MANAGEMENT ACCOUNTING – SEMESTER-4

Marks

Q. 2 (a) Coefficient of Correlation 'r' and the Coefficient of Determination 'r^2':

Month	Utility Cost (Rs.) Y	Machine Hours X	$Y-\overline{Y}$	$X-\overline{X}$	$(Y-\overline{Y})^2$	$(X-\overline{X})^2$	$(X-\overline{X})(Y-\overline{Y})$	
January	160,000	2,300	2,000	(8)	4,000,000	64	(16,000)	
February	157,000	2,250	(1,000)	(58)	1,000,000	3,364	58,000	
March	161,000	2,400	3,000	92	9,000,000	8,464	276,000	
April	155,000	2,250	(3,000)	(58)	9,000,000	3,364	174,000	
May	153,000	2,160	(5,000)	(148)	25,000,000	21,904	740,000	
June	154,000	2,240	(4,000)	(68)	16,000,000	4,624	272,000	
July	152,000	2,180	(6,000)	(128)	36,000,000	16,384	768,000	
August	153,000	2,170	(5,000)	(138)	25,000,000	19,044	690,000	
September	158,000	2,260	–	(48)	–	2,304	–	
October	165,000	2,500	7,000	192	49,000,000	36,864	1,344,000	
November	166,000	2,540	8,000	232	64,000,000	53,824	1,856,000	
December	162,000	2,450	4,000	142	16,000,000	20,164	568,000	
Total	1,896,000	27,700			254,000,000	190,368	6,730,000	2

$$\overline{Y} = \frac{\sum Y}{n} = \frac{1,896,000}{12} = 158,000 \quad ½$$

$$\overline{X} = \frac{\sum X}{n} = \frac{27,700}{12} = 2,308 \quad ½$$

$$r = \frac{\sum(x-\overline{x})(y-\overline{y})}{\sqrt{\sum(x-\overline{x})^2 \sum(y-\overline{y})^2}} = \frac{6,730,000}{\sqrt{254,000,000 \times 190,368}} = 0.97 \quad 1$$

$$r^2 = 0.9409$$

Month	Utility Cost (Rs.) Y	Labour Hours X	$Y-\overline{Y}$	$X-\overline{X}$	$(Y-\overline{Y})^2$	$(X-\overline{X})^2$	$(X-\overline{X})(Y-\overline{Y})$	
January	160,000	4,200	2,000	(30)	4,000,000	900	(60,000)	
February	157,000	4,000	(1,000)	(230)	1,000,000	52,900	230,000	
March	161,000	4,360	3,000	130	9,000,000	16,900	390,000	
April	155,000	4,000	(3,000)	(230)	9,000,000	52,900	690,000	
May	153,000	4,050	(5,000)	(180)	25,000,000	32,400	900,000	
June	154,000	4,100	(4,000)	(130)	16,000,000	16,900	520,000	
July	152,000	4,150	(6,000)	(80)	36,000,000	6,400	480,000	
August	153,000	4,250	(5,000)	20	25,000,000	400	(100,000)	
September	158,000	4,150	–	(80)	–	6,400	–	
October	165,000	4,500	7,000	270	49,000,000	72,900	1,890,000	
November	166,000	4,600	8,000	370	64,000,000	136,900	2,960,000	
December	162,000	4,400	4,000	170	16,000,000	28,900	680,000	
Total	1,896,000	50,760			254,000,000	424,800	8,580,000	2

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$$\overline{Y} = \frac{\sum Y}{n} = \frac{1,896,000}{12} = 158,000$$ ½

$$\overline{X} = \frac{\sum X}{n} = \frac{50,760}{12} = 4,230$$ ½

$$r = \frac{\sum(x-\overline{x})(y-\overline{y})}{\sqrt{\sum(x-\overline{x})^2 \sum(y-\overline{y})^2}} = \frac{8,580,000}{\sqrt{254,000,000 \times 424,800}} = 0.83$$ 1

$$r^2 = 0.6889$$

(b) The coefficient of correlation and coefficient of determination in respect of utility cost and number of machine hours is higher i.e. there is greater correlation between the two, therefore, number of machine hours should be used as a basis to estimate the allowable cost of utility. 3

