaining profitability and maintaining or improving market share requires effective marketing activities. Effectiveness in marketing however demands proper consideration of factors such as selling price, sales volume and market price, market share and productivity.

Improvements in productivity are achieved when fewer workers, materials, machines or other resources are used to manufacture and sell the same or better products.

Benefits that higher productivity brings about to business firms;

- Competitive advantages
- Higher-than-average returns, earnings and
- Attainment of long-term success

“Measuring Productivity” A productivity measure that includes all input resources used in production is a *total productivity*.

**Productivity** is the ratio of output to input. A productivity measure is often compared to the performance of a prior period, another firm, the industry standard or a benchmark in assessing a firm’s productivity.

Measures of productivity are applicable to all organizations including service firms and non-profit organizations.

Productivity= Output/Input

### Two types of Productivity Measures

#### 1. Operational Productivity and Financial Productivity

Their formula is:

Operational Productivity= Output Units/ Input Units

Financial Productivity= P Input/ P output

#### 2. Partial Productivity

*Partial Productivity* measures the relationship between the output and one or part of the required input resources used in producing output. The higher the ratio is , the better.

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It is computed as follows:

Partial Productivity= Number of units or value or output manufactured/Number of units or cost of single or part of the input resources

*A partial operational productivity is the required physical amount of an input resource to produce one unit output while a partial financial productivity of an input resource is the number of units or the value of output manufactured for each peso spent on the input resource.*

### **Advantages of Partial productivity measures**

- (1) It allows managers to focus on the use of a particular input.
- (2) It is easily interpreted by all within the organization and are easy to use for assessing productivity of performance of operating personnel.
- (3) For operational control, the standard for performance are very often short-term, say productivity ratios of prior batches of goods, and productivity trends within the year can therefore be tracked.

### **Limitations of Partial productivity measures**

- (1) It measures only the relationship between an input resource and the output; it ignores any effect that changes in other manufacturing factors have on productivity. An improved partial productivity could have been obtained by decreasing the productivity of one or more other input resources.
- (2) It ignores any effect the changes in other production factors have on productivity.
- (3) It ignores the effects that changes in the firm's operating characteristics have on the productivity of the input resource.
- (4) An improved partial productivity does not imply that the firm or division operates efficiently. No efficiency standard is involved in the determination of partial productivity measures.

### **Total productivity**

*Total productivity* shows the relationship between the output and the total cost of all input resources use to produce the output.

Total productivity is a financial productivity measure.

It is computed as follows:

Total productivity = Units or Sales Value of Output / Total cost of all input resources

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### Benefits of Total productivity measures

Total productivity measures the combined productivity of all operating factors. It decreases the possibility of manipulating some of the manufacturing factors to improve the productivity of other manufacturing factors.

### Limitations of Total productivity measure

(1) Total productivity is a financial measure and executives at the operational level may have difficulty linking financial productivity measures to their day-to-day operations. Furthermore, deterioration in total productivity can result from increased costs of resources that were beyond the manager's control or decreased productivity of some of the input resources that were outside the realm of the manager

(2) The basis for assessing changes in productivity could vary over time, that year, yearly measure use different years as the base.

(3) It can ignore the effects of changes in demand for the product, changes in selling prices of the goods and services and special purchasing and selling arrangements on productivity.

No entity can gain success without effective marketing activities that will enable it to accomplish the following:

- Earn the projected operating income
- Attain the desired and budgeted market share
- Adapt to market change

*The factors that can affect the marketing effectiveness of a firm includes changes in selling prices, sales quantity, product mix, market size and market share.*

### Sales variance

*Sales variance* is the difference between the actual sales revenues of a period and the sales revenue in the master budget.

### Sales price variance

*Sales price variance* is the difference between the actual peso amount received from all the units sold and the peso amount the firm would have received had the firm sold these units at the budgeted selling price per unit.

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Sales price variance measures the impact of deviations of the actual selling prices from the master budgeted selling prices on contribution margin and operating income.

Sales Price Variance = [Actual selling price per unit - Budgeted selling price per unit] x Actual no. of units sold

### **Sales Volume Variance**

A *sales volume variance* is the difference between the budgeted contribution margin for the actual total units sold ( flexible budget contribution margin ) and the budgeted contribution margin for the ,budgeted units ( master budget contribution margin ). This variance measures the effect on contribution margin and operating income when the quantity sold for one or more products differs from the quantity in the master budget for the period.

Sales volume variance = [ No. of units sold - No. of units in master budget ] x Budgeted contribution margin per unit

### **Sales mix variance**

Sales mix variance of a product is the product of the difference between the actual and budgeted sales mix, the actual total units of all products sold, and the budgeted contribution margin per unit of the product. The product's sale mix variance measures the effect on the contribution margin and operating income due to the deviation of the actual sales mix from the budgeted sales mix.

Sales mix variance for a product = [actual sales mix percentage for the product - budgeted sales mix percentage for the product ] x Actual total units of all products sold x Budgeted unit contribution margin of the product

### **Sales Quantity Variance**

A *sales quantity variance* measures the effect on the contribution margin and operating income due to the deviation of the actual total sales units from the budgeted total units.

Sales quantity Variance for a product = [ Actual Total units of all product sold - Budgeted Total sales units of all products ] x Budgeted sales mix percentage of the product x Budgeted contribution margin per unit of the product

### **Market Size Variance**

*Market size variance* measures the effect of changes in the total market-size on the firm's total contribution margin and operating income. As the size of the total market for a firm's products changes, the total sales of the firm are likely to change with it. When the total market size for the firm's products expands, the total sales of

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the firm likely would increase. A firm that failed to increase its total sales in proportion to the increase in the total market is not keeping up with the market and is losing its marketing position.

Market size variance = [ Actual total units of the market - Budgeted total units of the market ] x budgeted market shares x Weighted-average budgeted contribution margin per unit

### **Market share variance**

*Market share variance* compares the firm's actual market share to its budgeted market share and measures the effect of changes in the firm's market share on its total contribution margin and operating income.

Market share variance = [ Actual market share - Budgeted market share ] x Actual Total units of the industry x Weighted- average budgeted contribution margin per unit

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### ESSAY:

1. **What does productivity mean?**

Productivity measures the relationship between actual inputs used (both quantities and costs) and actual outputs produced. The lower the inputs for a given quantity of outputs or the higher the outputs for a given quantity of inputs, the higher the productivity measuring productivity improvements over time highlights the specific input-output relationships that contribute to cost leadership.

2. **Distinguish between operational productivity and financial productivity.**

An operational productivity is the ratio of the output to the number of units of an input resource.

A financial productivity measures the relationship between the output and the cost of one or more of the input resources.

3. **Distinguish between partial productivity and total productivity.**

A partial productivity is a productivity measure that focuses only on the relationship between the amount of one of the input resources and the output attained.

A total productivity measures the relationship between the output and the total input costs of all the required input resources for the output.

4. **“We are already measuring total factor productivity. Measuring partial productivities would be of no value.” Do you agree? Comment briefly.**

No. Total factor productivity (TFP) and partial productivity measures work best together because the strengths of one offset weakness in the other. TFP measures are comprehensive, consider all inputs together, and explicitly consider economic substitution among inputs. Physical partial productivity measures are easier to calculate and understand and, as in the case of labor productivity, relate directly to employees' tasks. Partial productivity measures are also easier to compare across different plants and different time periods.

5. **What is the advantage of using a customer-cost hierarchy?**

Customer-cost hierarchies highlight low different cost pools have different types of cost drivers and how some costs can be reliably assigned to individual customers whereas other costs can be reliably assigned only to distribution channels or to companywide activities.

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### 6. Why do customer-level costs differ across customers?

Different customers place different demands on a company's resources in terms of processing purchase orders, making deliveries and customer support. Companies should be aware of and devote sufficient resources to maintaining and expanding relationships with customers who contribute significantly to profitability. Customer-profitability reports often highlight that a small percentage of customers contributes a large percentage of operating income.

### 7. Distinguish between a market-share variance and a market-size variance.

The sales-quantity variance can be decomposed into (a) a market-size variance (because the actual total market size in units is different from the budgeted market size in units), and (b) a market-share variance (because the actual market share of a company is different from the budgeted market share of a company). Both variances use the budgeted contribution margin per unit.

### 8. "A customer-profitability profile highlights those customer who should be dropped to improve profitability." Do you agree? Explain.

No. a customer-profitability profile highlights differences in current period's profitability across customers. Dropping customers should be the last resort. An unprofitable customer in one period may be highly profitable in subsequent future periods. Moreover, costs assigned to individual customers need not be purely variable with respect to short-run elimination of sales to those customers. Thus, when customers are dropped, costs assigned to those customers may not be disappear in the short-run.

### 9. Why is it important for a firm that follows a strategy of being the cost leader to improve productivity?

A critical success factor for a firm that competes as a cost leader is to be the low cost provider. A low cost provider needs to perform the required tasks for the same output with fewer resources than its competitors.

### 10. What are the criteria often used to assess productivity? Give their advantages and disadvantages.

Among criteria that often are used in assessing productivity and their advantages and disadvantages are:

*Using a prior year's productivity as the criterion*

Advantages:

- Data readily available
- Facilitates monitoring of continuous improvements

Disadvantages:

- Difficult to assess adequacy of productivity improvements
- Hard to compare productivity improvements between the years

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*Using the best performance as the criterion*

Advantages:

- Provides as the benchmark the utmost performance
- Motivates people to strive for the maximum potential

Disadvantages:

- The standard can be too high for the operation and frustrating to workers
- Data may be difficult to obtain
- The criteria on which the operation is based may not be comparable

### 11. Why is operational productivity measures preferred over financial productivity measures by manufacturing personnel?

Manufacturing personnel often prefer operational productivity measures over financial productivity measures because all the input data for computing operational productivity measures are either results of their activities or resources consumed for these activities. Financial productivity measures use costs of resources that often are results of activities by personnel outside of manufacturing functions.

### 12. Give some important measurements for assessing marketing effectiveness.

Measurements of marketing effectiveness include market share, sales price, sales mix, and sales quantity variances.

### 13. Distinguish between a sales price variance and a sales volume variance.

Sales quantity variance is a component of sales volume variance. A sales volume variance can be the result of both sales mix and sales quantity variances.

### 14. Do you agree with the following statements? Why? Or why not?

- a. As long as the firm sells more units than the number of units specified in the master budget, the firm will not have an unfavorable sales volume variance.

No. A multi-product firm can still have an unfavorable sales volume variance even if it sells more than the budgeted units of sales. The unfavorable sales volume variance is a result of selling more of less profitable products and less of more profitable products.

- b. A favorable sales quantity variance indicates that the marketing manager has done a good job.

A favorable sales quantity variance reflects the marketing manager's excellent performances only if there is no adverse change in selling prices, sales mix, or market size. A favorable sales quantity variance is hardly favorable to the firm if the firm has lowered its selling prices or sold more of low-priced, low-margin and less of high-priced, high-margin products. Increases in the total market size in which the firm operates often also leads to a favorable sales quantity variance. A favorable sales quantity

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variance in an expanding total market may not be favorable to the firm strategically if the firm also has an unfavorable market share variance. A firm can have a favorable market size variance and an unfavorable market share variance if the proportional increase of the firm's total sales is less than those of the total market.

- c. An improvement in earnings growth can be achieved at the expense of market shares (indicated by an unfavorable market share variance).

Yes. The Wall Street Journal reported on April 14, 1994 (p. B4) that Colgate-Palmolive had slashed marketing spending to reach its ambitious target of 15 percent annual earnings growth. The firm, for example, spent P88.8 million on advertising in 1993, compared with P97.5 million in 1992. The firm met the goal of a 15 percent increase in per share earnings and its CEO, Mr. Mark, expected the company to announce a similar increase for first quarter earnings soon. The market share of the firm, however, have decreased in all categories.

15. What are the relationships between a market size variance, a market share variance, a sales quantity variance, and a sales volume variance?

The sales volume variance is the sum of sales quantity and sales mix variances. The sales quantity variance is the sum of market size and market share variances.

16. How to achieve improvements in productivity?

Improvements in productivity is achieved when fewer workers, materials, machines or other resources are used to manufacture and sell the same or better products.

17. What is productivity measure? What is the formula of productivity?

Productivity is the ratio of output to input. A productivity measure is often compared to the performance of a prior period, another firm, the industry standard or a benchmark in assessing a firm's productivity.

Measures of productivity are applicable to all organizations including service firms and non-profit organizations.

$$\text{Productivity} = \text{Output/Input}$$

18. What is partial productivity measures and how it is computed?

Partial Productivity measures the relationship between the output and one or part of the required input resources used in producing output. The higher the ratio is, the better.

It is computed as follows:

$$\text{Partial Productivity} = \frac{\text{Number of units or value or output manufactured}}{\text{Number of units or cost of single or part of the input resources}}$$

19. What are the benefits of Total productivity measures?

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Total productivity measures the combined productivity of all operating factors. It decreases the possibility of manipulating some of the manufacturing factors to improve the productivity of other manufacturing factors.

20. No entity can gain success without effective marketing activities that will enable it to accomplish their objectives, what are those three objectives?

- (1) Earn the projected operating income
- (2) Attain the desired and budgeted market share
- (3) Adapt to market change

### MULTIPLE CHOICE: THEORIES

1. In gross profit analysis, if the cost variance is zero, such variance indicates that;
  - a. Manufacturing management was unable to keep production costs at budgeted costs.
  - b. Manufacturing management was able to control production cost below budgeted costs.
  - c. Manufacturing management was able to control production cost at budgeted costs.
  - d. Manufacturing management was not able to control production at budgeted costs but purchasing was able to keep at budgeted price.

#### EXPLANATION:

A zero cost variance indicates that there is no difference between the standard cost prices and the actual cost prices. It also reflects the ability of the manufacturing management to control actual unit costs in accordance with the budgeted unit costs. Hence, choice-letter "b" is incorrect because the difference in production costs and budgeted costs may be reflective of both cost price and cost quantity variance. Choice-letter "d" is incorrect because production cost is affected by all inputs of production and not by purchasing alone.

2. The differences between the master budget amounts and the amounts in the flexible budget are due to
  - a. Activity level variances
  - b. Gaps in affectivity
  - c. Favorable variances
  - d. Unfavorable variances

#### EXPLANATION:

Master budget shows the estimated costs at a particular budgeted level of production. Flexible budget shows the estimated costs based on a given actual level of production. The variable costs rate and total fixed costs are the same under the same budget levels. What differs is the estimated total variable costs. The difference between master budget and flexible budget lies on the level of production used, master budget uses the budgeted level while flexible budget uses the actual production level.

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Choice-letter “a” is correct. The difference in master budget and flexible budget lies on the activity level variances.

Choice-letter “b” is incorrect because effectively relates to the applicability or correctness of the methods (procedures) used and therefore does not speak well of the estimated costs of production which shall be based on the level of units produced. Choice-letter “c” and “d” are incorrect because variances, whether favorable or unfavorable, is the difference of actual and standards, not of two budgeted amounts.

3. The controller of Lan Corporation found a P250,000 favorable flexible budget variance. The variance was calculated by comparing the actual results with the flexible budget. This variance can be wholly explained by
  - a. **The total flexible budget variance**
  - b. The total static budget variance
  - c. Changes in unit selling prices
  - d. Changes in the number of units sold

### **EXPLANATION:**

Flexible budget is estimated value based on actual capacity. Choice-letter “a” is correct because the total flexible budget variance is explained by the net effect of the sales price variance and the cost price variance.

Choice-letter “b” is incorrect because the total static budget variance is the net of sale price variance, cost price variance and the quantity variance. Choice-letter “c” is incorrect because sales price variance alone does not explain the total flexible budget sales variance. Choice-letter “d” is incorrect because changes in the number of units sold explains the quantity variance and is not related to the flexible budget variance.

4. The sales volume variance equals
  - a. **A flexible budget amount minus a static budget amount**
  - b. Actual operating income minus flexible budget operating income
  - c. Actual unit price minus budgeted unit price, times the actual units produced
  - d. Budgeted unit price times the difference between actual inputs and budgeted inputs for the actual activity achieved.

### **EXPLANATION:**

Sales volume variance refers to the change between budgeted sales and actual sales activity levels. It further assumes that unit sales price, unit variable costs and fixed costs are constant. Since flexible budget is based on the actual capacity and static budget is based on budgeted capacity, their difference is therefore the sales volume variance.

Choice-letter “b” is incorrect because sales volume variance does not refer to change in operating income. Choice-letter “c” is incorrect because it refers to production price variance. Choice-letter “d” is incorrect because it refers to efficiency variance (e.g., budgeted inputs for the actual capacity level is the standard capacity), and the term “inputs” here refers to hours.

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5. In analyzing company operations, the controller of the FM Corporation found a P250,000 favorable flexible budget revenue variance. The variance was calculated by comparing the actual results with the flexible budget. The variance can be wholly explained by
- The total flexible budget variance
  - The total static budget variance
  - Changes in unit selling prices
  - Changes in the number of units sold

### EXPLANATION:

Actual cost is actual hours at actual price per hour. Flexible budget is based on standard hours which is actual production multiplied by the standard hours per unit. Therefore, the difference between actual cost and flexible budget is price variance. Translating this variance to revenue means it is sales price variance, or change in unit sales price. Choice-letter "c" is correct.

Choice-letter "a" is incorrect because flexible budget variance covers items other than revenue. Choice-letter "b" is incorrect because total static budget variance includes prices and volume variance and, also, it does not only refer to revenue. Choice-letter "d" is incorrect because changes in the number of units sold is volume variance which is the difference between flexible budget and static budget.

