Chapter 12

FACTORY OVERHEAD: PLANNED, ACTUAL, AND APPLIED

MULTIPLE CHOICE

Question Nos. 8 and 13-15 are AICPA adapted.
Question Nos. 10 and 12 are ICMA adapted.
Question Nos. 9, 11, and 21 are CIA adapted.

E **1.** **All of the following phrases are used as alternate terminology for "factory overhead" *except:***
- **A. manufacturing expense**
- **B. indirect manufacturing cost**
- **C. factory expense**
- **D. factory burden**
- **E. other expense**

C **2.** **The component of per-unit costs that remains constant as the production level varies is:**
- **A. general and administrative expenses**
- **B. commercial expenses**
- **C. variable factory overhead**
- **D. fixed factory overhead**
- **E. heat, light, and power**

D **3.** **To express factory overhead as a percentage of direct materials dollars, estimated factory overhead is divided by estimated:**
- **A. machine hours**
- **B. normal capacity**
- **C. units of materials used**
- **D. materials cost**
- **E. materials requisition usage**

E **4.** **Estimated factory overhead is $600,000, and the hours usage of machinery is expected to be 150,000. Factory overhead is applied at the rate of $10 per direct labor hour. The wage rate for direct labor is $6 per hour, and the total number of estimated direct labor hours for the period is:**
- **A. 100,000**
- **B. 150,000**
- **C. 300,000**
- **D. 600,000**
- **E. 60,000**

SUPPORTING CALCULATION:

$$\frac{\$600{,}000}{x} = \$10/\text{DLHR}$$

$$x = 60{,}000$$

B **5.** **An objection to the use of a factory overhead rate based on direct labor dollars is that:**
- **A. these items are difficult to measure**
- **B. a job is charged with more overhead when a highly paid operator works on the job than when a low-paid operator performs the work**
- **C. overhead is allocated in relation to units produced by workers**
- **D. overhead rates will be distributed inequitably when there are no wage differentials in the department**
- **E. costs of applying this method are excessive**

D **6.** **A company expects to produce an average of 75,000 units per year, but last year production equaled 60,000 units. For the coming year, estimated production is 90,000 units. Estimated overhead costs are $900,000, and overhead is applied at the rate of $10 per unit. The company bases its overhead rates on:**
- **A. theoretical (engineering) capacity**
- **B. a short-term planning approach**
- **C. historical capacity costs**
- **D. expected actual capacity**
- **E. normal capacity**

C **7.** **Direct costing differs from absorption costing in that:**
- **A. direct materials and direct labor do not become a part of product cost under direct costing**
- **B. the variable portion of overhead cost does not become a part of product cost under direct costing**
- **C. the fixed portion of overhead cost does not become a part of product cost under direct costing**
- **D. marketing and administrative expenses become a part of product cost under direct costing**
- **E. direct costing does not differ from absorption costing**

E **8.** **Application rates for factory overhead best reflect anticipated fluctuations in sales over a cycle of years when they are computed under the concept of:**
- **A. practical capacity**
- **B. expected actual capacity**
- **C. theoretical capacity**
- **D. maximum capacity**
- **E. normal capacity**

D **9.** **Underapplied factory overhead related to a significant decrease in production should be charged to:**
- **A. Finished Goods Inventory**
- **B. Cost of Goods Sold**
- **C. Work in Process Inventory and Finished Goods Inventory**
- **D. Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold**
- **E. Work in Process Inventory**

B 10. Brownfield Company applies factory overhead on the basis of direct labor hours. Budget and actual data for direct labor and overhead for the year are as follows:

	Budget	Actual
Direct labor hours	**600,000**	**550,000**
Factory overhead costs	**$720,000**	**$640,000**

The factory overhead for Brownfield for the year is:

A. underapplied by $40,000
B. overapplied by $20,000
C. overapplied by $40,000
D. underapplied by $20,000
E. neither underapplied nor overapplied