(c) Variable Utility Rate:

$$b = \frac{\sum(x-\overline{x})(y-\overline{y})}{\sum(x-\overline{x})^2} = \frac{6,730,000}{190,368} = 35.352$$ 2

Fixed utility cost:

$$\overline{y} = a + b\overline{x}$$

$$158,000 = a + 35.352(2,308)$$

$$a = 76,406.24$$ 2

Q. 3

(a)	New Cars	Used Cars		Rupees
Budgeted selling price	3,000,000	2,400,000		
Actual selling price	2,960,000	2,380,000		
Sale price variances:				
New Cars {(2,960,000 – 3,000,000) x 190}		7,600,000	U	1
Used Cars {(2,380,000 – 2,400,000) x 320}		6,400,000	U	1
Total cars		14,000,000	U	

(b) Budgeted average contribution per used car:

Rs. 240,000,000 ÷ 500 480,000

	New Cars	Used Cars		
Budgeted sales unit	200	300		
Actual sales unit	190	320		1
Sale volume variances:				
New Cars {(190 – 200) x 480,000}		4,800,000	U	1
Used Cars {(320 – 300) x 480,000}		9,600,000	F	1
Total cars		4,800,000	F	

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(c)	Budgeted contribution margin per new car:			
	120,000,000 ÷ 200	600,000		½
	Budgeted contribution margin per used car:			
	120,000,000 ÷ 300	400,000		½
	Sales mix variances:			
	New cars {(190 – 200) x (600,000 – 480,000)}	1,200,000	U	½
	Used cars {(320 – 300) x (400,000 – 480,000)}	1,600,000	U	½
	Total cars	2,800,000	U	1

(d)	New Cars	Used Cars		
Budgeted cost of goods sold	2,400,000	2,000,000		
Actual cost of goods sold	2,460,000	2,000,000		
Cost of goods sold variance (variable cost variance):				
New cars {(2,460,000 – 2,400,000) x 190}		11,400,000	U	1
Used cars {(2,000,000 – 2,000,000) x 320}		–	F	
Total cars		11,400,000	U	1

(e) Summary of variances:	Favourable	Unfavourable		
Total selling price variance		14,000,000		
Total sales volume variance	4,800,000			
Total sales mix variance		2,800,000		
Total cost of goods sold variance		11,400,000		
Total variance	4,800,000	28,200,000		2
Unfavourable contribution margin variance	23,400,000			1

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Q. 4 (a) (i) Annual Incremental After Tax Cash Flows: Rupees

Years	1	2	3	4	5	6	7	
Earning before tax	25,000	25,000	25,000	25,000	25,000	25,000		
Add depreciation	20,000	20,000	20,000	20,000	20,000	20,000		
Cash flow before tax	45,000	45,000	45,000	45,000	45,000	45,000		1
Less capital allowance	30,000	30,000	30,000	30,000	–	–		
Taxable income	15,000	15,000	15,000	15,000	45,000	45,000		1
Income tax @ 30%	4,500	4,500	4,500	4,500	13,500	13,500		
Income after tax	10,500	10,500	10,500	10,500	31,500	31,500		1
Cash flow before tax	45,000	45,000	45,000	45,000	45,000	45,000		
Income tax	2,250	2,250	2,250	2,250	2,250	6,750		
		2,250	2,250	2,250	6,750	6,750	6,750	
Tax payment	2,250	4,500	4,500	4,500	9,000	13,500	6,750	1
Cash flow after tax	42,750	40,500	40,500	40,500	36,000	31,500	(6,750)	
Sale of asset*						44,000		
	42,750	40,500	40,500	40,500	36,000	75,500	(6,750)	1