6. Which of the following is not a limitation of Partial productivity measures?
- It measures only the relationship between an input resource and the output; it ignores any effect that changes in other manufacturing factors have on productivity. An improved partial productivity could have been obtained by decreasing the productivity of one or more other input resources.
  - It ignores any effect the changes in other production factors have on productivity.
  - It ignores the effects that changes in the firm's operating characteristics have on the productivity of the input resource.
  - None of the above.
7. Which of the following is not a limitation of Partial productivity measures?
- It allows managers to focus on the use of a particular input.
  - It ignores any effect the changes in other production factors have on productivity.
  - It ignores the effects that changes in the firm's operating characteristics have on the productivity of the input resource.
  - An improved partial productivity does not imply that the firm or division operates efficiently. No efficiency standard is involved in the determination of partial productivity measures.
8. Which of the following is not a limitation of Partial productivity measures?
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- b. It is easily interpreted by all within the organization and easy to use for assessing productivity of performance of operating personnel.
  - c. It ignores any effect the changes in other production factors have on productivity.
  - d. It ignores the effects that changes in the firm's operating characteristics have on the productivity of the input resource.
9. Which of the following is not a limitation of Partial productivity measures?
- a. It ignores any effect the changes in other production factors have on productivity.
  - b. It ignores the effects that changes in the firm's operating characteristics have on the productivity of the input resource.
  - c. It measures only the relationship between an input resource and the output; it ignores any effect that changes in other manufacturing factors have on productivity. An improved partial productivity could have been obtained by decreasing the productivity of one or more other input resources.
  - d. For operational control, the standard for performance are very often short-term, say productivity ratios of prior batches of goods, and productivity trends within the year can therefore be tracked.
10. Which of the following is not a limitation of Partial productivity measures?
- a. It ignores the effects that changes in the firm's operating characteristics have on the productivity of the input resource.
  - b. It measures only the relationship between an input resource and the output; it ignores any effect that changes in other manufacturing factors have on productivity. An improved partial productivity could have been obtained by decreasing the productivity of one or more other input resources.
  - c. Both A and B
  - d. None of the above
11. Which of the following is a benefit of Total productivity measure?
- a. It can ignore the effects of changes in demand for the product, changes in selling prices of the goods and services and special purchasing and selling arrangements on productivity.
  - b. The basis for assessing changes in productivity could vary over time, that year, yearly measure use different years as the base.
  - c. Total productivity is a financial measure and executives at the operational level may have difficulty linking financial productivity measures to their day-to-day operations. Furthermore, deterioration in total productivity can result from increased costs of resources that were beyond the manager's control or decreased productivity of some of the input resources that were outside the realm of the manager
  - d. None of the above.
12. Which of the following is not a benefit of Total productivity measure?
- a. It can ignore the effects of changes in demand for the product, changes in selling prices of the goods and services and special purchasing and selling arrangements on productivity.

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- b. The basis for assessing changes in productivity could vary over time, that year, yearly measure use different years as the base.
  - c. Total productivity is a financial measure and executives at the operational level may have difficulty linking financial productivity measures to their day-to-day operations. Furthermore, deterioration in total productivity can result from increased costs of resources that were beyond the manager's control or decreased productivity of some of the input resources that were outside the realm of the manager
  - d. **All of the above.**
13. Which of the following is not a limitation of Total Productivity measure?
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  - b. The basis for assessing changes in productivity could vary over time, that year, yearly measure use different years as the base.
  - c. Total productivity is a financial measure and executives at the operational level may have difficulty linking financial productivity measures to their day-to-day operations. Furthermore, deterioration in total productivity can result from increased costs of resources that were beyond the manager's control or decreased productivity of some of the input resources that were outside the realm of the manager
  - d. **It decreases the possibility of manipulating some of the manufacturing factors to improve the productivity of other manufacturing factors.**
14. Which of the following is a limitation of total productivity measure?
- a. **Total productivity is a financial measure and executives at the operational level may have difficulty linking financial productivity measures to their day-to-day operations. Furthermore, deterioration in total productivity can result from increased costs of resources that were beyond the manager's control or decreased productivity of some of the input resources that were outside the realm of the manager.**
  - b. It decreases the possibility of manipulating some of the manufacturing factors to improve the productivity of other manufacturing factors.
  - c. It ignores any effect the changes in other production factors have on productivity.
  - d. It ignores the effects that changes in the firm's operating characteristics have on the productivity of the input resource.
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- a. It decreases the possibility of manipulating some of the manufacturing factors to improve the productivity of other manufacturing factors.
  - b. **It can ignore the effects of changes in demand for the product, changes in selling prices of the goods and services and special purchasing and selling arrangements on productivity.**
  - c. It measures only the relationship between an input resource and the output; it ignores any effect that changes in other manufacturing factors have on productivity. An improved partial productivity could have been

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- obtained by decreasing the productivity of one or more other input resources.
- d. An improved partial productivity does not imply that the firm or division operates efficiently. No efficiency standard is involved in the determination of partial productivity measures.
16. Among are the benefits that higher productivity brings about to business firms, which is not true?
- Competitive advantages
  - Higher-than-average returns and earnings
  - Attainment of long-term success
  - Lower-than-average returns and earnings**
17. Among are the benefits that higher productivity brings about to business firms, which is not true?
- Competitive advantages
  - Attainment of short-term success
  - Higher-than-average returns and earnings**
  - Attainment of long-term success
18. Which of the following is not a productivity measure?
- Partial Productivity
  - Total Productivity
  - Both A and B
  - Neither A and B**
19. Which of the following is not a Partial Productivity?
- Partial Operational Productivity
  - Partial Sales Productivity**
  - Partial Financial Productivity
  - None of these
20. Which of the following statements are correct?
- A partial operational productivity is the required physical amount of an input resource to produce one unit output while a partial financial productivity of an input resource is the number of units or the value of output manufactured for each peso spent on the input resource.**
  - A partial operational productivity of an input resource is the number of units or the value of output manufactured for each peso spent on the input resource while a partial financial productivity is the required physical amount of an input resource to produce one unit output.
  - A partial sales productivity is the required physical amount of an input resource to produce one unit output while a partial financial productivity of an input resource is the number of units or the value of output manufactured for each peso spent on the input resource.
  - A partial operational productivity is the required physical amount of an output resource to produce one unit input while a partial financial productivity of an input resource is the number of units or the value of output manufactured for each peso spent on the input resource.

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21. Which of the following is not an advantage of Partial Productivity Measures?
- It allows managers to focus on the use of a particular input.
  - It is easily interpreted by all within the organization and easy to use for assessing productivity of performance of operating personnel.
  - For operational control, the standard for performance are very often short-term, say productivity ratios of prior batches of goods, and productivity trends within the year can therefore be tracked.
  - It measures only the relationship between an input resource and the output; it ignores any effect that changes in other manufacturing factors have on productivity. An improved partial productivity could have been obtained by decreasing the productivity of one or more other input resources.**
22. Which of the following statements is not an advantage of Partial Productivity Measures?
- It is easily interpreted by all within the organization and are easy to use for assessing productivity of performance of operating personnel.
  - It ignores any effect the changes in other production factors have on productivity.**
  - It allows managers to focus on the use of a particular input.
  - None of the above
23. Which of the following statements is not an advantage of Partial Productivity Measures?
- For operational control, the standard for performance are very often short-term, say productivity ratios of prior batches of goods, and productivity trends within the year can therefore be tracked.
  - It is easily interpreted by all within the organization and easy to use for assessing productivity of performance of operating personnel.
  - It ignores the effects that changes in the firm's operating characteristics have on the productivity of the input resource.**
  - It allows managers to focus on the use of a particular input.
24. Which of the following statements is not an advantage of Partial Productivity Measures?
- It is easily interpreted by all within the organization and easy to use for assessing productivity of performance of operating personnel.
  - It allows managers to focus on the use of a particular input.
  - For operational control, the standard for performance are very often short-term, say productivity ratios of prior batches of goods, and productivity trends within the year can therefore be tracked.
  - An improved partial productivity does not imply that the firm or division operates efficiently. No efficiency standard is involved in the determination of partial productivity measures.**
25. Which of the following statements is not an advantage of Partial Productivity Measures?
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  - It allows managers to focus on the use of a particular input.

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- c. For operational control, the standard for performance are very often short-term, say productivity ratios of prior batches of goods, and productivity trends within the year can therefore be tracked.
  - d. **None of the above.**
26. Which of the following is not a limitation of Partial productivity measures?
- a. It ignores any effect the changes in other production factors have on productivity.
  - b. An improved partial productivity does not imply that the firm or division operates efficiently. No efficiency standard is involved in the determination of partial productivity measures.
  - c. Both A and B
  - d. **None of the above**
27. It shows the relationship between the output and the total cost of all input resources used to produce the output, what is it?
- a. **Total Productivity**
  - b. Sales price variance
  - c. Sales volume variance
  - d. Market share variance
28. Which of the following is the correct formula of Total Productivity?
- a. **Total productivity = Units or Sales Value of Output / Total cost of all input resources**
  - b. Total productivity = [Actual selling price per unit - Budgeted selling price per unit] x Actual no. of units sold
  - c. Total productivity = [ No. of units sold - No. of units in master budget ] x Budgeted contribution margin per unit
  - d. Total productivity = [actual sales mix percentage for the product - budgeted sales mix percentage for the product ] x Actual total units of all products sold x Budgeted unit contribution margin of the product
29. Which of the following is not a benefit of Total Productivity measure?
- a. It decreases the possibility of manipulating some of the manufacturing factors to improve the productivity of other manufacturing factors.
  - b. Total productivity is a financial measure and executives at the operational level may have difficulty linking financial productivity measures to their day-to-day operations. Furthermore, deterioration in total productivity can result from increased costs of resources that were beyond the manager's control or decreased productivity of some of the input resources that were outside the realm of the manager
  - c. The basis for assessing changes in productivity could vary over time, that year, yearly measure use different years as the base.
  - d. **Both B and C**
30. Which of the following is not a benefit of Total Productivity measure?
- a. It can ignore the effects of changes in demand for the product, changes in selling prices of the goods and services and special purchasing and selling arrangements on productivity.

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- b. The basis for assessing changes in productivity could vary over time, that year, yearly measure use different years as the base.
  - c. Total productivity is a financial measure and executives at the operational level may have difficulty linking financial productivity measures to their day-to-day operations. Furthermore, deterioration in total productivity can result from increased costs of resources that were beyond the manager's control or decreased productivity of some of the input resources that were outside the realm of the manager
  - d. **All of the above**
31. Which of the following is a benefit of Total productivity measure?
- a. **It decreases the possibility of manipulating some of the manufacturing factors to improve the productivity of other manufacturing factors.**
  - b. The basis for assessing changes in productivity could vary over time, that year, yearly measure use different years as the base.
  - c. It can ignore the effects of changes in demand for the product, changes in selling prices of the goods and services and special purchasing and selling arrangements on productivity.
  - d. Total productivity is a financial measure and executives at the operational level may have difficulty linking financial productivity measures to their day-to-day operations. Furthermore, deterioration in total productivity can result from increased costs of resources that were beyond the manager's control or decreased productivity of some of the input resources that were outside the realm of the manager.
32. What is the ratio of output to input?
- a. Marketing
  - b. **Productivity**
  - c. Sales
  - d. Financial
33. Which of the following statements is correct?
- a. **Productivity is the ratio of output to input**
  - b. Marketing is the ratio of output to input
  - c. Both A and B
  - d. None of the above
34. Which of the following is the correct formula of Productivity?
- a. **Productivity = Output/Input**
  - b. Productivity = Income/Investment
  - c. Productivity = Operating income/Sales
  - d. Productivity = Income - (Required rate of return x Investment)
35. Which of the following is not an example of workforce productivity?
- a. Output per labor hour = Output/Input of labor hours
  - b. Output per person employed = Output/No. of labor force
  - c. Process (activity) productivity = Output/Machine hours used
  - d. **None of the above**
36. Which of the following statements is correct?

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- a. **The higher the partial productivity ratio is, the better.**
  - b. The lower the partial productivity is, the better.
  - c. Both A and B
  - d. Neither A and B
37. A primary purpose of using a standard cost system is
- A. To make things easier for managers in the production facility.
  - B. To provide a distinct measure of cost control.**
  - C. To minimize the cost per unit of production.
  - D. b and c are correct
38. Which one of the following statements is true concerning standard costs?
- A. Standard costs are estimates of costs attainable only under the most ideal conditions, but rarely practicable.
  - B. Standard costs are difficult to use with a process-costing system.
  - C. If properly used, standards can help motivate employees.**
  - D. Unfavorable variances, material in amount, should be investigated, but large favorable variances need not be investigated.
39. Which of the following is a purpose of standard costing?
- A. Determine "breakeven" production level
  - B. Control costs**
  - C. Eliminate the need for subjective decisions by management
  - D. Allocate cost with more accuracy
40. When evaluating the operating performance management sometimes uses the difference between expected and actual performance. This refers to:
- A. Management by Deviation
  - B. Management by Control
  - C. Management by Objective
  - D. Management by Exception**
41. The best basis upon which cost standards should be set to measure controllable production inefficiencies is
- A. Engineering standards based on ideal performance
  - B. Normal capacity
  - C. Engineering standards based on attainable performance**
  - D. Practical capacity
42. A company employing very tight (high) standards in a standard cost system should expect that
- A. No incentive bonus will be paid.
  - B. Most variances will be unfavorable.**
  - C. Employees will be strongly motivated to attain the standard.
  - D. Costs will be controlled better than if lower standards were used.
43. To measure controllable production inefficiencies, which of the following is the best basis for a company to use in establishing the standard hours allowed for the output of one unit of product?
- A. Average historical performance for the last several years
  - B. Engineering estimates based on ideal performance

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- C. Engineering estimates based on attainable performance  
D. The hours per unit that would be required for the present workforce to satisfy expected demand over the long run
44. Which of the following statements about the selection of standards is true?  
A. Ideal standards tend to extract higher performance levels since they give employees something to live up to.  
B. Currently attainable standards may encourage operating inefficiencies.  
C. Currently attainable standards discourage employees from achieving their full performance potential.  
D. Ideal standards demand maximum efficiency which may leave workers frustrated, thus causing a decline in performance.
45. A difference between standard costs used for cost control and the budgeted costs representing the same manufacturing effort can exist because  
A. standard costs must be determined after the budget is completed  
B. standard costs represent what costs should be while budgeted costs represent expected actual costs  
C. budgeted costs are historical costs while standard costs are based on engineering studies  
D. budgeted costs include some “slack” or “padding” while standard costs do not
46. When standard costs are used in a process-costing system, how, if at all, are equivalent units involved or used in the cost report at standard?  
A. Equivalent units are not used.  
B. Equivalent units are computed using a “special” approach.  
C. The actual equivalent units are multiplied by the standard cost per unit.  
D. The standard equivalent units are multiplied by the actual cost per unit.
47. The fixed overhead application rate is a function of a predetermined “normal” activity level. If standard hours allowed for good output equal this predetermined activity level for a given period, the volume variance will be  
A. Zero  
B. Favorable  
C. Unfavorable  
D. Either favorable or unfavorable, depending on the budgeted overhead.
48. The absolute minimum cost possible under the best conceivable operating conditions is a description of which type of standard?  
A. Currently attainable (expected) C. Theoretical  
B. Normal D. Practical
49. Standards, which are difficult to achieve due to reasons beyond the individual performing the task, are the result of firm using which of the following methods to establish standards?  
A. Ideal Standards C. Practical Standards  
B. Lax Standards D. Employee Standards

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50. Standards that represent levels of operation that can be attained with reasonable effort are called:
- A. Theoretical standards
  - B. Ideal standards
  - C. Variable standards
  - D. Normal standards
51. When performing input/output variance analysis in standard costing, "standard hours allowed" is a means of measuring
- A. Standard output at standard hours
  - B. Standard output at actual hours
  - C. Actual output at standard hours
  - D. Actual output at actual hours
52. A company uses a two-way analysis for overhead variances: budget (controllable) and volume. The volume variance is based on the
- A. Total overhead application rate
  - B. Volume of total expenses at various activity levels
  - C. Variable overhead application rate
  - D. Fixed overhead application rate
53. Assuming that the standard fixed overhead rate is based on full capacity, the cost of available but unused productive capacity is indicated by the:
- A. Factory overhead cost volume variance
  - B. Direct labor cost efficiency variance
  - C. Direct labor cost rate variance
  - D. Factory overhead cost controllable variance
54. In analyzing manufacturing overhead variances, the volume variance is the difference between the:
- A. Amount shown in the flexible budget and the amount shown in the debit side of the overhead control account
  - B. Predetermined overhead application rate and the flexible budget application rate times actual hours worked
  - C. Budget allowance based on standard hours allowed for actual production for the period and the amount budgeted to be applied during the period
  - D. Actual amount spent for overhead items during the period and the overhead amount applied to production during the period
55. The variance least significant for purposes of controlling costs is the:
- A. Material usage variance
  - B. Variable overhead efficiency variance
  - C. Fixed overhead spending variance
  - D. Fixed overhead volume variance
56. The variance most useful in evaluating plant utilization is the:
- A. Variable overhead spending variance
  - B. Fixed overhead spending variance.
  - C. Variable overhead efficiency variance
  - D. Fixed overhead volume variance
57. The choice of production volume as a denominator for calculating its factory overhead rate
- A. Has no effect on the fixed factory overhead rate for applying costs to

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- production
- B. Has an effect on the variable factory overhead rate for applying costs to production
- C. Has no effect on the fixed factory overhead budget variance
- D. Has no effect on the fixed factory overhead production volume variance
58. The budgeted overhead costs for standard hours allowed and the overhead costs applied to product are the same amount
- A. for both variable and fixed overhead costs.
- B. only when standard hours allowed is less than normal capacity.
- C. for variable overhead costs.
- D. for fixed overhead costs.
59. Which department is customarily held responsible for an unfavorable materials usage variance?
- A. Quality control
- B. Engineering
- C. Purchasing
- D. Production
60. Which of the following should be least considered when deciding whether to investigate a variance?
- A. Whether the variance is favorable or unfavorable
- B. Significance of the variance
- C. Cost of investigating the variance
- D. Trend of the variances over time
61. If the total materials variance (actual cost of materials used compared with the standard cost of the standard amount of materials required) for a given operation is favorable, why must this variance be further evaluated as to price and usage?
- A. There is no need to further evaluate the total materials variance if it is favorable
- B. Generally accepted accounting principles require that all variances be analyzed in three stages
- C. All variances must appear in the annual report to equity owners for proper disclosure
- D. To allow management to evaluate the efficiency of the purchasing and production functions
62. Which of the following unfavorable cost variances would be directly affected by the relative position of a production process on a learning curve?
- A. Materials mix
- B. Materials price
- C. Labor rate
- D. Labor efficiency
63. Which of the following is the most probable reason with a company would experience an unfavorable labor rate variance and a favorable labor efficiency variance?
- A. The mix of workers assigned to the particular job was heavily weighted toward the use of higherly paid, experienced individuals.
- B. The mix of workers assigned to the particular job was heavily weighted toward the use of new, relatively low paid, unskilled workers.

