NASHRA GHAFFAR

CT- 032

Date

Ex 20.1

a. Break even point b. Fixed Costs c. Relevant range d. Contribution margin e. Unit contribution margin f. Economies of ~~costs~~ scale g. Semivariable costs h. None.

Ex 20.2

a(1):

High point	5,500	$311,500
low point	2,800	184,600
Changes	2,700	$126,900

Thus, the estimated variable element of Bussa Mfg. Co's manufacturing overhead is $47 per machine hour.

(2) Total manufacturing overhead at 5,500 machine-hour level $311,800

Variable element of manufacturing overhead at 5500 machine-hour level $258,800

~~$ per~~ Fixed element of manu. overhead $53,000

(b) Estimated manufacturing overhead at activity level of 5,300 machine hours

Fixed element	$53,000
Variable cost element	$249,100
Total estimated manufacturing overhead	$302,100

(c) Estimated manufacturing overhead: Feb Mar

February:

$53,000 + ~~of~~ ($47 × 3200) 203,400

March:

$53,000

Actual manufacturing overhead 224,000 263,800

Amount over estimated $(20,600) $19,500

$283,300

Signature

Ex 20.3

a. Unit contribution margin, $70 − $43 = $27

b. Sales required to break even, $405,000 ÷ $27 = 15,000 units

c. ($405,000 + $270,000) ÷ $27 = 25,000 units

Ex 20.4.

(a)

	Product 1		Product 2	
Contribution margin ratio	60%		30%	
Relative sales mix	× 40%		× 60%	
	24%	+	18%	= 42%

$$\text{Break-Even on Sales} = \frac{\text{Fixed Costs}}{\text{Contribution Margin Ratio}}$$

Break-Even on Sales = $63,000 ÷ 42% = $150,000.

(b)

	Product 1		Product 2	
Contribution margin ratio	60%		30%	
Relative sales mix	× 25%		× 25%	
	15%		7.5%	= 37.5%

$$\text{Break-Even on Sales} = \frac{\text{Fixed Costs} + \text{Target Operating Income}}{\text{Contribution Margin Ratio}}$$

Break-Even on Sales = ($63,000 + $12,000) ÷ 37.5% = $200,000.

Ex 20.6:

It is never ethical to lie to one's employees. This type of behaviour will only serve to promote an atmosphere of distrust throughout the company.

Ex 20-7.

a) Contribution Margin Ratio = $\frac{\text{Unit Sale Price} - \text{Variable Cost Per Unit}}{\text{Unit Sale Price}}$.

$= \frac{\$28 - \$7}{\$28} = 75\%$.

b) Break Even Sales Volume = $\frac{\$240,000}{0.75} = \$320,000$.

c) Sales Volume = $\frac{\$240,000 + \$480,000}{0.75}$

= $\$920,000$

d) Sales volume $1,120,000

Less: Break even sales volume 320,000

Margin of safety at 40,000 units $ 800,000

e) Operating Income = Margin of Safety × Contribution Margin Ratio

= $800,000 × 0.75 = $600,000

Ex 20-10.

Contribution Margin Ratio = $\frac{\$24 - \$18}{\$24} = 25\%$

Break even sales Volume = $\frac{\$240,000}{0.25} = \$960,000$.

Signature

UNIQUE No.

Ex 20.12

20,000 units x $7 per unit = $140,000 total fixed cost.

Fixed Costs ÷ Cont. Margin = Break-Even in Units.

$140,000 ÷ (SP − $26) = 20,000 units.

20,000 SP − $260,000 = $140,000

SP = $20 per unit.

Ex 20.15

($980,000 − $752,800) ÷ (19,200 − $12,200) = $35

$980,000 = Monthly Fixed Costs + ($35 x 19,200 DLH)

M.F.C = $980,000 − $672,000 = $308,000

Total 3 Month Cost = ($308,000 x 3 months) + ($35 x 60,000 DLH)

= $924,000 + $750,000 = $ 2,674,000.

