1. Production Planning and Pricing (23)

Milkystreet Ltd. is a large producer of milk products. The company's product portfolio consists of three products: milk, whey, and cream. Milk is generated in Department 1, while whey and cream need to be treated in Departments 1 and 2. In each department, labor and machine time is applied to the products. Moreover, machine and labor skills are so specialized, that neither machines nor labor can be switched from one department to another.

The controller, Rick Cowder, is responsible for recommending the monthly production schedule. For the next month, he gathered the following data:

		Department	
		1	**2**
Monthly capacity available			
Available machine capacity [machine hours]		10,000	5,000
Available labor [direct-labor hours]		7,000	4,000
Labor and machine requirements per unit of product			
Milk	Machine hours per liter	0.3	-
	Direct-labor hours per liter	0.2	-
Whey	Machine hours per liter	0.5	0.2
	Direct-labor hours per liter	0.2	0.2
Cream	Machine hours per liter	0.8	0.6
	Direct-labor hours per liter	0.6	0.5

Milkystreet Ltd.'s variable costs are as follows: Direct material costs are $0.10 per liter of milk, $0.11 per liter of whey, and $2.00 per liter of cream. Direct labor costs are $4.00 per hour in Department 1 and $2.00 per hour in Department 2. Cowder uses a predetermined overhead rate of $0.10 per machine hour in Department 1 and $0.05 per machine hour in Department 2 to allocate variable manufacturing overhead.

According to the sales department, the monthly demand and the liter selling prices for the three products are expected to be as follows:

Product	Monthly demand	Liter selling price
Milk	10,000	$1.20
Whey	8,000	$1.40
Cream	4,000	$6.00

a) For each department, compute the monthly requirement for machine hours and direct-labor hours, assuming that the firm intends to satisfy the demand for the three products. Identify any resources that represent a bottleneck for production. (9)

b) Calculate the contribution margin per liter for the three products. Use the predetermined variable overhead rates for the two departments to apply variable manufacturing-overhead to the products. Determine the optimal monthly production schedule and calculate the total contribution to monthly profit. (14)