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- C. Because of the productive schedule, workers from other production areas were assigned to assist in this particular process.
- D. Defective materials caused more labor to be used in order to produce a standard unit.
64. The budget for a given cost during a given period was P1,600,000. The actual cost for the period was P1,440,000. Considering these facts, it can be said that the plant manager has done a better than expected job in controlling the cost if:
- A. The cost is variable and actual production was 90% of budgeted production
  - B. The cost is variable and actual production equaled budgeted production**
  - C. The cost is variable and actual production was 80% of budgeted production
  - D. The cost is discretionary fixed cost and actual production equaled budgeted production
65. The budget variance for fixed factory overhead for the normal-volume, practical-capacity, and expected-activity levels would be the:
- A. Same except for normal volume
  - B. Same except for practical capacity
  - C. Same except for expected activity
  - D. Same for all three activity levels**
66. You have leased a 5,000-gallon storage tank for P5,000 per month. You stored 4,000 gallons of liquid in the tank during the month. The cost of storage was P1.25 per gallon, rather than P1.00 per gallon based on 5,000 gallon capacity. Therefore, the cost of storing 4,000 gallons was P1,000 more (P.25 x 4,000) in total than if you had stored 5,000 gallons of liquid in the tank. Which variance is being described?
- A. Variable-overhead efficiency variance
  - B. Fixed-overhead spending variance
  - C. Variable-overhead spending variance
  - D. Fixed-overhead volume variance**
67. Favorable fixed overhead volume variance occurs if:
- A. There is a favorable labor efficiency variance
  - B. There is a favorable labor rate variance
  - C. Production is less than planned
  - D. Production is greater than planned**
68. The unfavorable volume variance may be due to all but which of the following factors?
- A. Failure to maintain an even flow of work
  - B. Machine breakdowns
  - C. Unexpected increases in the cost of utilities**
  - D. Failure to obtain enough sales orders
69. How will a favorable volume variance affect net income under each of the following methods?
- |    | <u>Absorption</u>    | <u>Variable</u> |
|----|----------------------|-----------------|
| A. | <u>n</u><br>Decrease | No<br>effect    |

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- |    |          |           |
|----|----------|-----------|
| B. | Decrease | Increase  |
| C. | Increase | No effect |
| D. | Increase | Decrease  |

70. Favorable volume variances may be harmful when:

- A. Machine repairs cause work stoppages
- B. Supervisors fail to maintain an even flow of work
- C. Production in excess of normal capacity cannot be sold
- D. There are insufficient sales orders to keep the factory operating at normal capacity

71. During 2006, a department's three-variance overhead standard costing system reported unfavorable spending and volume variances. The activity level selected for allocating overhead to the product was based on 80% of practical capacity. If 100% of practical capacity had been selected instead, how would the reported unfavorable spending and volume variances be affected?

- |    | <u>Spending</u><br><u>Variance</u> | <u>Volume</u><br><u>Variance</u> |
|----|------------------------------------|----------------------------------|
| A. | Increased                          | Unchanged                        |
| B. | Increased                          | Increased                        |
| C. | Unchanged                          | Increased                        |
| D. | Unchanged                          | Unchanged                        |

72. A standard cost:

- A. is the "true" cost of a unit of production.
- B. is a budget for the production of one unit of a product or service.
- C. can be useful in calculating equivalent units.
- D. is normally the average cost within an industry.
- E. is almost always the actual cost from previous years.

73. Which of the following is a predetermined estimated cost that can be used in the calculation of a variance?

- A. Product cost.
- B. Actual cost.
- C. Standard cost.
- D. Differential cost.
- E. Marginal cost.

74. Variances are computed by taking the difference between which of the following?

- A. Product cost and period cost.
- B. Actual cost and differential cost.
- C. Price factors and rate factors.
- D. Actual cost and standard cost.

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- E. Product cost and standard cost.
75. The term "management by exception" is best defined as:
- A. choosing exceptional managers.
  - B. controlling actions of subordinates through acceptance of management techniques.
  - C. investigating unfavorable variances.
  - D. devoting management time to investigate significant variances.
  - E. controlling costs so that non-zero variances are treated as "exceptional."
76. Which of the following are methods for setting standards?
- A. Analysis of historical data.
  - B. Task analysis.
  - C. Task analysis and the analysis of historical data.
  - D. Matrix application forms.
  - E. Goal congruence.
77. Which of the following individuals is least likely to become involved in the setting of either direct material standards or direct labor standards?
- A. The purchasing manager.
  - B. A production supervisor.
  - C. An engineer.
  - D. A machine operator.
  - E. A company's president.
78. A perfection standard:
- A. tends to motivate employees over a long period of time.
  - B. is attainable in an ideal operating environment.
  - C. would make allowances for normal amounts of scrap and waste.
  - D. is generally preferred by behavioral scientists.
  - E. will result in a number of favorable variances on a performance report.
79. Consider the following statements:
- I. Behavioral scientists find that perfection standards often discourage employees and result in low worker morale.
  - II. Practical standards are also known as attainable standards.
  - III. Practical standards incorporate a certain amount of inefficiency such as that caused by an occasional machine breakdown.
- Which of the above statements is (are) true?
- A. I only.
  - B. II only.
  - C. III only.
  - D. II and III.
  - E. I, II, and III.
80. Which of the following would be considered if a company desires to establish a series of practical manufacturing standards?
- A. The productivity loss associated with a short-term worker slowdown.
  - B. Normal defect rates in an assembly process.

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- C. Highly unusual spoilage rates with direct materials.
- D. Quantity discounts associated with purchases of direct materials.
- E. Both "B" and "D"

81. Which of the following would not be considered if a company desires to establish a series of practical manufacturing standards?

- A. Production time lost during unusual machinery breakdowns.
- B. Normal worker fatigue.
- C. Freight charges on incoming raw materials.
- D. Production time lost during setup procedures for new manufacturing runs.
- E. The historical 2% defect rate associated with raw material inputs.

82. Which of the following choices correctly notes a characteristic associated with perfection standards and one associated with practical standards?

- |    | <u>Perfection Standards</u>                  | <u>Practical Standards</u>  |
|----|--|---|
| A. | Attainable in an ideal environment           | Incorporate abnormal occurrences when setting quantity and efficiency targets |
| B. | Result in many unfavorable variances         | Are often attainable by workers   |
| C. | Tend to boost worker morale                  | Generally preferred by behavioral scientists                                  |
| D. | Generally, are easily achieved by workers    | Result in both favorable and unfavorable variances                            |
| E. | Generally preferred by behavioral scientists | Are easier to achieve than perfection standards                               |

83. Consider the following statements:

- I. The standard cost per unit of materials is used to calculate a materials price variance.
- II. The standard cost per unit of materials is used to calculate a materials quantity variance.
- III. The standard cost per unit of materials cannot be determined until the end of the period.

Which of the above statements is (are) true?

- A. I only.
- B. II only.
- C. III only.
- D. I and II.
- E. I, II, and III.

84. Which of the following choices correctly notes the use of the standard price per unit of direct material when calculating the materials price variance and the materials quantity variance?

- |    | <u>Price Variance</u> | <u>Quantity Variance</u> |
|----|-----------------------|--------------------------|
| A. | Used                  | Always used              |
| B. | Used                  | Occasionally used        |
| C. | Used                  | Not used                 |
| D. | Not used              | Always used              |

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E. Not used Not used

85. Most companies base the calculation of the materials price variance on the:
- A. number of units purchased.
  - B. number of units spoiled.
  - C. number of units that should have been used.
  - D. number of units actually used.
  - E. number of units to be purchased during the next accounting period.
86. Which of the following correctly lists all the information needed to calculate a labor rate variance?
- A. Standard labor rate and actual hours worked.
  - B. Actual hours worked and actual units produced.
  - C. Standard labor rate, actual labor rate, and actual units produced.
  - D. Actual labor rate and actual hours worked.
  - E. Actual labor rate, standard labor rate, and actual hours worked.
87. Which of the following variances are most similar with respect to the manner in which they are calculated?
- A. Labor rate variance and labor efficiency variance.
  - B. Materials price variance and materials quantity variance.
  - C. Materials price variance, materials quantity variance, and total materials variance.
  - D. Materials price variance and labor efficiency variance.
  - E. Materials quantity variance and labor efficiency variance.
88. Which of the following variances cannot occur together during the same accounting period?
- A. Unfavorable labor rate variance and favorable labor efficiency variance.
  - B. Unfavorable labor efficiency variance and favorable materials quantity variance.
  - C. Favorable labor rate variance and unfavorable total labor variance.
  - D. Favorable labor efficiency variance and favorable materials quantity variance.
  - E. None of the above, as all of these variance combinations are possible.
89. If a company has an unfavorable direct-material quantity variance, then:
- A. the direct-material price variance is favorable.
  - B. the total direct-material variance is unfavorable.
  - C. the total direct-material variance is favorable.
  - D. the direct-labor efficiency variance is unfavorable.
  - E. any of the above variances can occur.
90. A favorable labor efficiency variance is created when:
- A. actual labor hours worked exceed standard hours allowed.
  - B. actual hours worked are less than the standard hours allowed.
  - C. actual wages paid are less than amounts that should have been paid.
  - D. actual units produced exceed budgeted production levels.
  - E. actual units produced exceed standard hours allowed.

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91. When considering whether to investigate a variance, managers should consider all of the following except the variance's:
- A. size.
  - B. pattern of recurrence.
  - C. trends over time.
  - D. nature, namely, whether it is favorable or unfavorable.
  - E. controllability.
92. Which of the following combinations of direct-material variances might prompt management to undertake a detailed variance investigation?
- A. Price, unfavorable; quantity, unfavorable.
  - B. Price, unfavorable; quantity, favorable.
  - C. Price, favorable; quantity, unfavorable.
  - D. Price favorable; quantity, favorable.
  - E. All of the above.
93. Consider the following statements about variance investigation:
- I. Variance investigation involves a look at only unfavorable variances.
  - II. Variance investigation is typically based on a cost-benefit analysis.
  - III. Variance investigation is often performed by establishing guidelines similar to the following: Investigate variances that are greater than \$X or greater than Y% of standard cost.
- Which of the above statements is (are) true?
- A. I only.
  - B. II only.
  - C. III only.
  - D. II and III.
  - E. I, II, and III.

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94. A statistical control chart is best used for determining:
- A. direct-material price variances.
  - B. direct-labor variances.
  - C. whether a variance is favorable or unfavorable.
  - D. who should be held accountable for specific variances.
  - E. **whether a particular variance should be investigated.**
95. The individual generally responsible for the direct-material price variance is the:
- A. sales manager.
  - B. production supervisor.
  - C. **purchasing manager.**
  - D. finance manager.
  - E. head of the human resources department.
96. A production supervisor generally has little influence over the:
- A. direct-material quantity variance.
  - B. direct-labor rate variance.
  - C. direct-labor efficiency variance.
  - D. **direct-material price variance.**
  - E. number of units produced.
97. In which department would an investigation normally begin regarding an unfavorable materials quantity variance?
- A. Quality control.
  - B. Purchasing.
  - C. Engineering.
  - D. **Production.**
  - E. Receiving.
98. Cohen Corporation has a favorable materials quantity variance. Which department would likely be asked to explain the cause of this variance?
- A. Engineering.
  - B. Purchasing.
  - C. **Production.**
  - D. Marketing.
  - E. None, because the variance is favorable.
99. Rogers, Inc., had an unfavorable labor efficiency variance and an unfavorable materials quantity variance. Which department might be held accountable for these variances?
- A. Purchasing, because bad materials can harm labor efficiency.
  - B. Production, because inefficient workers may use more materials than allowed.
  - C. **Purchasing and/or production.**
  - D. Marketing.
  - E. Shipping.
100. A direct-material quantity variance can be caused by all of the following except:

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- A. improper employee training.
  - B. changes in sales volume.
  - C. acquisition of materials at a very attractive price.
  - D. adjustment problems with machines.
  - E. disgruntled workers.
101. A direct-labor efficiency variance cannot be caused by:
- A. inexperienced employees.
  - B. poor quality raw materials.
  - C. employee inefficiency.
  - D. an out-of-date labor time standard.
  - E. producing fewer finished units than originally planned.
102. Justin Company recently purchased materials from a new supplier at a very attractive price. The materials were found to be of poor quality, and the company's laborers struggled significantly as they shaped the materials into finished product. In a desperation move to make up for some of the time lost, the manufacturing supervisor brought in more-senior employees from another part of the plant. Which of the following variances would have a high probability of arising from this situation?
- A. Material price variance, favorable.
  - B. Material quantity variance, unfavorable.
  - C. Labor rate variance, unfavorable.
  - D. Labor efficiency variance, unfavorable.
  - E. All of the above.
103. Listed below are five variances (and possible causes) that are under review by management of Knox Company. Which of the following is least likely to cause the variance indicated?
- A. The need to ship goods acquired from a distant supplier via FedEx rather than via truck; material price variance.
  - B. The need to complete goods on a timely basis during a period of high absenteeism; labor rate variance.
  - C. A work-team that is very unhappy with its supervisor; labor efficiency variance.
  - D. The need to close a plant for two days because of blizzard conditions; material quantity variance, part no. 542.
  - E. A malfunctioning piece of manufacturing equipment; labor efficiency variance.
104. Standard costs:
- A. allow a manager to assess the efficiency of operations.
  - B. allow a company to practice management by exception.
  - C. provide management with a basis for performance evaluations.
  - D. if set correctly, can provide a motivational tool for employees.
  - E. will provide all of the above benefits for a company.

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### MULTIPLE CHOICE: PROBLEMS

#### **Questions 1 and 5 are based on the following information:**

Fifo, Inc. produced 1,500 units of product LF last week. The inputs to the production process for Product LF were as follows:

450 pounds of Material X at a cost of P1.50 per pound  
300 pounds of Material Y at a cost of P2.75 per pound  
300 labor hours at a cost of P15.00 per hour

1. What is the total factory productivity for Product LF?
  - a. 2.00 units per pound
  - b. 5.00 units per hour
  - c. **0.25 units per peso input**
  - d. 0.33 units per peso input

#### **SUPPORTING ANALYSIS/COMPUTATION:**

Total factor productivity equals unit of output divided by the cost of all inputs. It varies with output levels, input prices, input quantities, and input mix. Hence, the total factor productivity equals 0.25 units per peso unit.  
 $\{1,500 \text{ units} + [(450 \text{ pounds of A} \times \text{P}1.50) + (300 \text{ pounds of Y} \times \text{P}2.75) + (300 \text{ hours} \times \text{P}15.00)]$

2. What is the best productivity measure for the first-line supervisor in Fifo, Inc's production plant?
  - a. **5.00 units per labor hour**
  - b. P2.00 per pound
  - c. 0.33 units per peso input
  - d. P15.00 per labor hour

#### **SUPPORTING ANALYSIS/COMPUTATION:**

A first-line supervisor's primary job is employee supervision, so his/her productivity should be measured on the basis of output per labor hour. Thus, 5 units per labor hour expended ( $1,500 \text{ units} \div 300 \text{ labor hours}$ ) measures productivity based on the factor over which the first-line supervisor has the most control.

#### **Questions 3 through 8 are based on the following data:**

Rosales Automotive Company manufactures fuel-injection systems. It manufactured and sold 60,000 units in 2018 and 64,000 units in 2019 at P25 per unit. In 2018 the firm used 75,000 pounds of alloy X-45 at P7.20 per pound and spent 10,000 direct

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labor-hours at an hourly wage rate of P30. In 2019 the firm used 89,600 pounds of alloy X-45 at P6.20 per pound and spent 10,487 direct labor-hours at an hourly wage rate of P32. The total amount for all other expenses remains the same at P450,000 each year. Paolo Rosales, CEO, was disappointed that while the total sales increased, the P195,616 operating income earned in 2019 is only 93 percent of the amount earned in 2018, which was P210,000.