	Rupees
*Sale of asset	50,000
Book value	30,000
Gain on sale	20,000
Tax 30 %	6000
Receipt net of tax	44,000

(ii) Net Present Value (NPV): Rupees

Year		Discount at 14%		Discount at 19%		Discount at 18.64%	
0	(150,000)	–	(150,000)		(150,000)	150000	(150,000)
1	42,750	0.8772	37,500	0.84034	35,924	0.8429	36,033
2	40,500	0.7695	31,163	0.70616	28,600	0.7105	28,774
3	40,500	0.675	27,336	0.59342	24,033	0.5988	24,253
4	40,500	0.5921	23,979	0.49867	20,196	0.5047	20,442
5	36,000	0.5194	18,697	0.41905	15,086	0.4254	15,316
6	75,500	0.4556	34,397	0.35214	26,587	0.3586	27,074
7	(6,750)	0.3996	(2,698)	0.29592	(1,997)	0.3023	(2,040)
	NPV		20,376		(1,571)		(148)

½ + ½ + 1 + ½ + 1 + ½ + 1 = 5

(iii) Internal Rate of Return (IRR):

IRR = 5% x (20,376 ÷ 21,947) + 14%

= 18.6421 = 18.64% 3

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(b) Feasibility of the Project:

Rupees

Year	Fixed Income	Other Savings	Running Costs	Net Cash Flow	
1	250,000	50,000	100,000	200,000	½
2	250,000	52,500	110,000	192,500	½
3	250,000	55,125	121,000	184,125	½
4	250,000	57,881	133,100	174,781	½

The NPV of the project is as follows:

Rupees

Year	Cash Flow	Discount Factor @ 16%	PV	
0	(500,000)	1.000	(500,000)	½
1	200,000	0.862	172,400	½
2	192,500	0.743	143,028	½
3	184,125	0.641	118,024	½
4	174,781	0.552	96,479	½
		NPV	29,931	

The NPV is positive and the project would seem therefore, to be worthwhile. ½

Q. 5 (a) (i) When only One Product is being Sold:

Rupees

	Case-1		Case-2		Case-3		Case-4		
Number of units sold	18,000		**28,000**		40,000		10,000		
Sales	540,000	**30**	700,000	**25**	**800,000**	**20**	320,000	**32**	
Less: Variable expenses	324,000	**18**	**280,000**	**10**	560,000	**14**	**180,000**	**18**	
Contribution margin	**216,000**	**12**	**420,000**	15	**240,000**	6	**140,000**	**14**	
Less: Fixed expenses	180,000		340,000		**170,000**		164,000		
Net operating income	**36,000**		80,000		70,000		(24,000)		
	2	+	2	+	2	+	2	=	8

(ii) When more than One Product is being Sold:

Rupees

	Case-1		Case-2		Case-3		Case-4		
Sales	900,000	**100%**	400,000	**100%**	**1,400,000**	**100%**	600,000	**100%**	
Less: Variable expenses	**540,000**	**60%**	260,000	**65%**	**280,000**	**20%**	180,000	**30%**	
Contribution margin	**360,000**	40%	**140,000**	**35%**	**1,120,000**	80%	**420,000**	**70%**	
Less: Fixed expenses	**230,000**		120,000		940,000		**450,000**		
Net operating income	130,000		**20,000**		180,000		(30,000)		
	2	+	2	+	2	+	2	=	8

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(b) (i) Total Cost of each Product if Overhead Costs are Absorbed on Machine Hour:

Rupees

Products:	W	X	Y	Z	
Raw material	40	50	30	60	
Direct labour	28	21	14	21	
Overhead at Rs.20 per hour	80	60	40	60	
Cost per unit	148	131	84	141	1
Output in units	120	100	80	120	
Total Cost	17,760	13,100	6,720	16,920	1
OR	½ +	½ +	½ +	½ =	2