SUPPORTING CALCULATION:

$$\$640{,}000 \bullet \left(\frac{\$720{,}000}{600{,}000} - 550{,}000 \right) = (\$20{,}000)$$

D 11. A company manufactures plastic products for the home and restaurant market. The company also does contract work for other customers and utilizes a job order costing system. The flexible budget covering next year's expected range of activity is:

Direct labor hours	**50,000**	**80,000**	**110,000**
Machine hours	**40,000**	**64,000**	**88,000**
Variable overhead costs	**$100,000**	**$160,000**	**$220,000**
Fixed overhead costs	**150,000**	**150,000**	**150,000**
Total overhead costs	**$250,000**	**$310,000**	**$370,000**

A predetermined overhead rate based on direct labor hours at expected actual capacity is used to apply total overhead. Management has estimated that 100,000 direct labor hours will be used next year. The predetermined overhead rate per direct labor hour to be used to apply total overhead to individual jobs next year is:

A. $3.70
B. $3.88
C. $3.36
D. $3.50
E. none of the above

SUPPORTING CALCULATION:

$310,000 + $2(100,000 - 80,000)

$$= \frac{\$350{,}000}{100{,}000} = \$3.50$$

C 12. At the end of the last fiscal year, Tiger Company had the following account balances:

Overapplied Overhead	**$ 1,000**
Cost of Goods Sold	**980,000**
Work in Process Inventory	**38,000**
Finished Goods Inventory	**82,000**

The most common treatment of the Overapplied Overhead would be to:

A. carry it as a deferred credit on the balance sheet
B. report it as a miscellaneous operating revenue on the income statement
C. credit it to Cost of Goods Sold
D. prorate it between Work in Process Inventory and Finished Goods Inventory
E. prorate it among Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold

A 13. Overapplied factory overhead would result if:

A. factory overhead costs incurred were less than costs charged to production
B. factory overhead costs incurred were unreasonably large in relation to units produced
C. factory overhead costs incurred were greater than costs charged to production
D. theoretical capacity were used in computing the overhead rate
E. the plant were operating at less than normal capacity

D 14. Clyde Company found that the differences in product costs resulting from the application of predetermined overhead rates rather than actual overhead rates were very significant when actual production was substantially less than planned production. The most likely explanation is that:

A. costs of overhead were substantially less than anticipated
B. overhead was composed chiefly of variable costs
C. several products were produced simultaneously
D. fixed factory overhead was a significant cost
E. costs of overhead items were substantially higher than anticipated

A 15. Avery Co. uses a predetermined factory overhead rate based on direct labor hours. For the month of October, Avery's budgeted overhead was $300,000 based on a budgeted volume of 100,000 direct labor hours. Actual overhead amounted to $325,000 with actual direct labor hours totaling 110,000. How much was the overapplied or underapplied overhead?

A. $5,000 overapplied
B. $5,000 underapplied
C. $30,000 overapplied
D. $30,000 underapplied
E. none of the above

SUPPORTING CALCULATION:

$$\frac{\$300,000}{100,000}(110,000) \bullet \$325,000 = \$5,000$$

A 16. The absolute maximum capacity possible under the best conceivable operating conditions is a description of which type of activity level used in the computation of overhead rates?
- **A. theoretical**
- **B. normal**
- **C. practical**
- **D. expected actual**
- **E. currently attainable (expected)**

B 17. All of the following are terms used to describe the phenomenon measured in the denominator of an overhead rate, *except* the:
- **A. base**
- **B. overhead cost base**
- **C. overhead rate base**
- **D. overhead allocation base**
- **E. all of the above are acceptable terms**

B 18. The budget for a given factory overhead cost during a given period was $80,000. The actual cost for the period was $72,000. 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 a discretionary fixed cost and actual production equaled budgeted production**
- **B. the cost is variable and actual production equaled budgeted production**
- **C. the cost is variable and actual production was 90% of budgeted production**
- **D. the cost is fixed and the actual production was less than budgeted production**
- **E. the cost is variable and actual production was 80% of budgeted production**