3. The operational partial productivity of direct material in 2018 and 2019 are

|    | 2018   | 2019   |
|----|--------|--------|
| a. | 0.8    | 0.7413 |
| b. | 0.1111 | 0.105  |
| c. | 6.0    | 5.9002 |
| d. | 0.2    | 0.1844 |

### SUPPORTING ANALYSIS/COMPUTATION:

|      | 2005   |                     |                      | 2006   |                     |                      |
|------|--------|---------------------|----------------------|--------|---------------------|----------------------|
|      | Output | Input Resource Used | Partial Productivity | Output | Input Resource Used | Partial Productivity |
| X-45 | 60,000 | 75,000              | 0.8                  | 64,000 | 89,600              | 0.7143               |
|      | ÷      | =                   |                      | ÷      | =                   |                      |
|      |        |                     |                      | (3)    |                     |                      |

4. The operational partial productivity of direct labor for 2018 and 2019 are

|    | 2018   | 2019   |
|----|--------|--------|
| a. | 0.8    | 0.7413 |
| b. | 0.1111 | 0.105  |
| c. | 6.0    | 5.9002 |
| d. | 0.2    | 0.1844 |

### SUPPORTING ANALYSIS/COMPUTATION:

| Direct labor | 2018   | 2019   |     | 2018   | 2019   |        |
|--------------|--------|--------|-----|--------|--------|--------|
|              | 60,000 | 10,000 | 6.0 | 64,000 | 10,847 | 5.9002 |
|              | ÷      | =      |     | ÷      | =      |        |
|              |        |        |     | (4)    |        |        |

5. The financial partial productivity of the direct material for 2018 and 2019 are

|    | 2018   | 2019   |
|----|--------|--------|
| a. | 0.8    | 0.7413 |
| b. | 0.1111 | 0.105  |
| c. | 6.0    | 5.9002 |
| d. | 0.2    | 0.1844 |

**CHAPTER 24 MANAGING PRODUCTIVITY AND MARKETING EFFECTIVENESS**

**SUPPORTING ANALYSIS/COMPUTATION:**

|      | 2005            |                  |               |                      | 2006            |                  |               |
|------|-----------------|------------------|---------------|----------------------|-----------------|------------------|---------------|
|      | Units of Output | Cost of Resource | of Input Used | Partial Productivity | Units of Output | Cost of Resource | of Input Used |
| X-45 | 60,000          | ÷                | P540,000      | =                    | 64,000          | ÷                | P609,280      |
|      |                 |                  |               | =                    | <b>0.1111</b>   |                  | <b>0.1050</b> |

(5)

6. The financial partial productivity of the direct labor for 2018 and 2019 are

|    | 2018       | 2019          |
|----|------------|---------------|
| a. | 0.8        | 0.7413        |
| b. | 0.1111     | 0.105         |
| c. | 6.0        | 5.9002        |
| d. | <b>0.2</b> | <b>0.1844</b> |

**SUPPORTING ANALYSIS/COMPUTATION:**

|              |        |   |         |   |            |        |   |          |   |               |
|--------------|--------|---|---------|---|------------|--------|---|----------|---|---------------|
| Direct labor | 60,000 | ÷ | 300,000 | = | <b>0.2</b> | 64,000 | ÷ | P347,104 | = | <b>0.1844</b> |
|--------------|--------|---|---------|---|------------|--------|---|----------|---|---------------|

(6)

7. The total productivity for 2018 as measured in both units and sales pesos are

|    | Units           | P              |
|----|-----------------|----------------|
| a. | <b>0.071429</b> | <b>P1.7857</b> |
| b. | 0.066919        | P1.6730        |
| c. | 0.004510        | P0.1127        |
| d. | 0.071249        | P1.7587        |

**SUPPORTING ANALYSIS/COMPUTATION:**

*Total productivity in units*

|   | 2005               |   | 2006     |
|---|--------------------|---|----------|
| (a) Total units manufactured                    | 60,000             |   | 64,000   |
| (b) Total manufacturing variable costs incurred | P840,000           |   | P956,384 |
| (c) Total productivity (a) ÷ (b)                | <b>0.071429(7)</b> |   | 0.066919 |
| (d) Decrease in productivity                    | 0.071429           | - | 0.066919 |
|   |                    | = | 0.00451  |

*Total productivity in sales pesos*

|                    | 2005       |  | 2006       |
|--------------------|------------|--|------------|
| (a) Total sales    | P1,500,000 |  | P1,600,000 |
| (b) Total variable |            |  |            |

## CHAPTER 24 MANAGING PRODUCTIVITY AND MARKETING EFFECTIVENESS

|                                  |                    |          |
|----------------------------------|--------------------|----------|
| manufacturing costs incurred     | P840,000           | P956,384 |
| (c) Total productivity (a) ÷ (b) | <b>P1.7857(7)</b>  | P1.6730  |
| (d) Decrease in productivity     | P1.7857 - P1.6730= | P0.1127  |

8. The decrease in productivity in 2019 as measured in both units and sales pesos are

|    | <i>Units</i>    | <i>P</i>       | <i>-</i> |
|----|-----------------|----------------|----------|
| a. | 0.071429        | P1.7857        |          |
| b. | 0.066919        | P1.6730        |          |
| c. | <b>0.004510</b> | <b>P0.1127</b> |          |
| d. | 0.071249        | P1.7587        |          |

### SUPPORTING ANALYSIS/COMPUTATION:

#### Total productivity in units

|   | 2005                  | 2006               |
|---|-----------------------|--------------------|
| (a) Total units manufactured                    | 60,000                | 64,000             |
| (b) Total manufacturing variable costs incurred | P840,000              | P956,384           |
| (c) Total productivity (a) ÷ (b)                | 0.071429              | 0.066919           |
| (d) Decrease in productivity                    | 0.071429 - 0.066919 = | <b>0.00451 (8)</b> |

#### Total productivity in sales pesos

|   | 2005               | 2006               |
|---|--------------------|--------------------|
| (a) Total sales                                 | P1,500,000         | P1,600,000         |
| (b) Total manufacturing variable costs incurred | P840,000           | P956,384           |
| (c) Total productivity (a) ÷ (b)                | P1.7857            | P1.6730            |
| (d) Decrease in productivity                    | P1.7857 - P1.6730= | <b>P0.1127 (8)</b> |

9. Patrick, Inc., provided the following information for a production factor.

|                     |               |
|---------------------|---------------|
| Budgeted Production | 10,000 units  |
| Actual Production   | 9,500 units   |
| Budgeted Point      | 9,750 gallons |
| Actual Input        | 8,950 gallons |

What is the operational partial productivity ratio of the production factor?

- 0.97 unit per gallon
- 1.02 units per gallon
- 1.06 units per gallon

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d. 1.12 units per gallon

### SUPPORTING ANALYSIS/COMPUTATION:

$$\text{Operational Partial Productivity} = \frac{\text{Actual Production}}{\text{Actual Input}} = \frac{9,500}{8,950} = 1.06$$

### ***Questions 10 and 11 are based on the following data:***

ETC Corporation makes small parts from steel alloy sheets. ETC's management has some ability to substitute direct materials for direct manufacturing labor. If workers cut the steel carefully, ETC can manufacture more parts out of metal steel, but this requires more direct manufacturing labor-hours. Alternatively, ETC can use fewer direct manufacturing labor-hours if it is willing to tolerate more waste of direct materials. ETC provides this information for the years 2018 and 2019:

|                                       | 2018     | 2019     |
|---------------------------------------|----------|----------|
| Output units                          | 400,000  | 486,000  |
| Direct manufacturing labor-hours used | 10,000   | 13,500   |
| Wages per hour                        | P26      | P25      |
| Direct materials used                 | 160 tons | 180 tons |
| Direct materials cost per ton         | P3,375   | P3,125   |

10. The financial partial productivity for direct materials for 2019 is

- a. 0.7407
- b. **0.864**
- c. 1.5385
- d. 1.44

### SUPPORTING ANALYSIS/COMPUTATION:

*Financial partial productivity:*

|   | 2005            | 2006                |
|---|-----------------|---------------------|
| (1) Output                                    | <u>400,000</u>  | <u>486,000</u>      |
| (2) Direct materials:                         |                 |                     |
| Quantity                                      | 160             | 180                 |
| Unit cost                                     | x <u>P3,375</u> | x <u>P3,125</u>     |
| Total direct materials cost                   | <u>P540,00</u>  | <u>P562,500</u>     |
|   | <u>0</u>        |                     |
| (3) DM financial partial productivity (1) (2) | <u>0.7407</u>   | <b><u>0.864</u></b> |
| (4) Direct labor:                             |                 |                     |
| Hour spent                                    | 10,000          | 13,500              |
| Hourly wage                                   | x <u>P26</u>    | x <u>P25</u>        |
| Total direct labor cost                       | <u>P260,00</u>  | <u>P337,500</u>     |

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|                             |                   |               |             |
|-----------------------------|-------------------|---------------|-------------|
| (5) DL productivity (1) (4) | financial partial | <u>0</u>      |             |
|                             |                   | <u>1.5385</u> | <u>1.44</u> |

11. The total productivity in units for 2018 is
- 0.864
  - 0.7407
  - 0.5**
  - 0.54

### SUPPORTING ANALYSIS/COMPUTATION:

Total productivity:

|                                | 2005              | 2006            |
|--------------------------------|-------------------|-----------------|
| (1) Output                     | <u>400,000</u>    | <u>486,000</u>  |
| Total cost:                    |                   |                 |
| Direct materials cost          | P540,000          | P562,500        |
| Direct labor cost              | <u>260,000</u>    | <u>337,500</u>  |
| (2) Total cost                 | <u>P800,000</u>   | <u>P900,000</u> |
| (3) Total productivity (1) (2) | <u><b>0.5</b></u> | <u>0.54</u>     |

### **Questions 12 through 14 are based on the following data:**

Ching Company manufactures one product. Its budget and operating results for 2018 are:

|                          | Budgeted | Actual  |
|--------------------------|----------|---------|
| Units sold               | 90,000   | 100,000 |
| Unit contribution margin | P8.00    | P10.00  |
| Unit selling price       | P20.00   | P21.00  |

Industry volume was estimated to be 1,500,000 units at the time the budget was prepared. Actual industry volume for the period was 2,000,000 units.

12. The market size variance is
- P160,000 U
  - P80,000 U
  - P240,000 U
  - P240,000 F**

### SUPPORTING ANALYSIS/COMPUTATION:

Market Share

|        | Firm      | Total Market | Market Share |
|--------|-----------|--------------|--------------|
| Actual | 100,000 / | 2,000,000 =  | 5%           |
| Budget | 90,000 /  | 1,500,000 =  | 6%           |

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Market size variance:  $(2,000,000 - 1,500,000) \times 0.06 \times P8 = \mathbf{P240,000 F}$

13. The market variance is

- a. **P160,000 U**
- b. P80,000 F
- c. P240,000 U
- d. P240,000 F

### SUPPORTING ANALYSIS/COMPUTATION:

*Market Share*

|        | <i>Firm</i> | <i>Total Market</i> | <i>Market Share</i> |
|--------|-------------|---------------------|---------------------|
| Actual | 100,000 /   | 2,000,000 =         | 5%                  |
| Budget | 90,000 /    | 1,500,000 =         | 6%                  |

Market share variance:  $(5\% - 6\%) \times 2,000,000 \times P8 = \mathbf{P160,000 U}$

14. The sales quantity variance is

- a. P160,000 U
- b. **P80,000 F**
- c. P80,000 U
- d. P160,000 F

### SUPPORTING ANALYSIS/COMPUTATION:

*Market Share*

|        | <i>Firm</i> | <i>Total Market</i> | <i>Market Share</i> |
|--------|-------------|---------------------|---------------------|
| Actual | 100,000 /   | 2,000,000 =         | 5%                  |
| Budget | 90,000 /    | 1,500,000 =         | 6%                  |

Sales quantity variance:  $(100,000 - 90,000) \times P8 = \mathbf{P 80,000 F}$

### **Questions 15 through 23 are based on the following data:**

Cai & Si, Ltd., manufactures two products that sell to the same market. Its budget and operating results for 2018 are:

|                          | <i>Budgeted</i> | <i>Actual</i> |
|--------------------------|-----------------|---------------|
| Unit sales               |                 |               |
| Product A                | 30,000          | 35,000        |
| Product B                | 60,000          | 65,000        |
| Unit Contribution Margin |                 |               |
| Product A                | P4.00           | P3.00         |
| Product B                | P10.00          | P12.00        |
| Unit Selling Price       |                 |               |
| Product A                | P10.00          | P12.00        |



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|           | Budgeted      |            | Actual         |            |
|-----------|---------------|------------|----------------|------------|
|           | Unit          | %          | Unit           | %          |
| Product A | 30,000        | 1/3        | 35,000         | 35         |
| Product B | <u>60,000</u> | <u>2/3</u> | <u>65,000</u>  | <u>65</u>  |
| TOTAL     | <u>90,000</u> | <u>100</u> | <u>100,000</u> | <u>100</u> |

Sales mix contribution margin variance:

$$\text{Product A: } (0.35 - 1/3) \times 100,000 \times P4 = \mathbf{P\ 6,667\ F}$$

$$\text{Product B: } (0.65 - 2/3) \times 100,000 \times P10 = \mathbf{16,667\ U}$$

$$\text{Total sales mix contribution margin variance} \mathbf{P10,000\ U}$$

18. The sales quantity contribution margin variance for each product is

|    | Product A        | Product B        |
|----|------------------|------------------|
| a. | P13,333 U        | P66,667 U        |
| b. | P13,333 F        | P66,667 U        |
| c. | P13,333 U        | P66,667 F        |
| d. | <b>P13,333 F</b> | <b>P66,667 F</b> |

### SUPPORTING ANALYSIS/COMPUTATION:

Sales mixes:

|           | Budgeted      |            | Actual         |            |
|-----------|---------------|------------|----------------|------------|
|           | Unit          | %          | Unit           | %          |
| Product A | 30,000        | 1/3        | 35,000         | 35         |
| Product B | <u>60,000</u> | <u>2/3</u> | <u>65,000</u>  | <u>65</u>  |
| TOTAL     | <u>90,000</u> | <u>100</u> | <u>100,000</u> | <u>100</u> |

Sales quantity contribution margin variance:

$$\text{Product A: } (100,000 - 90,000) \times 1/3 \times P4 = \mathbf{P13,333\ F}$$

$$\text{Product B: } (100,000 - 90,000) \times 2/3 \times P10 = \mathbf{66,667\ F}$$

$$\text{Total sales quantity contribution margin variance} \mathbf{P80,000\ F}$$

19. The market size contribution margin variance is

- P240,000 U
- P240,000 F**
- P160,000 U
- P160,000 F

### SUPPORTING ANALYSIS/COMPUTATION:

Weighted average budget contribution margin per unit:  
P8.00 (calculated in no. 15)

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Market size contribution margin variance:

$$(2,000,000 - 1,500,000) \times 90,000 / 1,500,000 \times P8 = \mathbf{P240,000 F}$$

20. The market share contribution margin variance is
- P240,000 U
  - P240,000 F
  - P160,000 U**
  - P160,000 F

### SUPPORTING ANALYSIS/COMPUTATION:

$$(100,000 / 2,000,000 - 90,000 / 1,500,000) \times 2,000,000 \times P8 = \mathbf{P160,000 U}$$

21. The total flexible budget contribution margin variance is
- P95,000 F**
  - P95,000 U
  - P130,000 F
  - P130,000 U

### SUPPORTING ANALYSIS/COMPUTATION:

|           | Total Contribution margin |           |                 |                 | Flexible Budget Contribution Margin Variance |
|-----------|---------------------------|-----------|-----------------|-----------------|--|
|           | Actual Result             | Operating | Flexible Budget |                 |  |
| Product A | 35,000                    | x P3      | = 35,000        | x P4            | = P 35,000 U                                 |
|           | <u>P105,000</u>           |           |                 | <u>P140,000</u> |  |
| Product B | 65,000                    | x P12     | = 65,000        | x P10           | = <u>P130,000 F</u>                          |
|           | <u>P780,000</u>           |           |                 | <u>P650,000</u> |  |
| TOTAL     | <u>P885,000</u>           |           |                 | <u>P790,000</u> | <b><u>P 95,000 F</u></b>                     |

22. The total variable cost price variance if the total contribution margin price variance is P50,000 favorable is
- P50,000 F
  - P5,000 F
  - P5,000 U
  - P45,000 F**

### SUPPORTING ANALYSIS/COMPUTATION:

Total contribution margin price variance (given)  
P50,000 F

Sales price variance:

$$\text{Product A: } (P12 - P10) \times 35,000 = P70,000 F$$

$$\text{Product B: } (P24 - P25) \times 65,000 = \underline{P65,000U}$$

Total sales price variance

$$= 5,000 F$$

Total variable cost price variance

$$\mathbf{\underline{P45,000 F}}$$

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23. The total variable cost efficiency variance if the total contribution margin price variance is P50,000 favorable is
- P45,000 F
  - P95,000 F
  - P50,000 F
  - P45,000 U

