

Section: Cost and Management Accounting

1. Beauty, Inc. is a professional company that designs and manufactures different styles of picture frames. In the company's last monthly meeting, the president, Bryan Logan, found that one of the company's best-selling products, deluxe-plus, was sold at a price that is 10% lower than the major competitor's price, despite a 25% reduction of total production cost. Bryan asked the chief accountant, Mary Francis, to provide the cost details. Mary explained the cost data of the last month in the following. The company has two support departments, Maintenance and Information. The support departments provide services to two operating departments, Design and Shipment. Data for the four departments are as follows:

	Maintenance	Information	Design	Shipment
Department costs	\$350,000	\$75,000	\$134,132	\$11,211
Amount of square footage	2,000	600	2,900	500
Number of computer hours	3,500	-	6,500	2,500
Number of engineering hours	-	-	5,000	-
Number of deliveries	-	-	-	300

The company uses the reciprocal method to allocate support department costs to operating departments. The allocation base used for Maintenance department is square footage, and the allocation base used for Information department is computer hour. The costs of the Design department are allocated to products based on engineering hours, and the costs of Shipment department are allocated to products based on number of deliveries. The company ships products in a batch size of 20 units per delivery.

In the last month, the company produced 1,000 units of deluxe-plus, which used a total of 1,500 engineering hours. Each unit of deluxe-plus requires 4 board feet of raw materials, which cost \$8 per board foot. The assembly process in batches follows a 90% cumulative average-time learning model. It takes 60 labor hours to assemble the first batch of 250 units, and the wage rate is \$15 per hour.

Required: Determine the cost of deluxe-plus per unit. Round your answer to the nearest dollar. (10%)

2. Supreme Cat Tree Co. (SCTC) builds luxury cat trees and sells them through the Internet to cat owners who want to provide their cats with a more natural environment. At the start of 2008, SCTC carried no inventory. The planned production is 2,000 cat trees. During the year, the company produced 1,800 cat trees and sold 1,600 cat trees for \$400 each. Fixed production costs were \$200,000 and variable production costs were \$100 per cat tree. Fixed advertising and other general and administrative expenses were \$100,000 and variable shipping costs were \$50 per tree.

Required:

- (1) Calculate the production-volume variance. (5%)
- (2) Calculate the operating income under variable costing. (5%)
- (3) Calculate the breakeven point in units under absorption costing. (5%)

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3. Roya, Inc. is a large food processing company. It purchases raw tomatoes and processes them in the Canning department. For each batch of 100 cans, the budgeted quantities and budgeted prices of direct materials are as follows:

	Quantity for One Batch	Price of Input
Sliced tomatoes	70 pounds	\$1 per pound
Flavoring	20 cups	\$3 per cup
Salt	10 cups	\$2 per cup

Changing the standard mix of direct material quantities slightly does not significantly affect the overall end product. The canned tomatoes can be sold for \$8 each can. The company also processes canned tomatoes further into tomato juice, which can be sold for \$12 per can, and tomato paste, which can be sold for \$9 per can.

In the current period, the Canning department produces 2,400 cans of tomatoes, among which 900 cans are sold without further processing, 1,000 cans are further processed in the Juicing department into tomato juice, and 500 cans are further processed in the Paste department into tomato paste.

The actual quantity and cost of direct materials used in the Canning department are as follows:

	Actual Quantity	Actual Cost
Sliced tomatoes	1650 pounds	\$1,650
Flavoring	450 cups	1,350
Salt	250 cups	500

Direct labor and manufacturing overhead costs incurred in each department are: \$8,500 in Canning department, \$7,200 in Juicing department, and \$600 in Paste department. In addition, the tomato paste requires 20% of revenues for marketing costs. The company uses the net realizable value method to assign the costs of the joint process to its main products.