(ii) Manufacturing Overhead Cost per Unit:

Overhead	Rupees	Cost Driver	Cost Driver Transactions	Cost/ Unit (Rs.)	½
Machine department cost	10,430	Machine hours	1300 hours	8.023	½
Set-up costs	5,250	Production runs*	21	250.000	½
Stores receiving	3,600	Requisitions raised	4 x 20 = 80	45.000	½
Inspection/Quality control	2,100	Production runs*	21	100.000	½
Material handling and despatch	4,620	Orders executed**	42	110.000	½

* No. of production run = 420 units ÷ 20 units per set-up = 21 runs ½

** No. of order executed = 420 units ÷ 10 units per order = 42 orders ½

(iii) Total Cost of each Product Using Activity-Based Costing:

Cost		Products W	X	Y	Z	
Material & Labour	(1)	8,160	7,100	3,520	9,720	1
Set-up costs	(2)	1,500	1,250	1,000	1,500	1
Stores receiving (20 at Rs.45)		900	900	900	900	½
Inspection/Quality control	(3)	600	500	400	600	1
Mat. handling and despatch	(4)	1,320	1,100	880	1,320	1
Machine department cost	(5)	3,851	2,407	1,284	2,888	1
Total cost		16,331	13,257	7,984	16,928	½
(1) Cost per unit x Output units						
(2) Based on production run of 21		120 ÷ 20 x 250	100 ÷ 20 x 250	80 ÷ 20 x 250	120 ÷ 20 x 250	
(3) Based on production run of 21		120 ÷ 20 x 100	100 ÷ 20 x 100	80 ÷ 20 x 100	120 ÷ 20 x 100	
(4) Material handling		110 x 12	110 x 10	110 x 8	110 x 12	
(5) Output units x machine hours per unit x machine dept. cost per unit						
OR		1½ +	1½ +	1½ +	1½ =	6

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Q. 6 (a) Expected Return on Equity:

Rupees

	Tight	Moderate	Relaxed	
Current assets (% of sales)	45%	50%	60%	
Current assets (% of sales x sales)	1,350,000	1,500,000	1,800,000	1
Fixed assets	600,000	600,000	600,000	1
Total assets	1,950,000	2,100,000	2,400,000	1
Debt (60% of assets)	1,170,000	1,260,000	1,440,000	1
Equity	780,000	840,000	960,000	1
Total claim	1,950,000	2,100,000	2,400,000	
EBIT (15% x Rs. 3 million)	450,000	450,000	450,000	1
Interest (10%)	117,000	126,000	144,000	1
Earning before taxes	333,000	324,000	306,000	1
Taxes (35%)	116,550	113,400	107,100	1
Net income	216,450	210,600	198,900	1
Return on equity	27.75%	25.07%	20.72%	1

(b) No, this assumption would probably not be valid in the real world situation. A firm's current assets policy, particularly with regards to accounts receivables, such as discounts, collection period, collection policy, may have a significant effect on sales. The exact nature of this function may be difficult to quantify, however, and determining an "optimal" current asset level may not be possible in actuality. 2

(c) As the answers to part **(a)** indicate, the tighter policy leads to a higher expected return. However, as the current asset level is decreased, presumably some of this reduction comes from accounts receivable. This can be accomplished only through higher discounts, a shorter collection period, and/or tougher collection policies. As outlined above, this would in turn have some effect on sales, possibly lowering profits. More restrictive receivable policies might involve some additional costs such as collection etc., but would also probably reduce bad debt expenses. Lower current assets would imply lower liquid assets; thus, the firm's ability to handle contingencies would be impaired. Higher risk of inadequate liquidity would increase firm's risk of insolvency and thus increase its chance of failing to meet fixed charges. Also, lower inventories might mean lost sales and/or expensive production stoppages. Attempting to attach numerical values to these potential losses and probabilities would be extremely difficult. 3

THE END

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