### SUPPORTING ANALYSIS/COMPUTATION:

|  |                       |               |
|--|-----------------------|---------------|
| Total flexible budget contribution margin variance | P95,000               | F             |
| Total contribution margin price variance (given)   |                       | <u>50,000</u> |
| F  |                       |               |
| Total variance cost efficiency variance            | <b><u>P45,000</u></b> | <b>F</b>      |

### Questions 24 through 26 are based on the following data:

Chips Galore sells two RISC chips to small machine tool manufacturers: R66 and R100. Pertinent data for 2018:

|                        | <i>Budgeted</i> |             | <i>Actual</i> |             |
|------------------------|-----------------|-------------|---------------|-------------|
|                        | <i>R66</i>      | <i>R100</i> | <i>R66</i>    | <i>R100</i> |
| Selling price per chip | P50             | P160        | P55           | P155        |
| Variable cost per chip | <u>40</u>       | <u>90</u>   | <u>43</u>     | <u>95</u>   |
| Contribution margin    | P10             | P70         | P12           | P60         |
| Fixed cost per chip    | <u>6</u>        | <u>30</u>   | <u>5</u>      | <u>25</u>   |
| Operating income       | <u>P4</u>       | <u>P40</u>  | <u>P7</u>     | <u>P35</u>  |
| Sales in units         | 1,200           | 400         | 1,000         | 1,000       |

24. What is the R66 sales quantity variance?
- P400 F
  - P1,000 F
  - P1,200 F
  - P3,000 F**

### SUPPORTING ANALYSIS/COMPUTATION:

Sales mix ratio:

|       | <i>Actual</i>  |              | <i>Budget</i>  |              |
|-------|----------------|--------------|----------------|--------------|
|       | <i>Quantit</i> | <i>Ratio</i> | <i>Quantit</i> | <i>Ratio</i> |
| R66   | 1,000          | 0.50         | 1,200          | 0.75         |
| R100  | <u>1,000</u>   | <u>0.50</u>  | <u>400</u>     | <u>0.25</u>  |
| TOTAL | <u>2,000</u>   | <u>1.00</u>  | <u>1,600</u>   | <u>1.00</u>  |

R66 sales quantity variance:  $(2,000 - 1,600) \times 0.75 \times P10 = \mathbf{P3,000 F}$

25. What is the R100 sales mix variance?
- P20,000 F
  - P30,000 F
  - P35,000 F**
  - P40,000 F

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**SUPPORTING ANALYSIS/COMPUTATION:**

R100 sales mix variance:  $(0.5 - 0.25) \times 2,000 \times P70 = \mathbf{P35,000 F}$

26. What is the total sales volume variance?

- a. P10,000 F
- b. P12,400 F
- c. P22,000 F
- d. **P40,000 F**

**SUPPORTING ANALYSIS/COMPUTATION:**

Total sales volume variance:

|       |                         |                         |
|-------|-------------------------|-------------------------|
| R66:  | (1,000 - 1,200) x P10 = | P 2,000 U               |
| R100: | (1,000 - 400) x P70 =   | <u>42,000 F</u>         |
| Total |                         | <b><u>P40,000 F</u></b> |

27. Bi Corporation which sells a single product, provided the following data from its income statements for the calendar year, 2016 and 2015.

|                    |                 |                 |
|--------------------|-----------------|-----------------|
| 2016               |                 |                 |
| Sales              | (150,000 units) | P750,000        |
| Cost of Goods Sold |                 | <u>525,000</u>  |
| Gross Profit       |                 | <u>P225,000</u> |

|                    |                 |                 |
|--------------------|-----------------|-----------------|
| 2015 (base year)   |                 |                 |
| Sales              | (180,000 units) | P720,000        |
| Cost of Goods Sold |                 | <u>575,000</u>  |
| Gross Profit       |                 | <u>P145,000</u> |

In an analysis of variation in gross profit between the two years, what would be the effects of changes in sales price and sales volume?

- |                              |                             |
|------------------------------|-----------------------------|
| Sales Price                  | Sales Volume                |
| a. <b>P150,000 favorable</b> | <b>P120,000 unfavorable</b> |
| b. P150,000 unfavorable      | P120,000 favorable          |
| c. P180,000 favorable        | P150,000 unfavorable        |
| d. P180,000 unfavorable      | P150,000 favorable          |

**SUPPORTING ANALYSIS/COMPUTATION:**

The relevant data that could be derived from the given of the problem are:

|                  |         |         |           |
|------------------|---------|---------|-----------|
|                  | 2016    | 2015    | Change    |
| Quantity Sold    | 150,000 | 180,000 | 30,000 UF |
| Unit Sales Price | P5.00   | P4.00   | P1.00 F   |

Based on these data, the sales price variance and sales volume variances are computed as follows:

Sales Price Variance = Change in USP x Qty. sold this year  
 = P1.00 x 150,000 units



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- b. SP is P5,820 favorable; SV is P0 unfavorable; CP is P36,700 favorable; and CV is P9,000 favorable
- c. **SP is P36,000 favorable; SV is P9,700 unfavorable; CP is P0 unfavorable; and CV is P5,820 unfavorable**
- d. SP is P36,700 favorable; SV is P5,820 favorable; CP is P0 unfavorable; and CV is P900,000 favorable

### SUPPORTING ANALYSIS/COMPUTATION:

First, let us determine the unit sales prices, and unit cost prices.

|       | Unit sales price |        | Unit cost price |        |
|-------|------------------|--------|-----------------|--------|
|       | Actual           | Budget | Actual          | Budget |
| Green | P10.00           | P10.00 | P6.00           | P6.00  |
| Ann   | 7.00             | 6.00   | 3.60            | 3.60   |
| Co    | 6.00             | 5.00   | 3.00            | 3.00   |

The required variances are computed as follows:

Sales price variance =  $\Delta USP \times AQ$

|       |                               |                       |                   |
|-------|-------------------------------|-----------------------|-------------------|
| Green | $= (P10 - P10) \times 45,800$ | $= P0$                |                   |
| Ann   | $= (P7 - P6) \times 26,700$   | $= 26,700 \text{ UF}$ |                   |
| Co    | $= (P6 - P5) \times 9,300$    | $= 9,300 \text{ UF}$  | <u>P36,000 UF</u> |

Sales volume variance =  $\Delta Q \times BUSP$

|       |                                  |                        |                  |
|-------|----------------------------------|------------------------|------------------|
| Green | $= (45,800 - 45,000) \times P10$ | $= P8,000 \text{ UF}$  |                  |
| Ann   | $= (26,700 - 30,000) \times P6$  | $= (19,800) \text{ F}$ |                  |
| Co    | $= (9,300 - 5,000) \times P5$    | $= 21,500 \text{ UF}$  | <u>P9,700 UF</u> |

Cost price variance =  $\Delta UC \times AQ$

|       |                                  |        |           |
|-------|----------------------------------|--------|-----------|
| Green | $= (P6 - P6) \times 45,800$      | $= P0$ |           |
| Ann   | $= (P3.60 - 3.60) \times 26,700$ | $= 0$  |           |
| Co    | $= (P3 - P3) \times 9,300$       | $= 0$  | <u>P0</u> |

Cost volume variance =  $\Delta Q \times BUC$

|       |                                    |                        |                  |
|-------|------------------------------------|------------------------|------------------|
| Green | $= (45,800 - 45,000) \times P6$    | $= P4,800 \text{ UF}$  |                  |
| Ann   | $= (26,700 - 30,000) \times P3.60$ | $= (11,880) \text{ F}$ |                  |
| Co    | $= (9,300 - 5,000) \times P3$      | $= 12,900 \text{ UF}$  | <u>P5,820 UF</u> |

Where: *BUSP* = Budgeted unit sales price

*BUC* = Budgeted unit cost

30. Mel Inc., has a practical production capacity of two million units, the current year's budget was based on the production and sales of 1.4million units during the current year. Actual statistics came out to be: production of 1.44million units and sales of 1.2million. Selling price is at P20 each and the

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contribution margin ratio is 30%. The peso value that best quantities the marketing division's failure to achieve budgeted performance for the current year is

- a. P4,800,000 unfavorable
- b. P4,000,000 unfavorable
- c. P1,440,000 unfavorable
- d. **P1,200,000 unfavorable**

### **SUPPORTING ANALYSIS/COMPUTATION:**

The actual selling price is presumed to be P20, same as the budgeted amount, there is no sales price variance. The required variance is the net quantity variance.

|  |                                       |
|--|---------------------------------------|
| Actual sales in units                    | 1,200,00                              |
| - Budgeted sales in units                | <u>1,400,000</u>                      |
| Changes in quantity sold                 | (200,000) UF                          |
| x Unit contribution margin (P20 x P 30%) | 6                                     |
| Net quantity variance                    | <u><u>P1,200,000</u></u><br><u>UF</u> |

### **Use the following information for question number 31 and 32:**

Based on normal capacity operations, Anyel Company employs 25 workers in its Refining Department, working 8 hours a day, 20 days per month at a wage rate of P6 per hour. At normal capacity, production in the department is 5,000 units per month. Indirect materials average P0.25 per direct labor hour; indirect labor cost is 12½% of direct labor cost; and other overhead are P0.15 per direct labor hour.

The flexible budget at the normal capacity activity level follows:

|                        |                 |
|------------------------|-----------------|
| Direct materials       | P 4,000         |
| Direct labor           | 24,000          |
| Fixed factory overhead | 1,200           |
| Indirect materials     | 1,000           |
| Indirect labor         | 3,000           |
| Other overhead         | 600             |
| Total                  | <u>P 33,800</u> |
| Cost per unit          | <u>P 6.76</u>   |

31. The cost per unit at 60% capacity is

- a. P6.00
- b. P6.50
- c. P6.8
- d. **P6.92**

32. The total production cost for one month at 80% capacity is

- a. P20,760
- b. P21,500
- c. **P27,280**
- d. P30,160

### **Use the following information for question number 33 and 34:**

Fissan Co. has a standard cost system in which manufacturing overhead is applied

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to units of product on the basis of direct labor hours (DLHs). The following standards are based on 100,000 direct labor hours:

|                   |                                     |
|-------------------|-------------------------------------|
| Variable overhead | 2 DLHs @ \$3 per DLH = \$6 per unit |
| Fixed overhead    | 2 DLHs @ \$4 per DLH = \$8 per unit |

The following information pertains operations during March:

|   |           |
|---|-----------|
| Units actually produced                 | 38,000    |
| Actual direct labor hours worked        | 80,000    |
| Actual manufacturing overhead incurred: |           |
| Variable overhead                       | \$250,000 |
| Fixed overhead                          | \$384,000 |

33. For March, the variable overhead spending variance was:

- a. \$6,000 F.
- b. **\$10,000 U.**
- c. \$12,000 U.
- d. \$22,000 F.

34. For March, the fixed overhead volume variance was:

- a. \$80,000 F.
- b. \$80,000 U.
- c. \$96,000 F.
- d. **\$96,000 U.**

### **Use the following data for questions number 35 to 38:**

Ayaw ko sayo Company produces and sells gold-plated souvenir mugs. It expects to sell 3200 units in 2019 for P45 each to earn P25 contribution margin per unit. The president expects the total market to be 64000 units for the year.

In 2019, the University of the West won the national basketball championship. Mars sold 6000 at P75 per unit with P40 in variable costs per unit. Total market was 200000 units.

35. What is the market share variance?

- a. 150000F
- b. **100000U**
- c. 1100000F
- d. 110000U

### **SUPPORTING ANALYSIS**

Market share:

Actual  $6000/200000=3\%$

Budget  $3200/64000=5\%$

Market share variance =  $(3\%-5\%)(200000)(P25)$   
=P(100000) unfav.

36. What is the market size variance?

- a. 85000U
- b. **170000F**
- c. 95000F
- d. 95000U

### **SUPPORTING ANALYSIS**



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42. MNO Company applies overhead at P5 per direct labor hour. In March 2001, MNO incurred overhead of P120,000. Under applied overhead was P5,000. How many direct labor hours did MNO work?  
 A. 25,000  
 B. 22,000  
 C. 24,000  
 D. 23,000
43. Margolos, Inc. ends the month with a volume variance of \$6,360 unfavorable. If budgeted fixed factory O/H was \$480,000, O/H was applied on the basis of 32,000 budgeted machine hours, and budgeted variable factory O/H was \$170,000, what were the actual machine hours (AH) for the month?  
 A. 31,576  
 B. 31,687  
 C. 32,000  
 D. 32,424
44. ABC Company uses the equation  $P300,000 + P1.75$  per direct labor hour to budget manufacturing overhead. ABC has budgeted 125,000 direct labor hours for the year. Actual results were 110,000 direct labor hours, P297,000 fixed overhead, and P194,500 variable overhead. What is the fixed overhead volume variance for the year?  
 A. P2,000 F  
 B. P3,000 F  
 C. P35,000 U.  
 D. P36,000 U.
45. Jettters Company manufactured 100,000 motors for dehumidifiers and used 20,000 direct labor hours. The selling price of each motor is P25 and the labor cost is P10 per hour. The labor productivity ratio is:  
 A. P10  
 B. P12.50  
 C. 4 motors per hour  
 D. 2.5 motors per hour

### SUPPORTING ANALYSIS

Labor productivity ratios are operational measure ( $100,000/20,000 = 5$  motors per hour) or financial measure [ $(25 * 100,000)/(20,000 * 10) = P12.50$ ].

46. At the end of 2006, Duabi Corporation implemented a new labor process and redesigned its product with the expectation that input usage efficiency would increase. Now, at the end of 2007, the president of the company wants an assessment of the changes on the company's productivity. The data needed for the assessment are as follows:

|                      | 2006   | 2007   |
|----------------------|--------|--------|
| Output               | 30,000 | 38,000 |
| Output prices        | P12    | P12    |
| Materials (lbs.)     | 10,000 | 10,400 |
| Materials unit price | P8     | P7     |
| Labor hours          | 14,000 | 15,000 |
| Labor rate per hour  | P6     | P7     |
| Power (KwH)          | 12,000 | 13,000 |
| Price per KwH        | P3     | P4     |

By how much did profits change as a result of productivity changes in materials?

- A. P 13,000 decrease  
 C. P 23,400 decrease



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49. For March, the fixed overhead volume variance was:

- A. \$80,000 F.
- B. \$80,000 U.
- C. \$96,000 F.
- D. \$96,000 U.

**Questions 52 thru 54 are based on the following information.**

The Murray Company makes and sells a single product. The company recorded the following activity and cost data for May:

|   |              |
|---|--------------|
| Number of units completed                               | 45,000 units |
| Standard direct labor-hours allowed per unit of product | 1.5 DLHS     |
| Budgeted direct labor-hours (denominator activity)      | 72,000 DLHS  |
| Actual fixed overhead costs incurred                    | \$66,000     |
| Volume variance   | \$4,275 U    |

The fixed portion of the predetermined overhead rate is \$0.95 per direct labor-hour.

50. The amount of fixed overhead contained in the company's overhead flexible budget for May was:

- A. \$64,125.
- B. \$67,500.
- C. \$68,400.
- D. \$70,275.

51. The amount of fixed manufacturing overhead cost applied to work in process during May was:

- A. \$42,750.
- B. \$61,725.
- C. \$62,700.
- D. \$64,125.

52. The fixed overhead budget variance for May was:

- A. \$2,400 F.
- B. \$2,400 U.
- C. \$6,000 F.
- D. \$6,000 U.

53. Web Company uses a standard cost system in which manufacturing overhead is applied to units of product on the basis of machine hours. During February, the company used a denominator activity of 80,000 machine hours in computing its predetermined overhead rate. However, only 75,000 standard machine hours were allowed for the month's actual production. If the fixed overhead volume variance for February was \$6,400 unfavorable, then the total budgeted fixed overhead cost for the month was:

- A. \$96,000.
- B. \$98,600.
- C. \$100,000.
- D. \$102,400.

54. Given for the variable factory overhead of GHI Products, Inc.: P39,500 actual input at budgeted rate, P41,500 flexible budget based on standard input allowed for actual output, P2,500 favorable flexible budget variance. Compute the spending variance.

- A. P500 favorable.
- B. P500 unfavorable.
- C. P2,000 favorable.
- D. P2,000 unfavorable.

55. The following information is available from the Tyro Company:

|                              |          |
|------------------------------|----------|
| Actual factory O/H           | \$15,000 |
| Fixed O/H expenses, actual   | \$7,200  |
| Fixed O/H expenses, budgeted | \$7,000  |

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|                           |        |
|---------------------------|--------|
| Actual hours              | 3,500  |
| Standard hours            | 3,800  |
| Variable O/H rate per DLH | \$2.50 |

Assuming that Tyro uses a three-way analysis of O/H variances, what is the spending variance?

- A. \$200 U  
B. \$750 F  
C. \$750 U.  
D. \$950 F

56. At Overland Company, maintenance cost is exclusively a variable cost that varies directly with machine-hours. The performance report for July showed that actual maintenance costs totaled \$9,800 and that the associated spending variance was \$200 unfavorable. If 8,000 machine-hours were actually worked during July, the budgeted maintenance cost per machine-hour was:

- A. \$1.20.  
B. \$1.225.  
C. \$1.25.  
D. \$1.275.