Ex 20.5:

a)

	Sales	Var. Cost	Contr. Marg Ratio	Fixed costs	Quality Income	Units sold
1)	$200,000	120,000	20	55,000	25,000	4000
2)	180,000	105,000	15	45,000	30,000	5000
3)	600,000	360,000	30	150,000	70,000	8000

b)

	Sales	Var Cost	Contr Ma Ratio	Fixed Cost	Oper Income
1)	900,000	720,000	20%	85,000	95,000
2)	600,000	360,000	40%	165,000	75,000
3)	800,000	350,000	30%	90,000	60,000

Ex 20.8:

a) Projected operating income without other investment $ 250,000

	Ad Campaign	Ordering system
Projected sales revenue	$1,260,000	1,200,000
× CM ratio	0.25	0.30
Total CM	315,000	360,000
minus fixed cost	(100,000)	(100,000)
Operating income	215,000	260,000

b) For ad camp.

Sales Revenue × 25% = $ 360,000

Sales Revenue = $ 1,440,000

Percent. Increase = $1,440,000 - $1,200,000 / $1,200,000 = 20%.

Date

Ex 20-9:

a) Contribution margin per unit

Unit sale price	$ 1.75
less: Var cost per unit	1.25
CM per unit	$ 0.50

b) Margin of safety at sales:

Sales revenue	$ 78,750
less: Sales rev. at break-even	70,000
Margin of safety	8750

c) Estimated operating loss at sales level

Sales revenue		66,500
less: Var. costs.	47,500	
Fixed costs.	20,000	
Operating Income		67500
		1000

d) i Unit cost at production level

Var. Cost per unit	$ 1.25
Fixed Cost	0.50
Total unit cost	1.75

ii) Unit cost at production level

Var. Cost per unit	1.25
Fixed cost per unit	0.40
Total unit cost	1.65

Date

Ex 20.4

a) Selling Price per unit — $16
Variable manufacturing costs per unit — (8)
Var. selling & admin. costs — (4)
CM per unit — $ 4

Fixed manufacturing costs — 150,000
Fixed selling and admin. costs — 350,000
Total fixed costs — 800,000

Total fixed costs — 800,000
Divided by CM per unit — ÷ $4
Monthly break-even in units — 200,000

b) Contribution Margin Ratio — 25%.

c) Total fixed costs — $500,000
Target monthly income — 100,000
— 600,000
Divided by CM ratio — ÷ 25%.
Sales revenue required — 2,400,000

d) Total fixed costs — 500 000
CM ratio — 25%.
Monthly break-even sales rev. — $ 2,000,000

Current monthly sales level — 3,800,000
Monthly break-even sales revenue — (2,000,000)
Margin of safety. — 1,800,000

Signature _____ UNIQUE No. _____

Date

Ex 20.13

The lowest bid price req. to maintain the current level of opr. income equals total var. cost per unit:

Direct materials	$9
Direct Labor	8
Var. manufacturing overhead	7
lowest bid price to maintain curr income	24

CM ratio = CM ÷ Selling Price

36% = (SP − $9 − $8 − $7 − 0% SP) ÷ SP

SP = Bid price = $40

Ex 20.14 :

a)

	Units	Suits	Ropes
Unit selling price	$120	$300	$80
Unit var cost	(60)	(210)	(40)
Unit CM	$60	$90	$40
÷ Unit selling Price	120	300	80
Unit CM Ratio	50%	30%	50%
Vests	50% × 20%	=	10%
Suits	30% × 70%	=	21%
Ropes	50% × 40%	=	20%
Avg. CM ratio			51%

$ 714,000 ÷ 51% = $ 1,400,000

Set A

Date

Q.1

a. Required Contribution Margin per unit

Budgeted Operating Income	$ 260,000
Fixed Costs	540,000
Total required contribution margin	$ 800,000
No. of units to be produced by sold	50,000
Required contribution margin per unit ($ 800,000 ÷ 50,000 units)	1
	$ 16

