

Section: Cost and Management Accounting

1. Scot Company plans to sell 400,000 units of widget in July 20X1. Management (1) anticipates a growth rate in sales of 5% per month thereafter, and (2) desires a monthly ending finished goods inventory (in units) of 80% of the following month's estimated sales. Budgeted standards of direct inputs for one unit of widget are as follows:

	<u>Price</u>	<u>Quantity</u>
Direct materials	\$8 per pound	5 pounds per unit
Direr labor	\$16 per hour	3 hours per unit

The firm requires a stock of direct materials at the end of each month equal to 25% of the following month's production material usage. All manufacturing overhead costs are variable costs, and allocated at a rate of \$18 per direct labor hour. Actual production for this quarter (ended September 30, 20X1) is 1,310,000 units. Management discovered the following variances: direct materials usage variance of \$2,096,000 (favorable), direct labor efficiency variance of \$2,515,200 (unfavorable), and variable overhead spending variance of \$817,440 (unfavorable).

Required:

- (1) Determine the quarterly direct material purchases budget in pounds. (10%)
 - (2) Compute the actual usage of direct materials per widget. (5%)
 - (3) Compute the actual direct labor hour used per widget. (5%)
 - (4) Compute the actual total variable overhead for this quarter. (5%)
2. Sunny Inc. manufactures two sizes of car doors: large and small. Each door is processed through two operating departments—stamping and pressing. Two support departments—human resources (HR) and information systems (IS)—provide services to the operating departments. According to estimated customer demand, Sunny expects to produce 1,000 large doors and 3,000 small doors in the next year. The company uses the direct method to allocate service department costs to the operating departments. Human resources costs are allocated using number of employees, and information system costs are allocated using processing hours. Budgetary costs and activity measures for each department are given in the following table:

	<u>HR</u>	<u>IS</u>	<u>Stamping</u>	<u>Pressing</u>
Direct materials	\$ 1,200	\$ 2,500	\$ 2,360	\$ 4,720
Direct labor	4,000	5,500	36,000	7,200
Variable overhead	0	0	14,120	20,000
Fixed overhead	<u>12,000</u>	<u>10,800</u>	<u>7,000</u>	<u>11,000</u>
Total costs	<u>\$17,200</u>	<u>\$18,800</u>	<u>\$59,480</u>	<u>\$42,920</u>
Number of employees	160	200	500	300
Processing hours	1,000	0	200	800

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Management decides to adopt activity-based costing system to allocate manufacturing overhead in the operating departments to products. Variable overhead is comprised of three activities: setup costs \$9,000, machining costs \$22,400, and inspection costs \$2,720. Cost drivers for each activity are setup hours, machine hours, and inspection hours, respectively. Operating departmental fixed overhead and allocated service costs are allocated to each product based on direct labor hours expected to be used in production for the next year. The only variable non-manufacturing cost is sales commission, equal to \$2 per unit sold. Non-manufacturing fixed costs equal \$12,000, including distribution, marketing and administrative costs. There are no beginning inventories. The following actual data (all meets the budgetary estimates) for the two products are available:

	<u>Large</u>	<u>Small</u>
Direct materials per unit	2.0 pounds	1.2 pounds
Direct labor per unit	3.0 hours	2.0 hours
Number of units per batch	20	15
Setup time per batch	1.2 hours	1.5 hours
Machine hours per unit	4.0 hours	1.6 hours
Inspection time per batch	2.5 hours	2.25 hours
Selling price per unit	\$162	\$130
Sales volume (units)	800	200

Required:

- (1) Calculate total manufacturing costs per unit of large car door. (10%)
- (2) If the company adopts variable costing, how many units of each product need to be sold for the company to break even? Assume actual sales follow the pre-determined sales mix. (5%)
- (3) Determine the amount of operating income under absorption costing. (5%)
- (4) Suppose direct labor has a limited capacity of 3,000 hours, and fixed overhead is allocated based on the available capacity instead of expected demand. The company produces each product following the optimal production mix. Given the same sales volume, calculate the amount of operating income difference between absorption costing and variable costing. (5%)

3. Shiny Company manufactures a high-quality paint, which is used primarily by commercial building painters. Two departments are involved in the production process. In the Mixing Department, pigments are entered into production. After processing, the Mixing Department transfers a mixed paint paste to the Canning Department. There the paint paste is completed, filled in cans, labeled, and boxed under the brand name Glowing.