57. Patridge Company uses a standard cost system in which it applies manufacturing overhead to units of product on the basis of direct labor hours. The information below is taken from the company's flexible budget for manufacturing overhead:

| Percent of capacity | 70%       | 80%       | 90%       |
|---------------------|-----------|-----------|-----------|
| Direct labor hours  | 21,000    | 24,000    | 27,000    |
| Variable overhead   | \$ 42,000 | \$ 48,000 | \$ 54,000 |
| Fixed overhead      | 108,000   | 108,000   | 108,000   |
| Total overhead      | \$150,000 | \$156,000 | \$162,000 |

During the year, the company operated at exactly 80% of capacity, but applied manufacturing overhead to products based on the 90% level. The company's fixed overhead volume variance for the year was:

- A. \$6,000 F.  
B. \$6,000 U.  
C. \$12,000 F.  
D. \$12,000 U

58. The materials mix variance for a product is P450 unfavorable and the materials yield variance is P150 unfavorable. This means that

- a. the materials price variance is P600 unfavorable.  
b. the materials quantity variance is P600 unfavorable  
c. the total materials cost variance is definitely P600 unfavorable.  
d. the materials price variance is also unfavorable, but the amount cannot be determined from the given information.

### SUPPORTING ANALYSIS:

|                   |               |
|-------------------|---------------|
| Mix variance      | P450 U        |
| Yield variance    | <u>150 U</u>  |
| Quantity variance | <u>P600 U</u> |

59. Samson Company uses a standard costing system in the production of its only product. The 84,000 units of raw materials inventory were purchased for P126,000 and 4 units of raw materials are required to produce one unit of

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final product. In October, the company produced 14,400 units of product. The standard cost allowed for materials was P72,000, and there was an unfavorable usage variance of P3,000.

- The materials price variance for the units used in October was
- a. **P15,000 unfavorable.**
  - b. P15,000 favorable.
  - c. P3,000 unfavorable.
  - d. P3,000 favorable.

### SUPPORTING ANALYSIS:

|  |               |
|--|---------------|
| Total standard cost                          | P72,000       |
| ÷ Std qty for actual production (14,400 x 4) | <u>57,600</u> |
| Standard price per unit of materials         | <u>P1.25</u>  |

The usage variance is P3,000 unfavorable. The standard price is P1.25. Using the formula for Usage variance, the difference in quantity may be computed as follows:

$$\begin{aligned} \text{Usage variance} &= \text{Difference in quantity} \times \text{Std. price} \\ 3,000 \text{ U} &= \text{Difference in quantity} \times \text{P1.25} \\ \text{Difference in quantity} &= 3,000 \div \text{P1.25} \\ &= \underline{2,400} \text{ unfavorable} \end{aligned}$$

If the difference in quantity is unfavorable, the actual quantity is greater than the standard quantity:

|  |                     |
|--|---------------------|
| Standard quantity (14,400 x 4)         | 57,600              |
| Add unfavorable difference in quantity | <u>2,400</u>        |
| Actual quantity used                   | <u>60,000</u> units |

$$\begin{aligned} \text{Price Variance} &= (\text{AP} - \text{SP}) \times \text{AQ} \\ &= ([\text{P}126,000 \div 84,000] - \text{P1.25}) \times 60,000 \\ &= \underline{\text{P15,000}} \text{ unfavorable} \end{aligned}$$

60. The standard direct materials cost to produce a unit of a product is four meters of materials at P2.50 per meter. During June, 2015, 4,200 meters of materials costing P10,080 were purchased and used to produce 1,000 units of the product. What was the materials price variance for June, 2015?

- a. P480 unfavorable
- b. P 80 unfavorable
- c. P400 favorable
- d. **P420 favorable**

### SUPPORTING ANALYSIS:

|                                  |              |
|----------------------------------|--------------|
| Actual price (P10,080 ÷ 4,200)   | P2.40        |
| Standard price                   | <u>2.50</u>  |
| Difference in prices - favorable | P 0.10       |
| X actual quantity purchased      | <u>4,200</u> |
| Price variance - favorable       | <u>P 420</u> |

61. Buchoy Company manufactures one product with a standard direct manufacturing labor cost of four hours at P12.00 per hour. During June, 1,000

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units were produced using 4,100 hours at P12.20 per hour. The unfavorable direct labor efficiency variance was:

- a. P820  
 b. P400  
 c. **P1,200**  
 d. P1,220

### SUPPORTING ANALYSIS:

|                                   |             |              |
|-----------------------------------|-------------|--------------|
| Actual time - hours               | 4,100       |              |
| Less standard time (1,000 x 4)    |             | <u>4,000</u> |
| Difference in time - unfavorable  |             | 100          |
| X standard rate per hour          | <u>P 12</u> |              |
| Efficiency variance - unfavorable |             |              |

### ITEMS 62 TO 66 ARE BASED ON THE FOLLOWING:

Vhong, Inc. evaluates manufacturing overhead in its factory by using variance analysis. The following information applies to the month of July:

|                          | <u>ACTUAL</u> | <u>BUDGETED</u>          |
|--------------------------|---------------|--------------------------|
| Number of units produced | 19,000        | 20,000                   |
| Variable overhead costs  | P4,100        | P2 per direct labor hour |
| Fixed overhead costs     | P22,000       | P20,000                  |
| Direct labor hours       | 2,100         | 0.1 hour per unit        |

62. The controllable variance amounts to

- a. P2,500 unfavorable  
 b. P1,000 unfavorable  
 c. **P2,300 unfavorable**  
 d. P2,000 unfavorable

### SUPPORTING ANALYSIS:

|  |               |                |
|--|---------------|----------------|
| Actual variable overhead   | P4,100        |                |
| Actual time x std. var. rate (2,100 x P2)                            |               | <u>4,200</u>   |
| Spending variance - favorable  | <u>P 100</u>  |                |
| Actual time x std. var. rate (2,100 x P2)                            |               | P4,200         |
| Std. variable overhead [(19,000 x 0.1) x P2]                         |               | <u>3,800</u>   |
| Efficiency variance - unfavorable                                    | <u>P 400</u>  |                |
| Actual fixed overhead  | P22,000       |                |
| Less budgeted fixed overhead   | <u>20,000</u> |                |
| Fixed spending variance - unfavorable                                |               | <u>P 2,000</u> |
| Budgeted fixed overhead  | P20,000       |                |
| Less standard fixed overhead<br>[1,900 x (P20,000 / <20,000 x 0.1>)] |               | <u>19,000</u>  |
| Volume variance - unfavorable  | <u>1,000</u>  |                |

Controllable variance (P100 F + P400 U + P2,000 U) = 2,300 U

63. Using the three-way variance analysis, the spending variance amounts to

- a. P100 favorable  
 b. **P1,900 unfavorable**  
 c. P2,000 unfavorable  
 d. P2,100 unfavorable

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### SUPPORTING ANALYSIS:

|  |               |                 |
|--|---------------|-----------------|
| Actual variable overhead                     | P4,100        |                 |
| Actual time x std. var. rate (2,100 x P2)    |               | <u>4,200</u>    |
| Spending variance - favorable                | P <u>100</u>  |                 |
|  |               |                 |
| Actual time x std. var. rate (2,100 x P2)    |               | P4,200          |
| Std. variable overhead [(19,000 x 0.1) x P2] |               | <u>3,800</u>    |
| Efficiency variance - unfavorable            | P <u>400</u>  |                 |
|  |               |                 |
| Actual fixed overhead                        | P22,000       |                 |
| Less budgeted fixed overhead                 | <u>20,000</u> |                 |
| Fixed spending variance - unfavorable        |               | P <u>2,000</u>  |
|  |               |                 |
| Budgeted fixed overhead                      | P20,000       |                 |
| Less standard fixed overhead                 |               |                 |
| [1,900 x (P20,000/<20,000 x 0.1>)]           |               | <u>19,000</u>   |
| Volume variance - unfavorable                | <u>1,000</u>  |                 |
| Spending variance (P100 F + P2,000 U) =      |               | <u>P1,900 U</u> |

64. The efficiency variance amounts to

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>a. P400 unfavorable</li> <li>b. P1,900 unfavorable</li> </ul> | <ul style="list-style-type: none"> <li>c. P400 favorable</li> <li>d. P1,000 unfavorable</li> </ul> |
|--|--|

### SUPPORTING ANALYSIS:

|  |              |              |
|--|--------------|--------------|
| Actual time x std. var. rate (2,100 x P2)    |              | P4,200       |
| Std. variable overhead [(19,000 x 0.1) x P2] |              | <u>3,800</u> |
| Efficiency variance - unfavorable            | P <u>400</u> |              |

65. The non-controllable variance is

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>a. P2,300 unfavorable</li> <li>b. P400 unfavorable</li> </ul> | <ul style="list-style-type: none"> <li>c. P2,000 unfavorable</li> <li>d. P1,000 unfavorable</li> </ul> |
|--|--|

### SUPPORTING ANALYSIS:

|                                    |              |               |
|------------------------------------|--------------|---------------|
| Budgeted fixed overhead            | P20,000      |               |
| Less standard fixed overhead       |              |               |
| [1,900 x (P20,000/<20,000 x 0.1>)] |              | <u>19,000</u> |
| Volume variance - unfavorable      | <u>1,000</u> |               |

66. The fixed overhead efficiency variance is:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>a. P400 unfavorable</li> <li>b. P2,000 unfavorable</li> </ul> | <ul style="list-style-type: none"> <li>c. P400 favorable</li> <li>d. 0</li> </ul> |
|--|---|

67. Shampoo Company is a chemical manufacturer that supplies industrial users. The company plans to introduce a new chemical solution and needs to develop a standard product cost for this new <sup>solution</sup>.

The new chemical solution is made by combining a chemical compound (Nyclyn) and a solution (Salex), boiling the mixture; adding a second

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compound (Protet), and bottling the resulting solution in 20-liter containers. The initial mix, which is 20 liters in volume, consists of 24 kilograms of Nyclyn and 19.2 liters of Salex. A 20% reduction in volume occurs during the boiling process. The solution is then cooled slightly before 10 kilograms of Protet are added; the addition of Protet does not affect the total liquid volume.

The purchase prices of the raw materials used in the manufacture of this new chemical solution are as follows:

|        |                     |
|--------|---------------------|
| Nyclyn | P15.00 per kilogram |
| Salex  | P21.00 per liter    |
| Protet | P28.00 per kilogram |

The total standard materials cost of 20 liters of the product is:

- A. P1,043.20                      C. P 834.56  
B. P1,304.00                      D. **P1,234.00**

### SUPPORTING ANALYSIS:

|        |                      |                         |
|--------|----------------------|-------------------------|
| Nyclyn | (24 ÷ 0.80 × P15)    | P 450.00                |
| Salex  | (19.20 ÷ 0.80 × P21) | 504.00                  |
| Protet | (10 × P28)           | <u>280.00</u>           |
| Total  |                      | <u><b>P1,234.00</b></u> |

68.El Andre Co. uses a standard costing system in connection with the manufacture of a line of T-shirts. Each unit of finished product contains 2.25 yards of direct material. However, a 25 percent direct material spoilage calculated on input quantities occurs during the manufacturing process. The cost of the direct materials is P150 per yard. The standard direct material cost per unit of finished product is

- A. P 253                              C. **P 450**  
B. P 422                              D. P 405

### SUPPORTING ANALYSIS:

Required inputs to be placed in process per unit of product:  $2.25 \div 0.75 = 3.0$  yards  
Standard Material cost per unit of product:  $3.0 \times P150 = \underline{\underline{P450}}$

69.Each finished unit of Product EM contains 60 pounds of raw material. The manufacturing process must provide for a 20% waste allowance. The raw material can be purchased for P2.50 a pound under terms of 2/10, n/30. The company takes all cash discounts. The standard direct material cost for each unit of EM is:

- A. P180.00                      C. P187.50  
B. **P183.75**                      D. P176.40

### SUPPORTING ANALYSIS:

|  |                      |
|--|----------------------|
| Required inputs of raw materials (in pounds) (60 ÷ 0.80) | 75.00                |
| Standard price per pound (2.5 × 0.98)                    | <u>x 2.45</u>        |
| Standard materials cost per unit                         | <u><b>183.75</b></u> |

70.The Vandana Company has a signature scarf for ladies that is very popular.

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Certain production and marketing data are indicated below:

|                                  |                  |
|----------------------------------|------------------|
| Cost per yard of cloth           | P40.00           |
| Allowance for rejected scarf     | 5% of production |
| Yards of cloth needed per scarf  | 0.475 yard       |
| Airfreight from supplier         | P1.00/yard       |
| Motor freight to customers       | P0.90 /scarf     |
| Purchase discounts from supplier | 3%               |
| Sales discount to customers      | 2%               |

The allowance for rejected scarf is not part of the 0.475 yard of cloth per scarf. Rejects have no market value. Materials are used at the start of production.

Calculate the standard cost of cloth per scarf that Vandana Company should use in its cost sheets.

- |    |        |    |               |
|----|--------|----|---------------|
| A. | P19.85 | C. | P19.40        |
| B. | P20.00 | D. | <b>P19.90</b> |

### SUPPORTING ANALYSIS:

Net price per yard:

|                             |              |                     |
|-----------------------------|--------------|---------------------|
| Purchase price              | 40.00        |                     |
| Freight                     | 1.00         |                     |
| Purchase discount           | 0.03 x 40    | ( <u>1.20</u> )     |
| Standard cost per yard      |              | <u>39.80</u>        |
| Standard quantity per scarf | 0.475/0.95   | <u>0.50</u>         |
| Standard cost per scarf:    | 0.50 x 39.80 | <u><u>19.90</u></u> |

71. Double M company is a chemical manufacturer that supplies various products to industrial users. The company plans to introduce a new chemical solution called Bysap, for which it needs to develop a standard product cost. The following labor information is available on the production of Bysap.

- The product, which is bottled in 10-liter containers, is primarily a mixture of Byclyn, Salex, and Protet.
- The finished product is highly unstable, and one 10-liter batch out of six is rejected at final inspection. Rejected batches have no commercial value and are thrown out.
- It takes a worker 35 minutes to process one 10-liter batch of Bysap. Employees work on eight-hour a day, including one hour per day for rest breaks and cleanup.

What is the standard labor time to produce one 10-liter batch of Bysap?

- |    |            |    |                   |
|----|------------|----|-------------------|
| A. | 35 minutes | C. | <b>48 minutes</b> |
| B. | 40 minutes | D. | 45 minutes        |

### SUPPORTING ANALYSIS:

72. The following direct labor information pertains to the manufacture of Part J35:

|   |              |
|---|--------------|
| Number of hours required to make a part                 | 2.5 DLH      |
| Number of Direct workers                                | 75           |
| Number of total productive hours per week               | 3000         |
| Weekly wages per worker                                 | P1,000       |
| Laborers' fringe benefits treated as direct labor costs | 25% of wages |



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= P 35,000 favorable

### PROBLEM 3

Faty Company produces and sells personalized t-shirts. It expects to sell 2,600 units in 2020 for P 55 each to earn a P 35 contribution margin per unit. The president expects the total market to be 42,000 units for the year.

In 2020, the BGSM won the Local basketball championship. Faty sold 6,000 at P 85 per unit with P 50 in variable costs per unit. Total market was 200,000 units.

Required:

1. What is the market share variance?
2. What is the market size variance?
3. What is the sales volume variance?

### SUPPORTING ANALYSIS AND COMPUTATION:

1. Market share:

Actual:  $6,000 / 200,000 = 3\%$

Budget:  $2,600 / 42,000 = 6.19\%$

Market share variance:  $= (3\% - 6.19\%) (200,000) (P 35)$   
 $= P (223,300)$  unfavorable

2. Market size variance  $= (100,000 - 42,000) (0.0619) (P 35)$   
 $= P 130,305.7$  favorable

3. Sales volume variance  $= (6,000 - 2,600) (P35)$   
 $= 119,000$  favorable

### PROBLEM 6: Sales Variance Ratios

Sales last year of P6million decreased to P5.4million but sales price increased by 20%.

Required:

- a. Sales Price Variance
- b. Sales quantity variance and sales quantity variance ratio.

### PROBLEM 9: Cost Variance Ratios

Cost of goods sold this year amounting to P9.6million is 20% higher than that of last year. On the average, cost prices increased by 25%.

Required:

- a. Cost Price Variance
- b. Cost quantity variance and Cost quantity variance ratio.

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### PROBLEM 12: Sales and Cost Variances with incomplete data

The contribution margin of Mel Corporation for 2012 and 2013 are given below:

|                      | 2012              | 2013              |
|----------------------|-------------------|-------------------|
| Sales                | P8,000,000        | P12,000,000       |
| Less: Variable Costs | <u>6,000,000</u>  | <u>8,000,000</u>  |
| Contribution Margin  | <u>P2,000,000</u> | <u>P4,000,000</u> |

The number of units sold increased by 5%.

Required:

- Sales price variance and sales price variance ratio
- Sales quantity variance
- Variable cost price variance and variable cost price variance ratio
- Variable cost quantity variance

### PROBLEM 15: Gross Profit Variances Analysis

Bi Distribution presents the following data for two types of canned products, Ariel and Surf, for 2015 and 2016:

|                     | 2015         |       |                | 2016         |        |                 |
|---------------------|--------------|-------|----------------|--------------|--------|-----------------|
|                     | Per<br>Units | Unit  | Amount         | Per<br>Units | Unit   | Amount          |
| Sales:              | 8,000        | P8.00 | P64,000        | 12,000       | P10.00 | P120,000        |
| Ariel               | 8,000        | P4.00 | <u>32,000</u>  | 20,000       | P6.00  | <u>120,000</u>  |
| Surf                |              |       | <u>96,000</u>  |              |        | <u>240,000</u>  |
| Cost of Goods Sold: |              |       |                |              |        |                 |
| Ariel               | 8,000        | P6.00 | P48,000        | 12,000       | P9.00  | P108,000        |
| Surf                | 8,000        | P3.00 | <u>24,000</u>  | 20,000       | P5.00  | <u>100,000</u>  |
|                     |              |       | <u>P72,000</u> |              |        | <u>P208,000</u> |
| Gross Profit        | 16,000       | P1.50 | P24,000        | 32,000       | P1.00  | P32,000         |

Required:

Compute the price and volume variances for sales and costs, and the sales mix and final sales volume variances.

