MODEL TEST PAPER

CHAPTER: COST-VOLUME-PROFIT ANALYSIS

Question 1

The Hot Millions has two restaurants that are open 24 hours a day. Fixed costs for the two restaurants together total Rs. 450000 per year. Service varies from a cup of coffee to full meals. The average sales check per customer is Rs. 8.00. The average cost of food and other variable costs for each customer is Rs. 3.20. The income tax rate is 30 percent. Target net income is Rs. 105000.

Required

1. Compute the revenues needed to obtain the target net income.
2. How many sales checks are needed to breakeven? To earn net income of Rs. 105000?
3. Compute net income if the number of sales checks is 150000.

Question 2

Tally is top selling accounting software, Tally is about to release ERP version 1.0. It divides its customers into two groups – new customers and upgrade customers (those who previously purchased Tally 9.1 or earlier versions). Although the same physical product is provided to each customer group, sizable differences exist in their selling prices and variable marketing costs.

		New Customers		Upgrade Customers
Selling price		Rs. 210		Rs. 120
Variable costs:				
Manufacturing	Rs. 25		Rs. 25	
Marketing	Rs. 65	90	Rs. 15	40
Contribution Margin		Rs. 120		Rs. 80

The fixed costs of Tally ERP are Rs. 14000000. The planned sales mix in units is 60% new customers and 40% upgrade customers.

Required

1. What is the Tally ERP breakeven point in units, assuming that the planned 60%/40% sales mix is maintained?
2. If the sales mix is maintained, what is the operating income when 200000 units are sold?
3. Show how the breakeven point in units changes with the following customer mixes
   a. New 50%/Upgrade 50%
   b. New 90%/Upgrade 10%
   c. Comment on the results

Question 3

Infinity Ltd.'s income statement for the year 2009 on production and sales of 200000 units is as follows.

Revenues	Rs. 2600000
Cost of goods sold	1600000
Gross margin	1000000
Marketing and distribution cost	1150000
Operating income (loss)	Rs. (150000)

Infinity's fixed manufacturing costs were Rs. 500000 and variable marketing and distribution costs were Rs. 4 per unit.

Required

1. Calculate Infinity's variable manufacturing costs per unit in 2009.
2. Calculate Infinity's fixed marketing and distribution costs in 2009.
3. Infinity's gross margin per unit is Rs. 5 (Rs. 1000000 / 200000 units). Mr Neeraj, Infinity's GM, believes that if production and sales had been 230000 units, it would have covered the Rs. 1150000 of marketing and distribution costs (Rs. 1150000 / 5 = 230000) and enabled Infinity to breakeven for the year. Calculate

Infinity's operating income if production and sales equal 230000 units. Explain briefly why Mr Neeraj is wrong.
4. Calculate the breakeven point for the year 2009 in units and in revenues.

Question 4

Divinity is a distributor of brass picture frames. For 2009, it plans to purchase frames for Rs. 30 each and sell them for Rs. 45 each. Divinity's fixed costs for 2009 are expected to be Rs. 240000. Divinity's only other costs will be variable costs of Rs. 60 per shipment for preparing the invoice and delivery documents, organizing the delivery, and following up for collecting accounts receivable. The Rs. 60 cost will be incurred each time Divinity ships an order of picture frames, regardless of the number of picture frames in the order.

Required

1. Suppose Divinity sells 40000 picture frames in 1000 shipments in 2009. Calculate Divinity's 2009 operating income.
2. Suppose Divinity sells 40000 picture frames in 800 shipments in 2009. Calculate Divinity's 2009 operating income.
3. Suppose Divinity anticipates making 500 shipments in 2009. How many picture frames must Divinity sell to breakeven in 2009?
4. Calculate another breakeven point for 2009, different from the one described in requirement 2. Explain briefly why Divinity has multiple breakeven points.

Question 5

IPL is promoter for cricket tournaments. IPL is promoting a new series. The key area of uncertainty is the size of the cable pay-per-view TV market. IPL will pay cricket teams a fixed fee of Rs. 2 million and 25% of net cable pay-per-view revenues. Every cable TV home receiving the event pays Rs. 29.95, of which IPL receives Rs. 16. IPL pays teams 25% of the Rs. 16.

