

ME 502 (18+3)

L-1/T-1/IPE

Date: 14/09/2025

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1 B.Sc. Engineering Examinations 2024-2025

Sub: IPE 105 (Principles of Cost and Management Accounting)

Full Marks: 210

Time: 3 Hours

The figures in the margin indicate full marks

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION - A

There are **FOUR** questions in this section.

Answer Question No. 1 and any two from Questions 2 - 4.

Assume reasonable values for missing data, if any.

1. (a) Pearl Products Limited outside Shenzhen, China, manufactures and distributes toys throughout South East Asia. Three cubic centimeters (cc) of solvent H300 are required to manufacture each unit of Supermix, one of the company's products. The company is now planning raw materials needs for the third quarter, the quarter in which peak sales of Supermix occur. To keep production and sales moving smoothly, the company has the following inventory requirements: **(20) (CO2)**
- (i) The finished goods inventory on hand at the end of each month must be equal to 3,000 units of Supermix plus 20% of the next month's sales. The finished goods inventory on June 30 is budgeted to be 10,000 units.
 - (ii) The raw materials inventory on hand at the end of each month must be equal to one-half of the following month's production needs for raw materials. The raw materials inventory on June 30 is budgeted to be 54,000 cc of solvent H300.
 - (iii) The company maintains no work in process inventories.

A sales budget for Supermix for the last six months of the year follows.

	Budgeted Sales in Units
July	35,000
August	40,000
September	50,000
October	30,000
November	20,000
December.....	10,000

Required:

Apply appropriate methods to analyze the data and hence prepare a direct materials budget showing the quantity of solvent H300 to be purchased for July, August, and September, and for the quarter in total.

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Contd... Q. No. 1

(b) Financial data for Joel de Paris, Inc., for last year follow:

(15)(CO3)

Joel de Paris, Inc. Balance Sheet		
	Beginning Balance	Ending Balance
Assets		
Cash	\$ 140,000	\$ 120,000
Accounts receivable	450,000	530,000
Inventory	320,000	380,000
Plant and equipment, net	680,000	620,000
Investment in Buisson, S.A.	250,000	280,000
Land (undeveloped)	<u>180,000</u>	<u>170,000</u>
Total assets	<u>\$2,020,000</u>	<u>\$2,100,000</u>
Liabilities and Stockholders' Equity		
Accounts payable	\$ 360,000	\$ 310,000
Long-term debt	1,500,000	1,500,000
Stockholders' equity	<u>160,000</u>	<u>290,000</u>
Total liabilities and stockholders' equity	<u>\$2,020,000</u>	<u>\$2,100,000</u>

Joel de Paris, Inc. Income Statement		
Sales		\$4,050,000
Operating expenses		<u>3,645,000</u>
Net operating income		405,000
Interest and taxes:		
Interest expense	\$150,000	
Tax expense	<u>110,000</u>	<u>260,000</u>
Net income		<u>\$ 145,000</u>

The company paid dividends of \$15,000 last year. The "Investment in Buisson, S.A.," on the balance sheet represents an investment in the stock of another company.

Required:

Analyze the above data and compute the company's margin, turnover, and return on investment (ROI) for last year.

- (a) The Gourmand Cooking School runs short cooking courses at its small campus. Management has identified two cost drivers that it use in its budgeting and performance reports – the number of courses and the total number of students. For example, the school might run two courses in a month and have a total of 50 students enrolled in those two courses. Data concerning the company's cost formulas appear below:

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Contd... Q. No. 2(a)

	Fixed Cost per Month	Cost per Course	Cost per Student
Instructor wages		\$3,080	
Classroom supplies			\$260
Utilities	\$870	\$130	
Campus rent	\$4,200		
Insurance	\$1,890		
Administrative expenses	\$3,270	\$15	\$4

For example, administrative expenses should be \$3,270 per month plus \$15 per course plus \$4 per student. The company's sales should average \$800 per student.

The actual operating results for September appear below:

(20)

	Actual
Revenue	\$32,400
Instructor wages	\$9,080
Classroom supplies	\$8,540
Utilities	\$1,530
Campus rent	\$4,200
Insurance	\$1,890
Administrative expenses	\$3,790

Required:

(i) The Gourmand Cooking School expects to run three courses with a total of 45 students in September. Prepare the company's planning budget for this level of activity.