### PROBLEM 16:

The Hooray Company makes and sells a single product. The company recorded the following activity and cost data for May:

Number of units completed 45,000 units

Standard direct labor-hours allowed per unit of product 1.5 DLHS

Budgeted direct labor-hours (denominator activity) 72,000 DLHS

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Actual fixed overhead costs incurred \$66,000  
Volume variance \$4,275 U  
The fixed portion of the predetermined overhead rate is \$0.95 per direct labor-hour.

### Required:

1. The amount of fixed overhead contained in the company's overhead flexible budget for May
2. The amount of fixed manufacturing overhead cost applied to work in process during May
3. The fixed overhead budget variance for May

### ANSWERS:

1. \$68,400.
2. \$64,125.
3. \$2,400 F

### PROBLEM 17:

### PROBLEM 18:

### PROBLEM 19:

### PROBLEM 20:

## COMPREHENSIVE PROBLEMS:

### PROBLEM 1: Operational and Financial Partial Productivity

In the fourth quarter of 2018 Star Company embarked on a major drive to improve productivity. The drive included redesigned products, reengineered manufacturing processes, and productivity improvement courses. The drive was completed in the last quarter of 2019. The controller's office has gathered the following year-end data for the assessment of the drive.

|                              | 2018   | 2019   |
|------------------------------|--------|--------|
| Units manufactured and sold  | 15,000 | 18,000 |
| Selling price of the product | P40    | P40    |
| Materials used (pounds)      | 12,000 | 12,600 |
| Cost per pound of materials  | P8     | P10    |
| Labor-hours                  | 6,000  | 5,000  |
| Hourly wage rate             | P20    | P25    |
| Power (kwh)                  | 1,000  | 2,000  |
| Cost of power per kwh        | P2     | P2     |

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Required:

1. Prepare a summary contribution-approach income statement for each year and calculate the total change in profits.
2. Compute the operational partial productivity ratios for each of the production factors for 2018 and 2019.
3. Compute the financial partial productivity ratios for each of the production factors for 2018 and 2019.
4. On the basis of the operational and financial partial productivity you computed, what conclusions can you draw on the productivity of the firm in 2019 relative to 2018?
5. Separate the changes in the financial partial productivity ratios from 2018 to 2019 into productivity changes, input price changes, and output changes.
6. Discuss additional insights on the relative productivity between 2018 and 2019 from the detailed information provided by the separations of the change in the financial partial productivity ratios.

### SUPPORTING ANALYSIS/COMPUTATION:

#### Requirement 1

Star Company  
Comparative Income Statement  
For the years 2005 and 2006

|                               |              | 2005            |              | 2006            |
|-------------------------------|--------------|-----------------|--------------|-----------------|
| Sales                         | 15,000 x P40 | <u>P600,000</u> | 18,000 x P40 | <u>P720,000</u> |
|                               | =            |                 | =            | <u>00</u>       |
| Variable cost of sales:       |              |                 |              |                 |
| Materials                     | 12,000 x P 8 | P 96,000        | 12,600 x P10 | P126,000        |
|                               | =            |                 | =            | <u>00</u>       |
| Labor                         | 6,000 x P20  | 120,000         | 5,000 x P25  | = 125,000       |
|                               | =            |                 | =            | <u>0</u>        |
| Power                         | 1,000 x P 2  | <u>2,000</u>    | 2,000 x P 2  | = <u>4,000</u>  |
|                               | =            |                 | =            |                 |
| Total variable costs of sales |              | <u>P218,000</u> |              | <u>P255,000</u> |
| Contribution margin           |              | <u>P382,000</u> |              | <u>P465,000</u> |

Change in profits from 2005: P465,000 - P382,000 = P83,000 increase

#### Requirement 2

*Operational Partial Productivity*

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|       | <u>2006</u>                | <u>2005</u>              |
|-------|----------------------------|--------------------------|
| DM    | $18,000 / 12,600 = 1.4286$ | $15,000 / 12,000 = 1.25$ |
| DL    | $18,000 / 5,000 = 3.6$     | $15,000 / 6,000 = 2.5$   |
| Power | $18,000 / 2,000 = 9$       | $15,000 / 1,000 = 15$    |

### Requirement 3

#### Total cost of production factors

|       | <u>2006</u>                     | <u>2005</u>                         |
|-------|---------------------------------|-------------------------------------|
| DM    | $12,600 \times P10$<br>P126,000 | $= 12,000 \times P 8$<br>= P 96,000 |
| DL    | $5,000 \times P25$<br>P125,000  | $= 6,000 \times P20 =$<br>P120,000  |
| Power | $2,000 \times P 2$<br>P 4,000   | $= 1,000 \times P 2 =$<br>2,000 P   |

#### Financial Partial Productivity

|       | <u>2006</u>                    | <u>2005</u>                    |
|-------|--------------------------------|--------------------------------|
| DM    | $18,000 / 126,000 =$<br>0.1429 | $15,000 / 96,000 =$<br>0.15625 |
| DL    | $18,000 / 125,000 =$<br>0.144  | $15,000 / 120,000 =$<br>0.125  |
| Power | $18,000 / 4,000 =$<br>4.5      | $15,000 / 2,000 =$<br>7.5      |

### Requirement 4

Both direct materials and direct labor operation partial productivity improved from 2005 to 2006. In 2006 the firm was able to manufacture more output units for each unit of materials placed into production and for each hour spent on production. The operational productivity of power in 2006 deteriorated from 2005. It is likely that the firm used more equipment in production in 2006 that reduced consumption of materials and production hours.

The financial partial productivity for both direct materials and power deteriorated from 2005 to 2006. Increases in direct materials costs were more than the improvements in operational partial productivity for direct materials. Like the operational partial productivity, the financial partial productivity for direct labor also improved. The extent of improvements, however, is much lower in financial partial productivity. The direct labor operational partial productivity improved 44 percent in 2006 over those of 2005. The financial partial productivity, however, improved only 15.2 percent between the two years. The decrease in financial partial productivity is likely a result of increases in direct labor wages.




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### Requirement 5

#### Operating Data for Decomposing Financial Productivity Measure

| 2006 Output,<br>1/2006 Productivity<br>2006 Input cost  | 2006 Output<br>1/2005 Productivity<br>2006 Input cost   | 2006<br>Output<br>1/2005<br>Productivity<br>2005 Input<br>cost   | 2005 Output<br>1/2005 Productivity<br>2005 Input cost   |
|---|---|--|---|
| (1) Output (unit):<br>18,000  | 18,000  | 18,000   | 15,000  |
| (2) 1/Productivity<br>DM: 12,600/18,000<br>= 0.7<br>DL: 5,000/18,000<br>= 0.2778<br>Power: 2,000/18,000<br>= 0.1111   | 12,000/15,000<br>= 0.8<br>6,000/15,000<br>= 0.4<br>1,000/15,000<br>= 0.0667   | 12,000/15,000<br>= 0.8<br>6,000/15,000<br>= 0.4<br>1,000/15,000<br>= 0.0667  | 12,000/15,000<br>= 0.8<br>6,000/15,000<br>= 0.4<br>1,000/15,000<br>= 0.0667   |
| (3) Cost per unit of input<br>DM: P10<br>DL: P25<br>Power: P 2  | P10<br>P25<br>P 2   | P 8<br>P20<br>P 2  | P 8<br>P20<br>P 2   |
| (4) Output x (1/Productivity) x Input cost<br>DM: 18,000 x 0.7 x 10<br>= P126,000<br>DL: 18,000 x 0.2778 x 25<br>= P125,010<br>Power: 18,000 x 0.1111<br>x 2 = <u>P4,000</u><br>Total <u>P255,010</u> | 18,000 x 0.8 x 10<br>= P144,000<br>18,000 x 0.4 x 25<br>= P180,000<br>18,000 x 0.0667 x 2<br>= <u>P2,401</u><br><u>P326,401</u> | 18,000 x 0.8 x 8<br>= P115,200<br>18,000 x 0.4 x 20<br>= P144,000<br>18,000 x 0.0667 x 2<br>= <u>P2,401</u><br><u>P261,601</u> | 15,000 x 0.8 x 8<br>= P96,000<br>15,000 x 0.4 x 20<br>= P120,000<br>15,000 x 0.0667 x 2<br>= <u>P2,001</u><br><u>P218,001</u> |
| Decomposition<br>DM: 18,000 / 126,000<br>= 0.1429   | 18,000 / 144,000<br>= 0.125   | 18,000 / 115,200<br>= 0.15625  | 15,000 / 96,000<br>= 0.15625  |

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|  |   |  |
|--|---|--|
| $\begin{aligned} \text{DL: } & 18,000 / 125,010 \\ & = 0.1440 \end{aligned}$                                     | $\begin{aligned} & 18,000 / 180,000 \\ & = 0.1 \end{aligned}$   | $\begin{aligned} & 18,000 / 144,000 \\ & = 0.125 \end{aligned}$  |
| $\begin{aligned} \text{Power: } & 18,000 / 4,000 \\ & = 4.5 \end{aligned}$                                       | $\begin{aligned} & 18,000 / 2,401 \\ & = 7.4969 \end{aligned}$  | $\begin{aligned} & 15,000 / 2,001 \\ & = 7.4963 \end{aligned}$   |
|  <p>Productivity<br/>change</p> |  <p>Input price change</p> |  <p>Output change</p> |

|  |  |  |
|--|--|--|
| $\begin{aligned} \text{DM: } & 0.1429 - 0.125 \\ & = 0.0179 \text{ F} \end{aligned}$   | $\begin{aligned} & 0.125 - 0.15625 \\ & = 0.03125 \text{ U} \end{aligned}$ | $\begin{aligned} & 0.15625 - 0.15625 \\ & = 0 \end{aligned}$                       |
| $\begin{aligned} \text{DL: } & 0.144 - 0.1 \\ & = 0.044 \text{ F} \end{aligned}$       | $\begin{aligned} & 0.1 - 0.125 \\ & = 0.025 \text{ U} \end{aligned}$       | $\begin{aligned} & 0.125 - 0.125 \\ & = 0 \end{aligned}$                           |
| $\begin{aligned} \text{Power: } & 4.5 - 7.4969 \\ & = -2.9969 \text{ U} \end{aligned}$ | $\begin{aligned} & 7.4969 - 7.4969 \\ & = 0 \end{aligned}$                 | $\begin{aligned} & 7.4969 - 7.4963 \\ & = 0.0006 \text{ (rounding)} \end{aligned}$ |

*Summary of Result*

|        | Productivity<br>Change | Input Price<br>Change | Total<br>Change | Change as % of 2005 Productivity |                       |                 |
|--------|------------------------|-----------------------|-----------------|----------------------------------|-----------------------|-----------------|
|        |                        |                       |                 | Productivity<br>Change           | Input Price<br>Change | Total<br>Change |
| DM:    | 0.0179 F               | 0.03125<br>U          | 0.01335<br>U    | 11.46% F                         | 20% U                 | 8.54% U         |
| DL:    | 0.044 F                | 0.025<br>U            | 0.019 F         | 35.2% F                          | 20% U                 | 15.2% F         |
| Power: | 2.9969 U               | 0                     | 2.9969<br>U     | 39.98% U                         | 0                     | 39.98% U        |

*Requirement 6*

Productivity for both direct materials and direct labor improved in 2006. The percentages of improvements in productivity are 11.46 and 35.2 for direct materials and direct labor, respectively, of the 2005 productivity. However, cost increases in direct materials and direct labor reduced the gains in productivity on these two manufacturing factors.

**PROBLEM 2: Direct Labor Rate and Efficiency Variances, Productivity Measures, and Standard Costs**

Texas Manufacturing Inc. assembles industrial testing instruments. The firm has two departments: assembly and testing. Operating data for 2018 and 2019 are:

2018

2019

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|                             |     |     |
|-----------------------------|-----|-----|
| Assembly department:        |     |     |
| Actual direct-labor-hours   | 25  | 20  |
| per instrument              |     |     |
| Actual wage rate per hour   | P30 | P36 |
| Standard direct labor-hours | 24  | 21  |
| per instrument              |     |     |
| Standard wage rate per hour | P28 | P35 |
| Testing department:         |     |     |
| Actual direct-labor-hours   | 12  | 10  |
| per instrument              |     |     |
| Actual wage rate per hour   | P20 | P24 |
| Standard direct labor-hours | 14  | 11  |
| per instrument              |     |     |
| Standard wage rate per hour | P21 | P25 |

The firm assembled and tested 20,000 instruments in both 2018 and 2019.

Required:

1. Calculate the direct labor rate and efficiency variances for both years at both departments.
2. Compute the direct labor operational partial productivities in both years for both departments.
3. Determine the financial partial productivity for both departments for both years.
4. Compare your answers for requirements 2 and 3. Comment on your results.
5. How do the productivity measures differ from the variance analysis? Do they offer different perspectives for strategic decisions of the firm?

### SUPPORTING ANALYSIS/COMPUTATION:

*Requirement 1*

*Assembly Department Direct Labor Variances*

2018:

Total actual direct labor hours: 25 x 20,000 = 500,000

Total standard direct labor hours: 24 x 20,000 = 480,000

|             |   |             |   |             |   |
|-------------|---|-------------|---|-------------|---|
| P30         | x | P28         | x | P28         | x |
| 500,000     |   | 500,000     |   | 480,000     |   |
| =           |   | =           |   | =           |   |
| P15,000,000 |   | P14,000,000 |   | P13,440,000 |   |
|             |   | 0           |   | 0           |   |

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Rate variance  
= P1,000,000 U

Efficiency variance  
= P560,000 U

2019:

Total actual direct labor hours: 20 x 20,000 = 400,000

Total standard direct labor hours: 21 x 20,000 = 420,000

|                                      |                                      |  |
|--------------------------------------|--------------------------------------|--|
| P36 x<br>400,000<br>=<br>P14,400,000 | P35 x<br>400,000<br>=<br>P14,000,000 | P35 x<br>420,000<br>=<br>P14,700,000     |
| }<br>Rate variance<br>= P400,000 U   |                                      | }<br>Efficiency variance<br>= P700,000 F |

### *Testing Department Direct Labor Variances*

2018:

Total actual direct labor hours: 12 x 20,000 = 240,000

Total standard direct labor hours: 14 x 20,000 = 280,000

|                                     |                                     |  |
|-------------------------------------|-------------------------------------|--|
| P20 x<br>240,000<br>=<br>P4,800,000 | P21 x<br>240,000<br>=<br>P5,040,000 | P21 x<br>280,000<br>=<br>P5,880,000      |
| }<br>Rate variance<br>= P240,000 F  |                                     | }<br>Efficiency variance<br>= P840,000 F |

2019:

Total actual direct labor hours: 10 x 20,000 = 200,000

Total standard direct labor hours: 11 x 20,000 = 220,000

|                                     |                                     |  |
|-------------------------------------|-------------------------------------|--|
| P24 x<br>200,000<br>=<br>P4,800,000 | P25 x<br>200,000<br>=<br>P5,000,000 | P25 x<br>220,000<br>=<br>P5,500,000      |
| }<br>Rate variance<br>= P200,000 F  |                                     | }<br>Efficiency variance<br>= P500,000 F |

Recap:

|               | Assembly Department |            | Testing Department |            |
|---------------|---------------------|------------|--------------------|------------|
|               | 2018                | 2019       | 2018               | 2019       |
| Rate variance | P1,000,000 U        | P400,000 U | P240,000 F         | P200,000 F |
| Efficiency    | P560,000 U          | P700,000 F | P840,000 F         | P500,000 F |

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y variance F

*Requirement 2*

*Assembly Department Operational Partial Productivity*

2018:  $20,000 / 500,000 = 0.04$   
 2019:  $20,000 / 400,000 = 0.05$

*Testing Department Operational Partial Productivity*

2018:  $20,000 / 240,000 = 0.0833$   
 2019:  $20,000 / 200,000 = 0.1$

*Requirement 3*

*Assembly Department Financial Partial Productivity*

2018:  $20,000 / P15,000,000 = 0.001333$   
 2019:  $20,000 / P14,400,000 = 0.001389$

*Testing Department Financial Partial Productivity*

2018:  $20,000 / P4,800,000 = 0.004167$   
 2019:  $20,000 / P4,800,000 = 0.004167$

*Requirement 4*

*Operational partial productivity*

|          | 2005   | 2006 | Change   |       |
|----------|--------|------|----------|-------|
| Assembly | 0.04   | 0.05 | 0.01 F   | 25% F |
| Testing  | 0.0833 | 0.1  | 0.0167 F | 20% F |

*Financial partial productivity*

|          | 2005     | 2006     | Change     |       |
|----------|----------|----------|------------|-------|
| Assembly | 0.001333 | 0.001389 | 0.000056 F | 4.2%F |
| Testing  | 0.004167 | 0.004167 | -0-        | -0-   |

Operational partial productivity improved in both departments from 2005 to 2006. The financial partial productivity in the Assembly also improved while the Testing remains unchanged.