B 19. In highly automated manufacturing, all of the following may be appropriate bases for factory overhead application *except:*
- **A. machine hours**
- **B. direct labor hours**
- **C. number of setups**
- **D. number of inspections**
- **E. movement of materials**

E 20. The transactions-base approach to overhead application gives particular consideration to:
- **A. the amount of direct labor cost**
- **B. the number of machine hours**
- **C. overhead costs that are not driven by volume of output**
- **D. special, high-volume production items**
- **E. homogeneous production processes**

D 21. When the amount of overapplied factory overhead is significant, the entry to close Overapplied Factory Overhead will most likely require:
- **A. a debit to Cost of Goods Sold**
- **B. debits to Cost of Goods Sold, Finished Goods Inventory, and Work in Process Inventory**
- **C. a credit to Cost of Goods Sold**
- **D. credits to Cost of Goods Sold, Finished Goods Inventory, and Work in Process Inventory**
- **E. none of the above**

A 22. The type of activity level that results when theoretical capacity is reduced by allowances for unavoidable interruptions is:
- **A. practical capacity**
- **B. expected actual capacity**
- **C. normal capacity**
- **D. excess capacity**
- **E. none of the above**

D 23. The condition that results either from greater productive capacity than the company could ever hope to use or from an imbalance in equipment or machinery is termed:
- **A. theoretical capacity**
- **B. practical capacity**
- **C. idle capacity**
- **D. excess capacity**
- **E. none of the above**

B 24. The method of product costing in which only variable overhead is included in the overhead rate is:
- **A. absorption costing**
- **B. direct costing**
- **C. conventional costing**
- **D. full costing**
- **E. none of the above**

C 25. All of the following are names for the product costing method in which both fixed and variable costs are included in overhead rates, *except:*
- **A. absorption costing**
- **B. conventional costing**
- **C. direct costing**
- **D. full costing**
- **E. all of the above**

PROBLEMS

PROBLEM

1.
Determining Overhead Rate; Expected Actual Capacity Method. Desmond Corp. estimates that its production for the coming year will be 10,000 widgets, which is 80% of normal capacity, with the following unit costs: materials, $40; direct labor, $60. Direct labor is paid at the rate of $24 per hour. The widget shaper, the most expensive piece of machinery, must be run for 20 minutes to produce one widget. Total estimated overhead is expected to consist of $400,000 for variable overhead and $400,000 for fixed overhead.

Required: **Compute the overhead rate for each of the following bases, using the expected actual capacity activity level:**

(1)physical output
(2)materials cost
(3)direct labor cost
(4)direct labor hours
(5)machine hours

(Round all amounts to the nearest whole number.)

SOLUTION

$$(1)\quad \frac{\text{Estimated overhead (EOH)}}{\text{Estimated units of production}} = \frac{\$800{,}000}{10{,}000 \text{ widgets}} = \$80 \text{ overhead per widget}$$

$$(2)\quad \frac{\text{EOH}}{\text{Estimated materials cost}} \_ 100 = \frac{\$800{,}000}{\$40 \_ 10{,}000 \text{ widgets}} \_ 100 = 200\% \text{ of materials cost}$$

$$(3)\quad \frac{\text{EOH}}{\text{Estimated direct labor cost}} \_ 100 = \frac{\$800{,}000}{\$60 \_ 10{,}000 \text{ widgets}} \_ 100 = 133\% \text{ of direct labor cost}$$

$$(4)\quad \frac{\text{EOH}}{\text{Estimated direct labor hours}} = \frac{\$800{,}000}{25{,}000 \text{ hours}^{1}} = \$32 \text{ per direct labor hour}$$

$$\frac{^{1}\text{Labor cost per widget}}{\text{Labor widg et rate}} = \frac{\$60}{\$24} = 2.5 \text{ direct labor hours per widget}$$

2.5 direct labor hours per widget x 10,000 widgets = 25,000 estimated direct labor hours

$$(5)\quad \frac{\text{EOH}}{\text{Estimated machine hours}} = \frac{\$800{,}000}{3{,}333\text{ hours}^{\,1}} = \$240 \text{ per machine hour}$$

$$\frac{^{1}\ 20 \text{ minutes per widget}}{60 \text{ minutes per hour}} = 1/3 \text{ machine hour per widget}$$

1/3 hour per widget x 10,000 widgets = 3,333 estimated machine hours

NOTE: Since the following problem is identical to Problem 1, except for the activity level used, do not test on both problems at the same time.