Required:

- (1) Compute the total direct materials efficiency variance. (5%)
 - (2) Based on actual cost, compute the unit cost per can of tomato paste. (10%)
 - (3) If tomato paste is treated as a byproduct, compute the gross margin for tomato juice and canned tomatoes. The net realizable value of the byproduct is subtracted from the joint cost. (10%)
4. Jade Mountain Company produces pipes, one component in water heaters. Each pipe passes through the machining department and the finishing department. The company is very concerned about quality and has provided the following information of non-manufacturing costs for January:

	Machining Department	Finishing Department
Number of pipes produced (transferred)	48,000	55,000
Warranty costs ^a :		
Average repair cost per unit	\$12	\$8
Percentage of produced units needing repair	5%	7%
Reliability engineering at \$150 per hour	160 hours	200 hours
Transportation costs to client sites to fix problems	\$295	\$150
Pre-production quality training for employees	\$10,500	\$15,100

^a Warranty repairs are identified as machining-related or finishing-related problems before assigning the repairs to each department.

Machining department uses weighted-average process costing method. During January, the beginning work in process in the machining department was half complete as to conversion and complete as to direct materials. The beginning inventory included \$12,000 for materials and \$4,000 for conversion costs (excluding inspection costs). Overhead (excluding inspection costs) is applied at the rate of 50% of direct manufacturing labor costs. Ending work-in-process inventory in the machining department was 40% complete. All spoilage is considered normal and is inspected at the end of the process. Inspection is on a batch basis and costs \$50 per batch, with 500 units per batch.

Finishing department uses FIFO process costing method. Beginning work in process in the finishing department was 65% complete as to conversion and ending work in process was 90% converted. Direct materials are added at 50% of the process. Beginning inventories included \$15,400 for transferred-in costs, \$13,000 for materials, and \$13,100 for direct manufacturing labor costs. Overhead (excluding inspection costs) in this department is equal to direct manufacturing labor costs. All spoilage is considered normal and is inspected at 80% of the process. Inspection is on a batch basis and costs \$35 per batch, with 500 units per batch. Additional information about the two departments follows:

	Machining	Finishing
Beginning work-in-process units	18,000	23,500
Units started this period	41,000	?
Units transferred this period	48,000	55,000
Ending work-in-process units	8,000	14,000
Material costs added	\$48,000	\$27,500
Direct manufacturing labor	\$15,500	\$25,000

Required: (Round the cost per equivalent unit to the nearest thousandth)

- (1) Calculate internal failure costs as a percentage of total quality costs for Jade Mountain Company during January. (10%)
- (2) Determine the costs of good units completed and transferred out during January for finishing department. (10%)

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5. Ali Mountain Company is a diversified corporation with two operation divisions: the TV Assembly Division (TAD) and the Screen Division (SD). Ali Mountain promotes the autonomy of both divisions. The TAD assembles and sells television sets. The TAD currently uses a screen in its TV sets, which it purchases from an outside supplier at a cost of \$76 per screen. The SD currently manufactures and sells to outside firms a type of screen that is similar to the screen used by the TAD. TAD and SD have total capital investments of \$13,000,000 and \$15,000,000, respectively. Each division's performance is evaluated on the basis of profit and return on investment.

The TAD manager has asked the manager of the SD Division about selling screens to TAD. The SD has the capacity to produce 75,000 units. The specifications of the screens used by TAD are slightly different, which would reduce the SD's direct material cost by \$1.5 per unit. In addition, the SD would not incur any variable selling costs in the units sold to TAD. The manager of TAD wants all of the screens it uses to come from one supplier.

The coming year's budgeted income statement, which follows, is based upon TAD's sales volume of 15,000 TV sets and SD's sales volume of 64,000 screens without considering TAD's proposal.

Budgeted Income Statement				
	TV Assembly Division (TAD)		Screen Division (SD)	
	Per unit	Total (in thousands)	Per unit	Total (in thousands)
Sales revenue	\$410	\$6,150	\$102	\$6,528
Manufacturing costs:				
Compressor	\$ 76	\$1,140		
Other direct material	36	540	\$ 14	\$896
Direct labor	32	480	9	576
Variable overhead	48	720	11	704
Fixed overhead	30	450	10	640
Total manufacturing costs	<u>\$222</u>	<u>\$3,330</u>	<u>\$44</u>	<u>\$2,816</u>
Gross margin	<u>\$188</u>	<u>\$2,820</u>	<u>\$58</u>	<u>\$3,712</u>
Operating expenses:				
Variable selling	\$ 20	\$ 300	\$ 8	\$ 512
Fixed selling	16	240	5	320
Fixed administrative	36	540	9	576
Total operating expenses	<u>\$ 72</u>	<u>\$1,080</u>	<u>\$ 22</u>	<u>\$1,408</u>
Net income before taxes	<u>\$116.00</u>	<u>\$1,740</u>	<u>\$36.00</u>	<u>\$2,304</u>