Required sales price per unit:

Req. Contr. margin per unit	$ 16
Var. costs & expenses per unit	84
Total req. unit sales price	$ 100

b. Break-Even Sales Volume = $540,000 / $16 = 33,750 units

c. Margin of safety at 50,000 units:

Sales Vol. at 50,000 units	$ 5,000,000
Less: Break-even	3,375,000
Margin of Safety	$ 1,625,000

Operating Income at 50,000 units

Margin of Safety	$ 1,625,000
Contr. margin ratio	16
Operating Income	$ 260,000

Date

202

a) Sales price per unit:

Budgeted costs	$ 2,250,000
Add: Budgeted operating income	900,000
Budgeted sales revenue	$ 3,150,000
Sales price per unit	105

b) 1. Total f'xed costs

Manu. overhead	$ 540,000
Selling & admn exp.	480,000
Total f.c	$ 1,020,000

2. Variable costs & expenses per unit:

Direct material	$ 21
Direct labor	10
Manu. overhead	6
Selling & admn exp.	4
Total Var Cost	$ 41

3. Unit Contribution Margin:

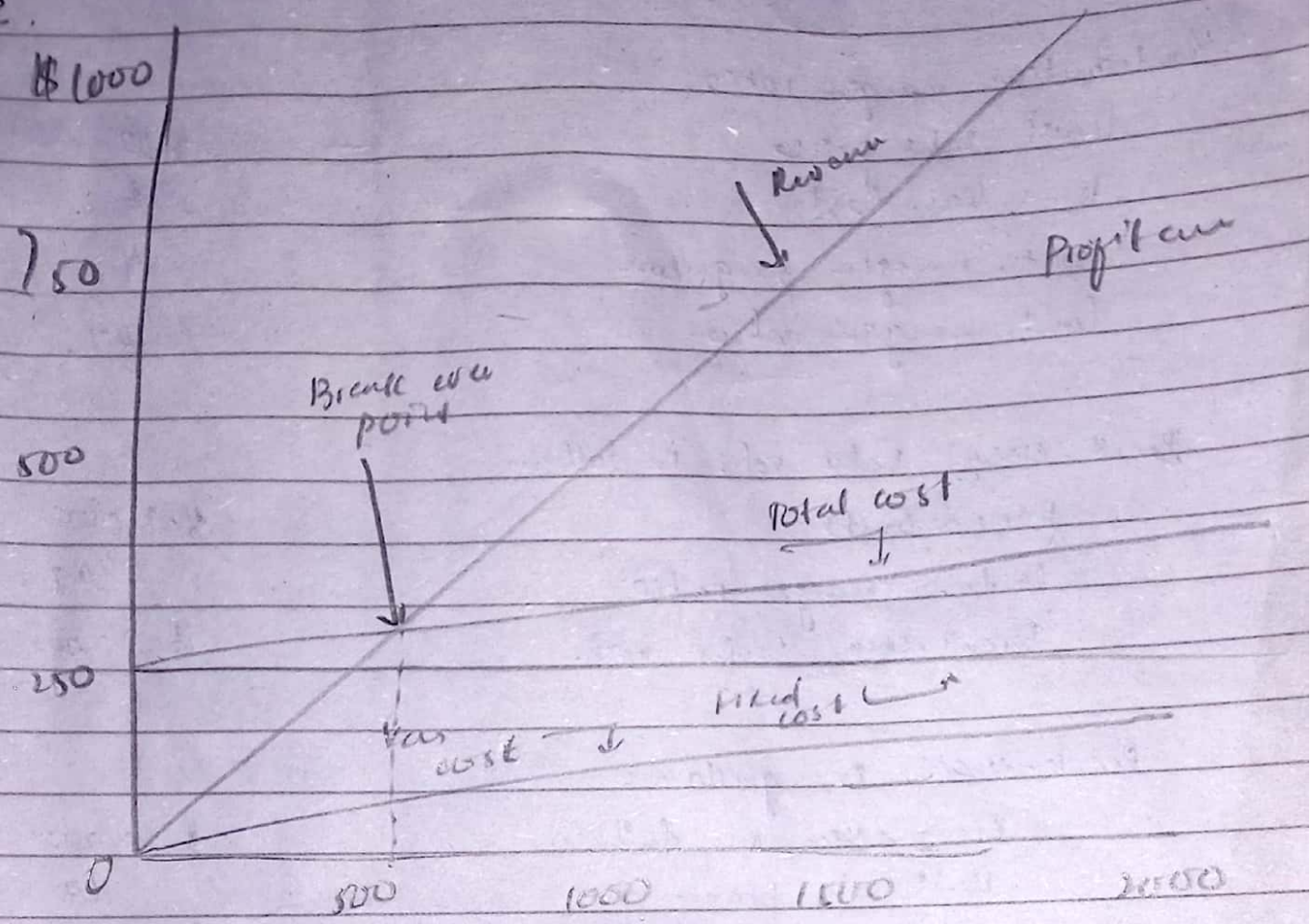
Sales price per unit	$ 121
Less: Var cost	41
Unit Contribution Margin	$ 80