In the Mixing Department, the raw materials (pigments) are added at the beginning of the process. Labor and overhead are applied continuously throughout the process. All direct departmental overhead is traced to the departments. Plant overhead is allocated to the two departments on the basis of direct labor hour. The plant overhead rate for 20X1 is \$2 per direct labor hour.

The following information relates to production during December 20X1 in the Mixing Department.

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● Work in process, December 1 (5,000 pounds, 65 percent complete as to conversion):	
Raw materials	\$ 23,000
Direct labor at \$5.00 per hour	26,060
Departmental overhead	11,600
Allocated plant overhead	10,424
● Raw materials:	
Inventory, December 1, 2,300 pounds	10,580
Purchase, December 5, 9,500 pounds	44,650
Purchase, December 20, 11,300 pounds	54,240
Released to production during December, 15,000 pounds	
● Direct-labor cost at \$5.50 per hour	110,660
● Direct departmental overhead costs	43,200
● Transferred to Canning Department, 16,000 pounds	
● Work in process, December 31 (4,000 pounds, 30 percent complete)	?

The company uses weighted-average process costing to accumulate product costs. However, for raw-material inventories, the firm uses the FIFO inventory method.

Required: Determine the balance of work-in-process inventory for Mixing Department on December 31, 20X1. (10%)

4. Buttonwood Corporation is a multi-divisional company whose managers have been delegated decisions on plant capacity, full profit responsibility, and complete autonomy to accept or reject transfers from other divisions. Buttonwood's top management charges a 14% imputed interest on all the used capital. Division X has a capacity of producing 2,500 units of a subassembly but is currently producing 2,300 units. This subassembly is currently used by Division Y for each final product manufactured. The final product is sold to outsiders for \$1,920 per unit. Division Y's sales during the current period amounted to 2,300 completed units. The subassembly has an external market with market price of \$1,250 per unit, with which Divisions X and Y have the autonomy of selling to and buying from the market. The data that follow relate to upcoming divisional operations.

	<u>Division X</u>	<u>Division Y</u>
Unit variable costs, excluding inter-divisional transfer price	\$ 850	\$ 600
Total fixed costs	250,000	125,000
Average invested capital	200,000	235,000

Required: (Round your answer to the nearest hundredth)

(1) If the transfers are set to the highest acceptable price for Division Y, calculate the return on investment for Division Y. (10%)

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(2) If both divisions' performance has been evaluated in terms of residual income, determine the lowest acceptable transfer price for Division X. (10%)

5. Taichung Fastener Corporation manufactures office furniture. To improve the manufacturing process, the company's management is considering the acquisition of automatic machine in December of 20X1. Data pertaining to the decision appear below.

- The automatic machine would cost \$1,200,000, to be paid in December of 20X1. The equipment's useful life is projected to be five years and will be depreciated under double-declining-balance method.
- The automatic machine requires software, which will be developed over a two-year period in 20X2 and 20X3. Each software expenditure, which amounts to \$23,500 per year, will be expensed during the year incurred.
- A computer systems operator will be hired immediately to oversee the operation of the new automatic machine. The computer operator's annual salary will be \$58,000. Fringe benefits will cost \$17,000 annually.
- Maintenance technicians will be needed. The total cost of their wages and fringe benefits will be \$120,000 per year.
- The changeover of the manufacturing line will cost \$86,000, to be expensed in 20X2.
- Several employees will need retraining to operate the new automatic machine. The training costs are projected as follows:

20X2	\$45,000
20X3	32,000
20X4	12,000
- An inventory of spare parts for the automatic machine will be purchased immediately at a cost of \$55,000. This investment in working capital will be maintained throughout the five-year life of the machine. At the end of 20X6, the parts will be sold for \$55,000.
- The automatic machine's salvage value at the end of 20X6 is projected to be \$48,000.
- Aside from the costs specifically mentioned above, management expects the automatic machine to save \$535,000 per year in manufacturing costs.
- The company's hurdle rate is 13 percent.

Required: (Round your answer to the nearest whole dollar)

- (1) Without the issue of taxation, compute the net present value of Taichung Fastener Corporation's proposed acquisition of automatic machine. (10%)
- (2) If Taichung Fastener Corporation is subject to a 30 percent tax rate, compute the net present value of the proposed acquisition of automatic machine. (10%)

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