(ii) The school actually ran three courses with a total of 42 students in September. Prepare the company's flexible budget for this level of activity.

(b) A company is considering an investment that costs \$10,000 today. The investment will generate \$4,000 per year for the next 4 years. What is the Internal Rate of Return (IRR) for this investment? Show all the required calculations. Showing only the answer will not be graded.

(15)

3. (a) Koontz Company Manufactures a number of products. The standards relating to one of these products are shown below, along with actual cost data for May.

(20)

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Contd... Q. No. 3(a)

	Standard Cost per Unit	Actual Cost per Unit
Direct materials:		
Standard: 1.80 feet at \$3.00 per foot	\$ 5.40	
Actual: 1.80 feet at \$3.30 per foot		\$5.94
Direct labor:		
Standard: 0.90 hours at \$18.00 per hour	16.20	
Actual: 0.92 hours at \$17.50 per hour		16.10
Variable overhead:		
Standard: 0.90 hours at \$5.00 per hour	4.50	
Actual: 0.92 hours at \$4.50 per hour		4.14
Total cost per unit	<u>\$26.10</u>	<u>\$26.18</u>
Excess of actual cost over standard cost per unit		\$0.08

The production superintendent was pleased when he saw this report and commented: " This \$0.08 excess cost is well within the 2 percent limit management has set for acceptable variances. It's obvious that there's not much to worry about with this product."

Actual production for the month was 12,000 units. Variable overhead cost is assigned to products on the basis of direct labor-hours. There were no beginning or ending inventories of materials.

Required:

Compute the following variances for May:

- (i) Material price and quantity variance
- (ii) Labor rate and efficiency variances

(b) XYZ, a retailing company, has two departments, Hardware and Linens. The company's most recent monthly contribution format income statement follows:

(15)

	Total	Hardware	Linens
Sales	\$4,000,000	\$3,000,000	\$1,000,000
Variable expenses	<u>1,300,000</u>	<u>900,000</u>	<u>400,000</u>
Contribution margin	2,700,000	2,100,000	600,000
Fixed expenses	<u>2,200,000</u>	<u>1,400,000</u>	<u>800,000</u>
Net operating income (loss)	<u>\$ 500,000</u>	<u>\$ 700,000</u>	<u>\$ (200,000)</u>

A study indicates that \$340,000 of the fixed expenses being charged to Linens are sunk costs or allocated costs that will continue even if the Linens Department is dropped. In addition, the elimination of the Linens Department will result in a 10% decrease in the sales of the Hardware Department.

Required:

If the Linens Department is dropped, what will be the effect on the net operating income of the company as a whole?

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4. (a) Thermal Rising, Inc., makes paragliders for sale through specialty sporting goods stores. The company has a standard paraglider model, but also makes custom-designed paragliders. Management has designed an activity-based costing system with the following activity cost pools and activity rates: (20)

Activity Cost Pool	Activity Rate
Supporting direct labor	\$26 per direct labor-hour
Order processing	\$284 per order
Custom design processing	\$186 per custom design
Customer service	\$379 per customer

Management would like an analysis of the profitability of a particular customer, Big Sky Outfitters, which has ordered the following products over the last 12 months:

	Standard Model	Custom Design
Number of gliders	20	3
Number of orders	1	3
Number of custom designs	0	3
Direct labor-hours per glider	26.35	28.00
Selling price per glider	\$1,850	\$2,400
Direct materials cost per glider	\$564	\$634

The company's direct labor rate is \$19.50 per hour.

Required:

Using the company's activity-based costing system, compute the customer margin of Big Sky Outfitters.

- (b) Andretti Company has a single product called a Dak. The company normally produces and sells 60,000 Daks each year at a selling price of \$ 32 per unit. The company's unit costs at this level of activity are given below: (15)

Direct materials	\$10.00	
Direct labor	4.50	
Variable manufacturing overhead	2.30	
Fixed manufacturing overhead	5.00	(\$300,000 total)
Variable selling expenses	1.20	
Fixed selling expenses	3.50	(\$210,000 total)
Total cost per unit	<u>\$26.50</u>	

Required:

Assume that Andretti Company has sufficient capacity to produce 90,000 Daks each year without any increase in fixed manufacturing overhead costs. The company could increase its sales by 25% above the present 60,000 units each year if it were willing to increase the fixed selling expenses by \$80,000. Would the increase fixed selling expenses be justified?