4. No. of units req. to break even:

Fixed costs	$ 1,000,000
Contribution margin	80
No of units req.	$ 12,150

Signature UNIQUE No.

10.3



Operating data:

Revenue per parking-space hour	50 cents
Variable costs per parking-space hour	5 cents
Fixed costs per year:	
Supervisor's salary	$24,000
Wages ($300 × 52.5)	78,000
Rent on lot ($7,250 × 12)	87,000
Fixed maintenance & other expense	36,000
Total fixed cost.	$225,000

Capacity = 800 spaces × 2500 hours = 2,000,000 parking space per year

Revenue at full capacity = 2,000,000 × $0.50 = $1,000,000

Signature _____ UNIQUE No. _____

Date

10-4

Contribution margin ratio:

Unit sale price	$ 10
Less: Var. Cost.	6
Cont. margin per gallon	4
Cont. margin ratio.	40%

Break-even sale vol. in dollar.

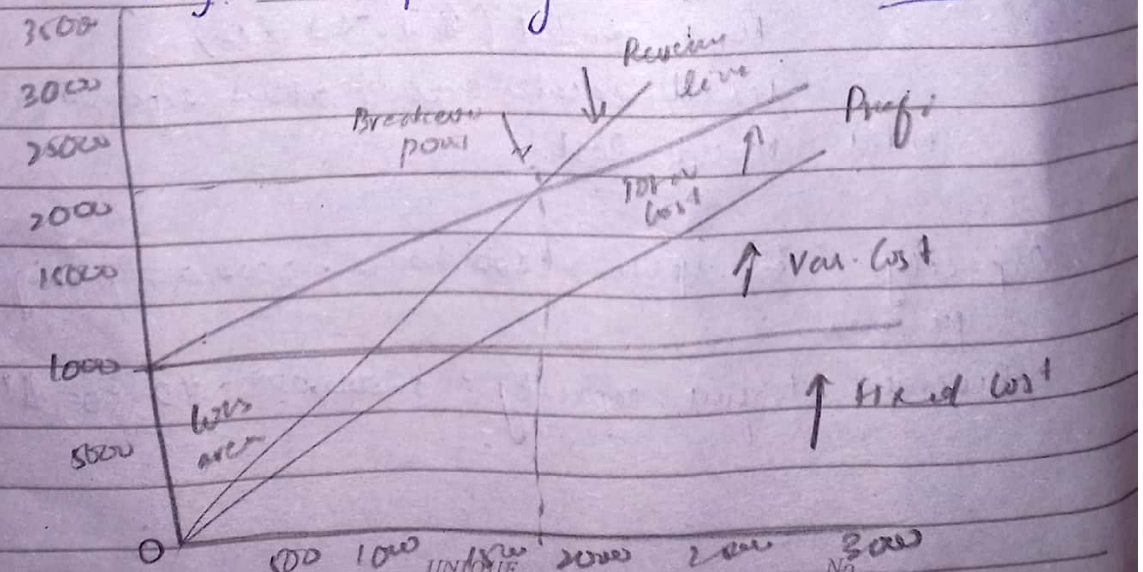
Fixed costs	$ 8,000
Contr. margin ratio	40%
Break-even sale vol.	$ 20,000