*Requirement 5*

The standards in a standard costing system often are determined independently and incorporate changes in operating factors. The

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standard for the operation of a year may change because of changes in, for example, technology, quality of materials, experience of production workers, designs, or processes.

Productivity measures use as the criterion the productivity of a prior year without adjusting for changes occurred or the expected changes for the current year. As a result, assessments of productivity may depict an entirely different picture than those of variance analyses in a standard costing system.

### PROBLEM 3: Sales Variance

Arrow Brewery has two main products – premium and regular beer. Its operating results and master budget for 2018 (000 omitted) are:

|                     | Operating Results of 2018 |                |                | Master Budget for 2018 |                |                |
|---------------------|---------------------------|----------------|----------------|------------------------|----------------|----------------|
|                     | Premium                   | Regular        | Total          | Premium                | Regular        | Total          |
| Barrels             | <u>180</u>                | <u>540</u>     | <u>720</u>     | <u>240</u>             | <u>360</u>     | <u>600</u>     |
| Sales               | P28,800                   | P62,100        | P90,900        | 36,000                 | P43,200        | P79,200        |
| Variable Expenses   | <u>16,200</u>             | <u>40,500</u>  | <u>56,700</u>  | <u>21,600</u>          | <u>27,000</u>  | <u>48,600</u>  |
| Contribution Margin | P12,600                   | 21,600         | P34,200        | P14,400                | 16,200         | P30,600        |
| Fixed Expenses      | <u>10,000</u>             | <u>5,000</u>   | <u>15,000</u>  | <u>10,000</u>          | <u>5,000</u>   | <u>15,000</u>  |
| Operating Income    | <u>P2,600</u>             | <u>P16,600</u> | <u>P19,200</u> | <u>P4,400</u>          | <u>P11,200</u> | <u>P15,600</u> |

Sam Kortés, CEO, estimated at the time she prepared the master budget that total industry sales would be 1,500,000 barrels during the period. After the year was over Mar Gopez, the controller, reported the total industry sales were 1,600,000 barrels.

Required: Calculate the

1. Selling price variances for the period for each of the products and for the firm.
2. Sales volume variances for the period for each of the products and for the firm.
3. Sales quantity variances for the firm and for each of the products.
4. Sales mix variances for the period for each of the products and for the firm.
5. The sum of the sales quantity variance and sales mix variance and verify that this total equals the sales volume variance.
6. Market size variances.
7. Market share variances.

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8. The sum of market size variance and market share variance and verify that this total equals the sales quantity variance.

### SUPPORTING ANALYSIS/COMPUTATION:

#### Requirement 1

Selling price variances (in 000)  
Flexible budget sales:

|         | <i>Master<br/>2005</i> | <i>Budget<br/>for</i> | Budgeted                     |         | Total Units        | Flexible                     |
|---------|------------------------|-----------------------|------------------------------|---------|--------------------|------------------------------|
|         | Total<br>Sales         | Units                 | Selling Price<br>Per Unit    |         | Sold<br>2005       | in<br>Budget<br>Sales        |
| Premium | P36,000                | ÷ 240                 | = P150                       |         | x 180              | P27,000                      |
|         |                        |                       | =                            |         |                    |                              |
| Regular | P43,200                | ÷ 360                 | = P120                       | x       | 540                | P64,800                      |
|         |                        |                       | =                            |         |                    |                              |
|         |                        | <i>Premium</i>        |                              |         | <i>Regular</i>     |                              |
|         | Actual                 | Flexible<br>Budget    | Selling<br>Price<br>Variance | Actual  | Flexible<br>Budget | Selling<br>Price<br>Variance |
| Barrels | 180                    | 180                   |                              | 540     | 540                |                              |
| Sales   | P28,800                | P27,000               | P1,800 F                     | P62,100 | P64,800            | P2,700 U                     |

Total selling price variance of the firm = P1,800 F + P2,700 U = P900 U

#### Requirement 2

Sales volume variances for the period for each of the products and for the firm

Flexible budget variable expenses:

|         | <i>Master<br/>2005</i>        | <i>Budget<br/>for</i> | Budgeted                         |                    | Total                 | Flexible                             |
|---------|-------------------------------|-----------------------|----------------------------------|--------------------|-----------------------|--------------------------------------|
|         | Total<br>Variable<br>Expenses | Number of<br>Units    | Variable<br>Expenses<br>Per Unit |                    | Units<br>Sold<br>2005 | in<br>Budget<br>Variable<br>Expenses |
| Premium | P21,600                       | ÷ 240                 | = P90                            | x                  | 180                   | = P16,200                            |
| Regular | P27,000                       | ÷ 360                 | = P75                            | x                  | 540                   | P40,500                              |
|         |                               |                       | =                                |                    |                       |                                      |
|         |                               | <i>Premium</i>        |                                  |                    | <i>Regular</i>        |                                      |
|         | Flexible<br>Budget            | Master<br>Budget      | Sales<br>Volume<br>Variance      | Flexible<br>Budget | Master<br>Budget      | Sales<br>Volume<br>Variance          |

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|  |               |                |                 |                |                |                 |
|--|---------------|----------------|-----------------|----------------|----------------|-----------------|
| Barrels  | <u>180</u>    | <u>180</u>     |                 | <u>540</u>     | <u>360</u>     |                 |
| Sales  | P27,000       | P36,000        |                 | P64,800        | P43,200        |                 |
|  | 0             |                |                 |                |                |                 |
| Variable expenses  | <u>16,200</u> | <u>21,600</u>  |                 | <u>40,500</u>  | <u>27,000</u>  |                 |
| Contribution margin  | P10,800       | P14,400        | P3,600 U        | P24,300        | P16,200        | P8,100          |
|  | 0             |                |                 |                |                |                 |
| Fixed expenses   | <u>10,000</u> | <u>10,000</u>  | _____ -         | <u>5,000</u>   | <u>5,000</u>   | _____ -         |
| Operating income   | <u>P 800</u>  | <u>P 4,400</u> | <u>P3,600 U</u> | <u>P19,300</u> | <u>P11,200</u> | <u>P8,100 F</u> |
| Total sales volume variance of the firm = P3,600 U + P8,100 F = P4,500 F |               |                |                 |                |                |                 |

*Requirement 3*

Sales quantity variances for the firm and for each of the products. (See next page.)

*Requirement 4*

Sales mix variances for the period for each of the products and for the firm (000 omitted).

Calculation for sales mixes:

|         | <i>Budgeted</i>         |              | <i>Actual</i>           |              |
|---------|-------------------------|--------------|-------------------------|--------------|
|         | Total Sales<br>in Units | Sales<br>Mix | Total Sales<br>in Units | Sales<br>Mix |
| Premium | 240                     | 0.40         | 180                     | 0.25         |
| Regular | <u>360</u>              | <u>0.60</u>  | <u>540</u>              | <u>0.75</u>  |
|         | <u>600</u>              | <u>1.00</u>  | <u>720</u>              | <u>1.00</u>  |

| Flexible Budget   | Master Budget   |
|---|---|
| Total actual units of all products sold x Actual sales mix x Standard contribution margin per unit          | Total actual units of all products sold x Budgeted sales mix x Standard contribution margin per unit        |
| Total budgeted units of sales for all products x Budgeted sales mix x Standard contribution margin per unit | Total budgeted units of sales for all products x Budgeted sales mix x Standard contribution margin per unit |

Premium

$$720 \times 0.25 \times P60 = P10,800 \qquad 720 \times 0.40 \times P60 = P17,280 \qquad 600 \times 0.40 \times P60 = P14,400$$

Sales mix variance = P6,480 U

Sales quantity variance = P2,880 F

Sales volume variance = P10,800 - P14,400

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= P3,600 U

To verify: Sales volume variance  
 = Sales mix variance + Sales quantity variance  
 = P6,480 U + P2,880 F  
 = P3,600 U

|  |                                       |                    |
|--|---------------------------------------|--------------------|
| Regular  |                                       |                    |
| 720 x 0.75 x P45 =   | 720 x 0.60 x P45 =                    | 600 x 0.60 x P45 = |
| P24,300  | P19,440                               | P16,200            |
| Sales mix variance<br>= P4,860 F                           | Sales quantity variance<br>= P3,240 F |                    |
| Sales volume variance<br>= P24,300 - P16,200<br>= P8,100 F |                                       |                    |

To verify: Sales volume variance  
 = Sales mix variance + Sales quantity variance  
 = P4,860 F + P3,240 F  
 = P8,100 F

Total  
 Sales mix variance = P6,480 U + P4,860 F = P1,620 U  
 Sales quantity variance = P2,880 U + P3,240 F = P6,120 F

*Requirement 5*

Verification

|         | Sales mix variance +<br>volume variance | Sales quantity<br>variance | = Sales         |
|---------|---|----------------------------|-----------------|
| Premium | P6,480 U                                | P2,880 F                   | P3,600 U        |
| Regular | <u>P4,860 F</u>                         | <u>P3,240 F</u>            | <u>P8,100 F</u> |
| Total   | <u>P1,620 U</u>                         | <u>P6,120 F</u>            | <u>P4,500 F</u> |

*Requirement 6*

Market size variances. (See below.)

*Requirement 7*

Market share variances (000 omitted. See below.)

|  |         |
|--|---------|
| Weighted average budgeted contribution margin per unit |         |
| Master budget total contribution margin                | P30,600 |

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Master budget total sales units  $\div$  600  
 Weighted-average budgeted contribution margin per unit P 51

*Calculation for market shares:*

Budgeted: Total sales in units 600  $\div$  Total sales of the industry 1,500 = 0.40

Actual: Total sales in units 720  $\div$  Total sales of the industry 1,600 = 0.45

*Calculation for variances:*

|   |  |   |
|---|--|---|
| Actual total market size x<br>Actual market share x<br>Average budgeted<br>contribution margin per<br>unit<br><br>1,600 x 0.45 x P51<br>= P36,720 | Actual total market<br>size x Budgeted market<br>share x Average budgeted<br>contribution margin per<br>unit<br><br>1,600 x 0.40 x<br>P51<br>= P32,640 | Budgeted total market<br>size x Budgeted market<br>share x Average budgeted<br>contribution margin per<br>unit<br><br>1,500 x 0.40 x P51<br>= P30,600 |
|   | $\underbrace{\hspace{10em}}$   | $\underbrace{\hspace{10em}}$  |
| Market share variance<br>= P4,080 F   | Market size variance<br>= P2,040 F   |   |
|   | $\underbrace{\hspace{10em}}$   |   |
| Sales quantity variance<br>= P4,080 F + P2,040 F<br>= P6,120 F  |  |   |

### Requirement 8

The sum of market size variance and market share variance and verification that this total equals the sales quantity variance.

|                               |   |                                |   |                            |
|-------------------------------|---|--------------------------------|---|----------------------------|
| Total market size<br>variance | + | Total market share<br>variance | = | Total quantity<br>variance |
| P2,040 F                      |   | P4,080 F                       |   | P6,120 F                   |

### PROBLEM 4: Small Business Market Size and Share Variances

Empress Designs is a small business run out of the house of its owner. For the past six months, the company has been selling two products, welcome signs and doghouse signs. The owner has become concerned about the market effectiveness of the company. The master budget and actual results for the month of March 2018 are:

#### Master Budget

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|                     | Welcome Signs | Doghouse Signs | Total        |
|---------------------|---------------|----------------|--------------|
| Units               | 50            | 25             | 75           |
| Sales               | P 1,000       | P 250          | P 1,250      |
| Variable Costs      | <u>900</u>    | <u>120</u>     | <u>1,020</u> |
| Contribution Margin | P 100         | P 130          | P 230        |
| Fixed Costs         | <u>75</u>     | <u>75</u>      | <u>150</u>   |
| Operating Income    | P 25          | P 55           | P 80         |

### Actual Results

|                     | Welcome Signs | Doghouse Signs | Total      |
|---------------------|---------------|----------------|------------|
| Units               | 45            | 35             | 80         |
| Sales               | P 675         | P 420          | P 1,095    |
| Variable Costs      | <u>580</u>    | <u>270</u>     | <u>850</u> |
| Contribution Margin | P 95          | P 150          | P 245      |
| Fixed Costs         | <u>75</u>     | <u>75</u>      | <u>150</u> |
| Operating Income    | P 20          | P 75           | P 95       |

The industry totals for welcome signs are 3,000 budgeted and 2,550 actual.

Required:

1. Show a comparison of Empress Designs' market shares.
2. What is the market share variance?
3. What is the market size variance?
4. Explain possible reasons for these variances.
5. How might Empress Designs improve the future?

### SUPPORTING ANALYSIS/COMPUTATION:

#### Requirement 1

|    | <i>Budget</i>  |                | <i>Actual</i>  |                |              |
|----|----------------|----------------|----------------|----------------|--------------|
|    | <i>Empres</i>  |                | <i>Empres</i>  |                |              |
|    | <i>s'</i>      | <i>Industr</i> | <i>s'</i>      | <i>Industr</i> | <i>Share</i> |
|    | <i>Designs</i> | <i>y</i>       | <i>Designs</i> | <i>y</i>       | <i>Share</i> |
| WS | 50             | 500            | 45             | 425            | 45/425       |
| DH | 25             | 200            | 35             | 150            | 35/150       |

#### Requirement 2

*Weighted Average Budgeted Contribution Margin Per Unit:*

$$(50 \text{ welcome signs} \times P2) + (25 \text{ doghouses} \times P5.20) / 75 = P3.07$$

*Market Share Variance*

Welcome Signs:  $(45/425 - 0.1) \times 425 \times P3.07 = P7.68 \text{ F}$

Doghouses:  $(35/150 - 25/200) \times 150 \times P3.07 = P49.89 \text{ F}$

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### Requirement 3

#### Market Size Variance

Welcome Signs:  $(45 - 500) \times 50/500 \times P3.07 = P23.03 \text{ U}$

Doghouses:  $(150 - 200) \times 25/200 \times P3.07 = P19.19 \text{ U}$

### Requirement 4

Among possible reasons are quality changes, pricing changes, less producers due to seasonal variations, and market no longer there.

### Requirement 5

Among alternatives are improving costs through adopting activity based costing, making different signs, using less expensive wood, finding competitive advantage.

### PROBLEM 5:

Big Marat, Inc. began operations on January 3. Standard costs were established in early January assuming a normal production volume of 160,000 units. However, Big Marat produced only 140,000 units of product and sold 100,000 units at a selling price of P180 per unit during the year. Variable costs totaled P7,000,000, of which 60% were manufacturing and 40% were selling. Fixed costs totaled P11,200,000, of which 50% were manufacturing and 50% were selling. Big Marat had no raw materials or work-in-process inventories at December 31. Actual input prices and quantities per unit of product were equal to standard.

Using absorption costing, Big Marat's income statement would show:

#### SUPPORTING ANALYSIS

Std unit cost:

|                     |   |                  |
|---------------------|---|------------------|
| Variable            | $(7,000,000 \times 0.60) \div 140,000$  | P30              |
| Fixed OH            | $(11,200,000 \times 0.50) \div 160,000$ | <u>35</u>        |
| Std unit cost       |   | <u>P65</u>       |
| CGS - Std           | $(100,000 \times 65)$                   | <u>6,500,000</u> |
| OH Volume Variance: | $(160,000 - 140,000) \times 35$         | <u>P700,000</u>  |
| UNF                 |   |                  |

### CASE STUDY:

#### 1. Productivity and Ethics

Francis Interiors installs custom interiors for luxury mobile homes. In its most recent negotiation with the union, the firm proposed to share equally productivity gains in direct labor. In return the union agreed not to demand wage increases. Most union members, however, are very skeptical about the honesty of the management in calculating the productivity measures. Nevertheless, union members voted to give the program a try. Nic Tan, the management accountant responsible for determining productivity measures, collected these data at the end of 2018:

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|                         | 19      | 20     | 20     |
|-------------------------|---------|--------|--------|
| Number of Installations | 560     | 500    | 500    |
| Direct labor-hours      | 112,000 | 99,000 | 99,000 |

Kel Juan, the CEO, is very anxious to demonstrate the firm's good intentions by showing the labor union a positive result. He suggests to Tan that some of the direct labor-hours are actually indirect. He believes that the hours spent on details are indirect because these hours cannot be allocated to specific types of work. Following his suggestion, Tan reclassifies 12,000 hours as indirect labor.

Required:

1. Evaluate whether Juan's suggestions to reclassify some of the direct labor-hours as indirect labor is ethical.
2. Would it be ethical for Tan to modify his calculations?

### **SUPPORTING ANALYSIS/COMPUTATION:**

#### *Requirement 1*

The operational partial productivity deteriorates slightly from 0.0051 in 2005 (500/99,000) to 0.005 in 2006 (560/112,000). Manipulating accounting numbers in order to show a desirable result is an unethical behavior regardless the intention.

#### *Requirement 2*

Tan should not follow the order without following a consistent accounting method. If the firm believes that certain cost items should be reclassified as indirect costs, the same procedure should be followed for all years. Tan should then go back and revise operating results of previous years.

### **REFERENCES:**

- Management Advisory Services CPA Reviewer by Cabrera
- Management Advisory Services CPA Reviewer by Agamata
- Management Advisory Services CPA Reviewer by Roque
- Management Advisory Services CPA Reviewer by Bobadilla
- [www.scribd.com](http://www.scribd.com)
- [www.quizlet.com](http://www.quizlet.com)