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SECTION – B

There are **FOUR** questions in this section.

Answer **THREE** questions including **Question No. 05**.

5. (a) What is meant by a product's contribution margin ratio? How is this ratio useful in planning business operations? **(08)(CO1)**
- (b) Explain the following cost terms with suitable examples: i. Differential costs and revenues, ii. Opportunity Costs; iii. Sunk Costs **(12)(CO1)**
- (c) High Country, Inc., produces and sells many recreational products. The company has just opened a new plant to produce a folding camp cot that will be marketed throughout the United States. The following cost and revenue data relate to May, the first month of the plant's operation: **(15)(CO1)**

Beginning inventory	0
Units produced	10,000
Units sold	8,000
Selling price per unit	\$75
Selling and administrative expenses:	
Variable per unit	\$6
Fixed (per month)	\$200,000
Manufacturing costs:	
Direct materials cost per unit	\$20
Direct labor cost per unit	\$8
Variable manufacturing overhead cost per unit	\$2
Fixed manufacturing overhead cost (per month)	\$100,000

Management is anxious to see how profitable the new camp cot will be and has asked that an income statement be prepared for May.

- i. Assume that the company uses absorption costing.
- a. Determine the unit product cost.
- b. Prepare an income statement for May.
- ii. Assume that the company uses variable costing.
- a. Determine the unit product cost.
- b. Prepare a contribution format income statement for May.
- iii. Explain the reason for any difference in the ending inventory balances under the two costing methods and the impact of this difference on reported net operating income.

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6. (a) High Desert Pottery works makes a variety of pottery products that it sells to retailers such as Home Depot. The company uses a job-order costing system in which predetermined overhead rates are used to apply manufacturing overhead cost to jobs. The predetermined overhead rate in the Molding Department is based on machine-hours, and the rate in the Painting Department is based on direct labor-hours. At the beginning of the year, the company's management made the following estimates:

(20)

	Department	
	Molding	Painting
Direct labor-hours	12,000	60,000
Machine-hours	70,000	8,000
Direct materials cost	\$510,000	\$650,000
Direct labor cost	\$130,000	\$420,000
Fixed manufacturing overhead cost	\$497,000	\$615,000
Variable manufacturing overhead per machine-hour	\$1.50	-
Variable manufacturing overhead per direct labor-hour	-	\$2.00

Job 205 was started on August 1 and completed on August 10. The company's cost records show the following information concerning the job:

	Department	
	Molding	Painting
Direct labor-hours	30	84
Machine-hours	110	20
Materials placed into production	\$470	\$332
Direct labor cost	\$325	\$588

- i. Compute the predetermined overhead rate used during the year in the Molding Department. Compute the rate used in the Painting Department.
- ii. Compute the total overhead cost applied to Job 205.
- iii. What would be the total cost recorded for Job 205? If the job contained 50 units, what would be the unit product cost?
- iv. At the end of the year, the records of High Desert Pottery works revealed the following actual cost and operating data for all jobs worked on during the year.

	Molding	Painting
Direct labor-hours	10,000	62,000
Machine-hours	65,000	9,000
Direct materials cost	\$430,000	\$680,000
Direct labor cost	\$108,000	\$436,000
Manufacturing overhead cost	\$570,000	\$750,000

What was the amount of underapplied or overapplied overhead in each department at the end of the year?

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Contd... Q. No. 6

(b) Selzik Company makes super-premium cake mixes that go through two processing department, Blending and Packaging. The following activity was recorded in the Blending Department during March:

(15)

Production data:	
Units in process, July 1 (materials 100% complete; conversion 30% complete) . . .	10,000
Units started into production	170,000
Units in process, July 31 (materials 100% complete; conversion 40% complete) . . .	20,000
Cost data:	
Work in process inventory, July 1:	
Materials cost	\$8,500
Conversion cost	\$4,900
Cost added during the month:	
Materials cost	\$139,400
Conversion cost	\$244,200

All materials are added at the beginning of work in the Blending Department. The company uses the FIFO method in its process costing system.

- i. Determine the equivalent units for July for the Blending Department.
- ii. Compute the costs per equivalent unit for July for the Blending Department.
- iii. Determine the total cost of ending work in process inventory and the total cost of units transferred to the next process for the Blending Department in March.
- iv. Prepare a cost reconciliation report for the Blending Department for March.