Break-even in gallon:

Break even in dollar.	$ 20,000
Unit sale price.	10
Break even sale in gal	2000

Projected operating income at various levels:

	2200 gall.	2600 gal.
Cont. margin per gallon	2 4	4
Total Cont. margin	8800	10,400
Less: Fixed costs.	8000	8000
Projected Operating income.	$ 800	$ 2400



205

Var. cost before 15% increase in the cost of direct labour	$ 60
Increase in dir. labor, 15% of $20	3
Var. cost & expense after 15%.	$ 63

New sales price, $63 ÷ 0.60	$ 105
Sales price before increase	100
Required increase in S.P	$ 5

Unit contribution margin	
Sales price per unit.	$100
Less: Var. cost per unit.	
following 15% increase in d.l.	63
Unit contribution margin	37

$$\text{Sales Volume} = \frac{\$390,000 + \$350,000}{\$37} = 20,000 \text{ units.}$$

	Current Capacity (200,000 units)	After Expansion (220,000 units)
Total cont. margin	$740,000	$ 925,000
Less: Fixed costs	390,000	530,000
Operating income	350,000	395,000

$390,000 + additional dep. per year on new machinery, $140,000 (20% of $700,000).

207

Variable costs per unit before 15%.
Leasing clownfish will result in the highest operating income:

	Clownfish	Angelfish
Number of saleable fish	100,000	50,000
× Sales price	4	10
Total revenue	$400,000	$500,000

Var. Cost		
Eggs.	5,500	9,500
Feedings	28,750	150,000
Water changes	35,000	100,000
Heat & lighting	14,000	20,000
Total Var. Costs.	$ 133,250	$ 279,500
Total Cont. Margin.	266,750	220,500
Fixed costs:	80,000	80,000
Operating Income.	186,750	140,500

The most imp. factor are sunk rate, and the cost of feeding & water changes.

Operating income with new filter material:

	Clownfish	Angelfish
Number of saleable fish	120,000	60,000
× Sale price.	4	10
Total revenue	480,000	600,000

Var. Cost &		
Eggs.	5500	9500
Feedings	84,000	150,000
Water changes.	36,000	80,000

Heating & lighting	14000	20,000
Total Var. Cost	138,600	234,600
total contribution margin	341,600	360,800
Fixed costs:	88,000	88,000
Operating income.	253,500	272,800

10-8

> Cont. margin of product lines:

Shoes	30%
Shorts	80%

* Monthly Operating income:

Total Sales	$1,000,000
Avg. cont. margin ratio	× 40%.
Total cont. margin	400,000
less: Fixed costs & expense	378,000
Operating income	22,000

* Monthly break-even

Fixed costs & exp.	378,000
Avg. cont. margin ratio	÷ 40%
Break even	945,000

* Among new sale mix

Avg. cont. marg. ratio

shoes	21%
shorts	24%
Avg. cont mar ratio	45%

* Monthly Operating income

total sales	$1,800,000
Avg. cont. margin ratio.	× 45%

Date

Total cont. margin.	
Less: fixed costs & exp.	£ 338,000
Avg. cont. margin ratio.	÷ 40%
Break-even sales volume.	£ 845,000

d) In the new sales mix, increased sales of shorts have replaced some sales of shoes. Shorts have a much higher contribution margin than shoes. Thus, at a given sales volume, selling shorts instead of shoes provides more contribution margin and lowers the sales volume required to break even.