PROBLEM

2.
Determining Overhead Rate; Normal Capacity Method. Desmond Corp. estimates that its production for the coming year will be 10,000 widgets, which is 80% of normal capacity, with the following unit costs: materials, $40; direct labor, $60. Direct labor is paid at the rate of $24 per hour. The widget shaper, the most expensive piece of machinery, must be run for 20 minutes to produce one widget. Total estimated overhead is expected to consist of $400,000 for variable overhead and $400,000 for fixed overhead.

Required: **Compute the overhead rate for each of the following bases, using the normal capacity activity level:**

(1)physical output
(2)materials cost
(3)direct labor cost
(4)direct labor hours
(5)machine hours

(Round answers to the nearest whole dollar or percentage.)

SOLUTION

(1) $$\frac{\$800{,}000}{12{,}500 \text{ widgets}} = \$64 \text{ overhead per widget}$$

(2) $$\frac{\$800{,}000}{(\$40 \times 12{,}500 \text{ widgets})} \times 100 = 160\% \text{ of materials cost}$$

(3) $$\frac{\$800{,}000}{(\$60 \times 12{,}500 \text{ widgets})} \times 100 = 107\% \text{ of direct labor cost}$$

(4) $$\frac{\$800{,}000}{(2.5 \text{ hours} \times 12{,}500 \text{ widgets})} = \$25.60 \text{ or } \$26 \text{ per direct labor hour}$$

$$(5)\quad \frac{\$800{,}000}{(1/3\ \text{hour} \_ 12{,}500\ \text{widgets})} = \$192\ \text{per machine hour}$$

PROBLEM

3.
Factory Overhead Application. St. Louis Sounds Inc. manufactures audio equipment. The company estimates the following costs at normal capacity and other items for the coming period:

Direct materials	**$300,000**	
Direct labor	**520,000**	
Factory overhead (fixed)	**300,000**	
Factory overhead (variable)	**240,000**	
Normal capacity	**100,000**	**direct labor hours**
Expected production	**80,000**	**direct labor hours**

Required: **Compute the overhead application rate for fixed, variable, and total overhead per direct labor hour, using both the normal capacity and the expected actual capacity activity levels.**

SOLUTION

Overhead per Direct Labor Hour

Overhead	**At Expected Actual Capacity**			**At Normal Capacity**		
Fixed	**$300,000 / 80,000 DLH**	**=**	**$3.75**	**$300,000 / 100,000 DLH**	**=**	**$3.00**
Variable	**$192,000 / 80,000 DLH**	**=**	**2.40**	**$240,000 / 100,000 DLH**	**=**	**2.40**
Total			**$6.15**			**$5.40**

PROBLEM

4.
Overhead Analysis. Data for the past two years for J&J Corp. are:

	19A	19B
Units produced	**10,000**	**11,000**
Overhead applied per unit	**$ 15**	**$ 18**
Actual overhead:		
Fixed	**50,000**	**55,000**
Variable	**95,000**	**150,000**
Estimated overhead:		
Fixed	**50,000**	**56,000**
Variable	**130,000**	**142,000**

The company determines overhead rates based on estimated units to be produced.

Required:

(1) Determine the estimated units of production used to obtain the overhead allocation rates in 19A and 19B.
(2) Determine the over- or underapplied factory overhead for each of the two years.