7. (a) Due to erratic sales of its sole product – a high-capacity battery for laptop computers – PEM, Inc., has been experiencing difficulty for some time. The company's contribution format income statement for the most recent month is given below:

(25)

Sales (19,500 units × \$30 per unit)	<u>\$585,000</u>
Variable expenses	<u>409,500</u>
Contribution margin	175,500
Fixed expenses	<u>180,000</u>
Net operating loss	<u>\$ (4,500)</u>

- i. Compute the company's CM ratio and its break-even point in both unit sales and dollar sales.
- ii. The president believes that a \$16,000 increase in the monthly advertising budget, combined with an intensified effort by the sales staff, will result in an \$80,000 increase in monthly sales. If the president is right, what will be the effect on the company's monthly net operating income or loss?

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Contd... Q. No. 7(a)

iii. Refer to the original data, the sales manager is convinced that a 10% reduction in the selling price, combined with an increase of \$60,000 in the monthly advertising budget, will double unit sales. What will the new contribution format income statement look like if these changes are adopted?

iv. Refer to the original data, the Marketing Department thinks that a fancy new package for the laptop computer battery would help sales. The new package would increase packaging cost by 75 cents per unit. Assuming no other changes, how many units would have to be sold each month to earn a profit of \$9,750?

v. Refer to the original data, by automating, the company could reduce variable expenses by \$3 per unit. However, fixed expenses would increase by \$72,000 each month.

Compute the new CM ratio and the new break-even point in both unit sales and dollar sales. Would you recommended that the company automate its operations?

(b) A comparative income statement is given below for McKenzie Sales. Ltd., of Toronto:

(10)

McKenzie Sales, Ltd.		
Comparative Income Statement		
	This Year	Last Year
Sales	\$8,000,000	\$6,000,000
Cost of goods sold	4,984,000	3,516,000
Gross margin	<u>3,016,000</u>	<u>2,484,000</u>
Selling and administrative expenses:		
Selling expenses	1,480,000	1,092,000
Administrative expenses	712,000	618,000
Total expenses	<u>2,192,000</u>	<u>1,710,000</u>
Net operating income	824,000	774,000
Interest expense	96,000	84,000
Net income before taxes	<u>\$ 728,000</u>	<u>\$ 690,000</u>

Members of the company's board of directors are surprised to see that net income increased by only \$38,000 when sales increased by two million dollars.

(i) Express each year's income statement in common-size percentages. Carry computations to one decimal place.

(ii) Comment briefly on the changes between the two years.

8. (a) What are cash equivalents, and why are they included with cash on a statement of cash flows?

(5)

(b) The financial statements for Castile Products, Inc., are given below:

(20)

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Castile Products, Inc.
Balance Sheet
December 31

Assets	
Current assets:	
Cash	\$ 6,500
Accounts receivable, net	35,000
Merchandise inventory	70,000
Prepaid expenses	<u>3,500</u>
Total current assets	115,000
Property and equipment, net	<u>185,000</u>
Total assets	<u><u>\$300,000</u></u>
Liabilities and Stockholders' Equity	
Liabilities:	
Current liabilities	\$ 50,000
Bonds payable, 10%	<u>80,000</u>
Total liabilities	<u>130,000</u>
Stockholders' equity:	
Common stock, \$5 per value	\$ 30,000
Retained earnings	<u>140,000</u>
Total stockholders' equity	<u>170,000</u>
Total liabilities and equity	<u><u>\$300,000</u></u>

Castile Products, Inc.
Income Statement
For the Year Ended December 31

Sales	\$420,000
Cost of goods sold	<u>292,500</u>
Gross margin	127,500
Selling and administrative expenses	<u>89,500</u>
Net operating income	38,000
Interest expense	<u>8,000</u>
Net income before taxes	30,000
Income taxes (30%)	<u>9,000</u>
Net income	<u><u>\$ 21,000</u></u>

Account balances at the beginning of the year were: accounts receivable \$25,000; and inventory, \$60,000. All sales were on account. Compute the following financial data and ratios:

- i. Working capital.
 - ii. Current ratio.
 - iii. Acid-test ratio.
 - iv. Debt-to-equity ratio.
 - v. Times interest earned ratio.
 - vi. Average collection period.
 - vii. Average sale period
 - viii. Operating cycle.
- (c) If the units produced and unit sales are equal, which method would you expect to show the higher net operating income-variable costing or absorption costing? Why?