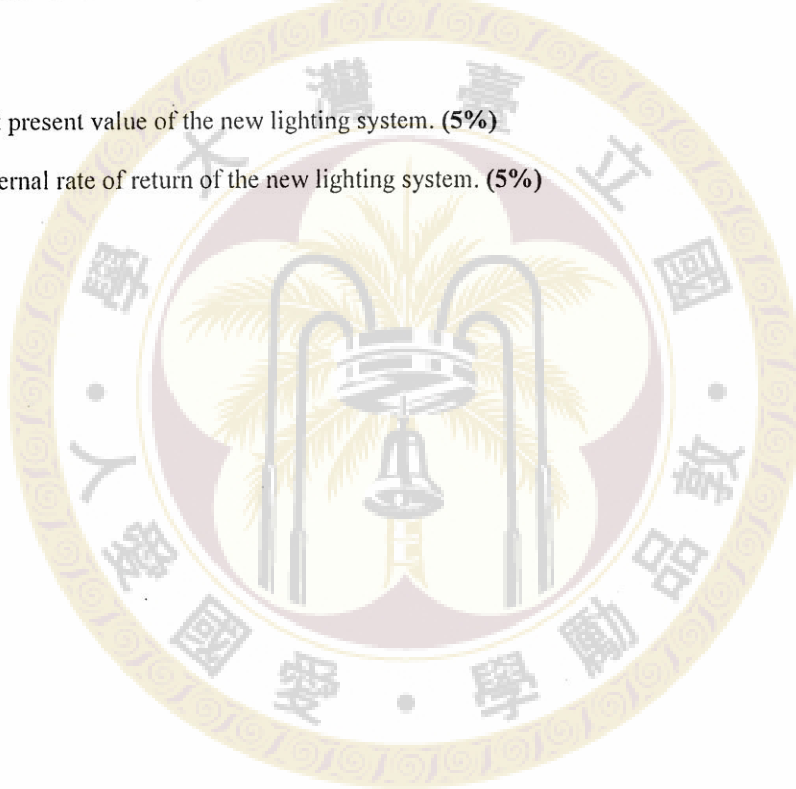
Required: Assume that TAD asks SD for 15,000 units of screens for assembling TV sets in the coming year. When transferring screens to TAD, the manager of SD would like to charge a single price on all of the 15,000 screens as requested by the TAD.

- (1) If Ali Mountain were to institute the use of negotiated transfer prices and allows divisions to buy and sell on the open market, determine the price range for screen that would be acceptable to both the TAD and the SD. (10%)
- (2) Independently of your answer to requirement (1), assume that SD intends to attain a target divisional return on investment (ROI) of 18% after transferring screens to TAD. SD prices the screens as requested by the TAD at full cost plus markup to reach the target divisional ROI. Determine the markup percentage on full cost. (10%)

6. Yangming Mountain Company plans to establish a new lighting system for its Taipei plant. The lighting system costs \$140,000 for initial installment and is expected to have a useful life of eight years, with a terminal disposal value of \$5,000. Yangming Mountain uses straight-line depreciation for this lighting system. The new lighting system is expected to save annual cash operating costs by \$30,000. However, additional working capital is needed to keep the lighting system running efficiently. The working capital must continually be replaced, so an investment of \$8,000 needs to be maintained at all times. The working capital is fully recoverable at the end of the useful life. Yangming Mountain's required rate of return is 14%. Assume no tax and all cash flows occur at year-end except for initial investment amounts.

Required:

- (1) Calculate net present value of the new lighting system. (5%)
- (2) Calculate internal rate of return of the new lighting system. (5%)



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