SOLUTION

(1) $$\frac{\text{Estimated overhead}}{\text{Estimated units of production}} = \text{Overhead per unit}$$

19A: $$\frac{\$50{,}000 + \$130{,}000}{x} = \$15$$

$$\$15\,x = \$180{,}000$$

$$x = 12{,}000 \text{ Estimated units of production}$$

19B: $$\frac{\$56{,}000 + \$142{,}000}{x} = \$18$$

$$\$18\,x = \$198{,}000$$

$$x = 11{,}000 \text{ Estimated units of production}$$

(2)

19A:	**Applied Factory Overhead (10,000 x $15)**	**$ 150,000**
	Actual Factory Overhead	**145,000**
	Overapplied Factory Overhead	**$ 5,000**
19B:	**Actual Factory Overhead**	**$ 205,000**
	Applied Factory Overhead (11,000 x $18)	**198,000**
	Underapplied Factory Overhead	**$ 7,000**

PROBLEM

5.

Entries for Factory Overhead. Blend Rite Inc. assembles and sells electric mixers. All parts are purchased and labor is paid on the basis of $22 per mixer assembled. The cost of the parts per mixer totals $20. As the company handles only this one product, the unit cost basis for applying factory overhead is used. Estimated factory overhead for the coming period, based on a production of 40,000 mixers, is as follows:

Indirect materials	**$ 60,000**
Indirect labor	**180,000**
Light and power	**45,000**
Depreciation	**35,000**
Miscellaneous	**16,000**

During the period, 42,000 mixers were assembled and actual factory overhead was $355,000. These units were completed but not yet transferred to the finished goods storeroom.

Required:

(1) Prepare journal entries to record the above information, including the entry to close the balance in the applied overhead account to the actual overhead account.
(2) Determine the amount of over- or underapplied factory overhead.

SOLUTION

(1)	**Work in Process**	**840,000**	
	Materials		**840,000**
	Work in Process	**924,000**	
	Payroll		**924,000**
	Factory Overhead Control	**355,000**	
	Materials, Payroll, Accruals, and Various Credits		**355,000**
	Work in Process	**352,800**	
	Factory Overhead Applied		**352,800**
	Factory Overhead Applied	**352,800**	
	Factory Overhead Control		**352,800**

$$\text{Overhead rate}: \frac{\text{Estimated factory overhead}}{\text{Estimated production}} = \frac{\$336{,}000}{40{,}000} = \$8.40 \text{ factory overhead rate per mixer}$$

(2) Underapplied factory overhead: $355,000 - $352,800 = $2,200

PROBLEM

6.
Disposition of Over- or Underapplied Overhead. The following information is available concerning the inventory and cost of goods sold accounts of PGA Company at the end of the most recent year:

	Work in Process	Finished Goods	Cost of Goods Sold
Direct material	$ 5,000	$ 8,000	$ 11,000
Direct labor	6,000	15,000	15,000
Applied overhead	4,000	12,000	24,000
Year-end balance	$ 15,000	$ 35,000	$ 50,000

Applied overhead has already been closed to Factory Overhead Control.

Required:

Give the journal entry required to close Factory Overhead Control, assuming:
(1) Overapplied overhead of $10,000 is to be allocated to inventories and Cost of Goods Sold in proportion to the balances in those accounts.
(2) Underapplied overhead of $10,000 is to be allocated to inventories and Cost of Goods Sold in proportion to the amounts of applied overhead contained in those accounts.

SOLUTION

	Requirement (1)		Requirement (2)	
	Account Balance	Percentage of Total	Applied Overhead	Percentage of Total
Work in Process	$ 15,000	15%	$ 4,000	10%
Finished Goods	35,000	35%	12,000	30%
Cost of Goods Sold	50,000	50%	24,000	60%
Total	$ 100,000	100%	$ 40,000	100%

(1)	Factory Overhead Control	10,000	
	Work in Process		1,500
	Finished Goods		3,500
	Cost of Goods Sold		5,000
(2)	Work in Process	1,000	
	Finished Goods	3,000	
	Cost of Goods Sold	6,000	
	Factory Overhead Control		10,000