IPL estimates the following probability distribution for homes purchasing the pay-per-view event:

Demand	Probability
100000	0.05
200000	0.10
300000	0.30
400000	0.35
500000	0.15
1000000	0.05

Required

1. What is the expected value of the payment IPL will make to cricket teams?
2. Assume the only uncertainty is over cable TV demand for the tournament; IPL wants to know the breakeven point given its own fixed costs of Rs. 1 million and its own variable costs of Rs. 2 per home. (Also include IPL's payments to teams in calculating your answer)

Question 6

Rahul is the newly elected charismatic leader of a Congress Party. Media Publishers is negotiating to publish Rahul's Manifesto, a new book that promises to be an instant best-seller. The fixed costs of producing and marketing the book will be Rs. 500000. The variable costs of producing and marketing will be Rs. 4.00 per copy sold. These costs are before any payments to Rahul. Rahul negotiates an up front payment of Rs. 3 million plus a 15% royalty rate on the net sales price of each book. The net sales price is the listed bookstore price of Rs. 30 minus the margin paid to the bookstore to sell the book. The normal bookstore margin of 30% of the listed bookstore price is expected to apply.

Required

1. Prepare a PV graph for Media Publishers.
2. How many copies must Media Publishers sell to (a) breakeven, and (b) earn a target operating income of Rs. 2 million?
3. Examine the sensitivity of the breakeven point to the following changes:
   a. Decreasing the normal bookstore margin to 20% of the listed bookstore price of Rs. 30.
   b. Increasing the listed bookstore price to Rs. 40 while keeping the bookstore margin at 30 percent.

Comment on the results.

Question 7

Ranbaxy Laboratory manufactures pharmaceutical products that are sold through a network of sales agents. The agents are paid a commission of 18% of revenues. The income statement for the year ending December 31, 1999, is as follows:

Ranbaxy Laboratory
Income statement
For the year ended December 31, 1999

Revenues		Rs. 26000000
Cost of goods sold:		
Variable	Rs. 11700000	
Fixed	2870000	14570000
Gross margin		11430000
Marketing costs:		
Commission	Rs. 4680000	
Fixed costs	3420000	8100000
Operating income		3330000

Ranbaxy is considering hiring its own sales staff to replace the network of sales agents. Ranbaxy would pay its sales people a commission of 10% of revenues and incur fixed costs of Rs. 2080000.

Required

1. Calculate Ranbaxy Laboratory's breakeven point in revenues for the year 1999.
2. Calculate Ranbaxy Laboratory's breakeven point in revenues for the year 1999 if the company had hired its own sales force in 1999 to replace the network of sales agents.
3. Calculate the degree of operating leverage at revenues of Rs. 26000000 if (a) Ranbaxy uses sales agents, and (b) Ranbaxy employs its own sales staff. Describe the advantages and disadvantages of each alternative.
4. If Ranbaxy had hired its own sales staff and increased the commission paid to them to 15%, keeping all other costs the same, how much revenue would Ranbaxy have to generate to earn the same operating income it did in 1999?

Question 8

PVR Cinemas owns and operates a nationwide chain of movie theaters. The 500 properties in the PVR's chain vary from low-volume, small town, single screen theaters to high volume, big city, multiscreen theaters.

The management is considering installing machines that will make popcorn on the premises. These machines would allow the theaters to sell popcorn that would be freshly popped daily rather than the prepopped corn that is currently purchased in large bags. This proposed feature would be properly advertised and is intended to increase patronage at the company's theaters.

The machine can be purchased in several different sizes. The annual rental costs and operating costs vary with the size of the machines. The machine capacities and costs are as follows:

	PC1	PC2	PC3
Annual capacity	50000 boxes	120000 boxes	300000 boxes
Costs:			
Annual machine rental	Rs. 8000	Rs. 11200	Rs. 20200
Popcorn cost per box	.14	.14	.14
Cost of each box	.09	.09	.09
Other variable costs per box	.22	.14	.05

Required

1. Calculate the volume level in boxes at which the PC1 and PC2 poppers would earn the same operating profit (loss).
2. The management can estimate the number of boxes to be sold at each of its theaters. Present a decision rule that would enable PVR's management to select the most profitable machine without having to make a separate cost calculation for each theater. That is, at which anticipated range of unit sales should the PC1 model be used? The PC2 model? The PC3 model?

Question 9

Shivalikview hotel has 400 rooms, with a fixed cost of Rs. 350000 per month during the busy season. Room rates average Rs. 65 per day with variable costs of Rs. 15 per rented room per day. Assume a 30-day month.

Required

1. How many rooms must be occupied per day to breakeven?
2. How many rooms must be occupied per month to make a monthly profit of Rs. 120000?
3. Assume that the Shivalikview has three average contribution margins per month from the use of space in the hotel:

Leased shops in hotel	Rs. 70000
Meals served, conventions	Rs. 40000
Dinning room and coffee shop	Rs. 32400
Bar and cocktail lounge	Rs. 30000

Fixed costs for the total hotel are Rs. 350000 per month. Variable costs are Rs. 15 per day per rented room. The hotel has 400 rooms and averages 80% occupancy per day. What average rate per day must the hotel charge to make a profit of Rs. 120000 per month?