

TOE408W – PAPER 1

SUGGESTED SOLUTION


- (a) Assumption: All cash flows will increase at the general rate of inflation resulting in current prices being equal to real cash flows. Real cash flows must be discounted at a real discount rate while a nominal required rate of return is given.

Use this formula

$$\begin{aligned}
 1 + \text{nominal rate} &= (1 + \text{real rate}) \times (1 + \text{anticipated inflation}) \\
 1 + 0,14 &= (1 + \text{real rate}) \times (1 + 0,0556 \text{ rate}) \\
 \therefore \text{Real rate} &= 8\% \qquad (1) \text{ R/W}
 \end{aligned}$$

Contribution per DVD sold

$$R40 - R16 - R4 - R3 - R4 = R13 \qquad (2) \text{ for R13R/W or (1)For R10 R/W}$$

 Note: Allocated fixed overheads do not represent incremental cash flows and are therefore not relevant to the decision.

	R		
$\therefore 165\,000 \times R13 =$	2 145 000		(1) R/W for 165 000
Taxation 28%	<u>600 600</u>		(1) C
Annuity for five years @ 8%	<u>1 544 400</u>	x 3,993	} (1) R/W for 8% & 5y
[n = 5; I = 8; PMT = 1; COMP PV= 3,993]			
Present value - Annuity	6 166 789	Calculator alt: R6 166 341	
Redesign and set-up	<u>(4 000 000)</u>		(1) R/W
NPV	<u>2 166 789</u>	Calculator alt: R2 166 341	(1) C

Using a financial calculator –

$$\begin{aligned}
 \text{IRR } \therefore \text{CFi}_0 &= \text{R- } 4\,000\,000 \\
 \text{CFi}_{1-5} &= \text{R } 1\,544\,400 \\
 \therefore \text{IRR} &= 26,9\% \qquad (2) \text{ if correct Or (1) if incorrect}
 \end{aligned}$$

(1) (1)

As both the **NPV is positive** and the **IRR exceeds the real cost of capital of 8%**, the production of DVD's is financially feasible. (2) 1 for general recommendation

(b) (i) Price (P)

NPV can drop by:	$2\,166\,789 \div 3,993$		
	$= 542\,646,9$ p.a.		(1) C
Per unit ($542\,647,9 \div 165\,000$)	$= 3,289$	for 165 000 (after tax cash flow)	(1) R/W
Before tax ($\div 0,72$)	$= 4,57$		(1) R/W
Sales price ($40 - 4,57$)	$= R35,43$		(1) C
			<u>4</u>

OR

		(C)	(C)	(R/W)	(R/W)	
NPV	$= 0$	$= [0,165 (P - R27)(1 - 0,28) (3,993)] - R4\,000$				
		$= [(0,165P - R4,455) 2,8750] - R4\,000$				
		$= 474\,375P - 12\,808\,125 - 4\,000\,000$				
	474 375 P	$= 16\,808\,125$				
	P	$= 35,43$				(4)

(ii) Volume (V)

NPV can drop by	$= 542\,646,9$		
Before tax ($\div 0,72$)	$= 753\,676,2$		(1) R/W
Number of DVD's ($\div 13$)	$= 57\,975$		(1) C
Volume ($165\,000 - 57\,975$)	$= 107\,025$ DVD's		(1) C
			<u>4</u>

OR

		(C)	(C)	(R/W)	(R/W)	
NPV	$= 0$	$= [V (R40 - R27) (1 - 0,28)(3\,993)] - R4m$				
		$= [V13 (2,8750)] - R4m$				
		$= V37,373 - R4m$				
	37,75V	$= R4\,000\,000$				
	V	$= 107\,023$				(4)

Discussion and recommendations:

Sensitivity (Price)	$= 4,57 / 40$		
	$= 11,43\%$		(1) C

The price can drop by R4,57 (11,43%) before the NPV becomes negative. (1) C

Sensitivity (Volume)	$= \frac{57\,975}{165\,000}$		
	$= 35,1\%$		(1) C

The volume can drop by 57 977 DVD's (35,1%) before the NPV becomes negative. (1) C

The results suggest that the project's NPV is more sensitive to price variations than to changes in volume. Pricing policy should be reviewed to ensure that prices do not (C) ito% decline by more than 11%. A focus on advertising will ensure that demand is kept at the proposed price. Advertising will lower contribution, assuming that these costs are variable.

(2) R/W
Max 4

(c) **Expected value of annual sales**

Sales	Probability	Total
8 000 000	0,2	1 600 000
10 000 000	0,4	4 000 000
14 000 000	0,3	4 200 000
20 000 000	0,1	<u>2 000 000</u>
		<u>11 800 000</u>

(2)R/W

Year	R'000							
	0	1	2	3	4	5	6	
Purchase of company	(800)							(1) R/W
Sales 5%		11 800	12 390	13 010	13 660	14 343		(2) R/W y2,5
Legal/professional		(40)	(40)	(40)	(40)	(40)		(½) R/W
Lease rentals		(24)	(24)	(24)	(24)	(24)		(1) R/W
Studio hire		(1 080)	(1 080)	(1 350)	(1 485)	(1 634)		(3) R/W y1,3,5
Camera hire		(240)	(240)	(240)	(240)	(240)		(1) R/W
Technical staff		(3 120)	(3 338)	(3 572)	(3 822)	(4 090)		(2) R/W y1,5
Screenplay		(300)	(336)	(376)	(421)	(472)		(2) R/W y1,5
Actors salaries		(4 200)	(4 494)	(4 809)	(5 145)	(5 505)		(1)R/W y5
Costumes/wardrobe		(360)	(360)	(360)	(360)	(360)		(1) R/W
Set design		(900)	(900)	(900)	(900)	(900)		(½) R/W
Non-production staff wages		(120)	(128)	(137)	(147)	(157)		(1) R/W
Lost income (office accommodation)		(40)	(40)	(40)	(40)	(40)		(1) R/W
Cash flow before tax	(800)	1 376	1 410	1 162	1 036	881	-	
Taxation at 28%	-	-	(385)	(395)	(325)	(290)	(247)	(3) 1 for 28%, R/W 1 for flow in year 2 C + 1 for tax in Y6 R/W
Net cash flow	(800)	1 376	1 025	767	711	591	(247)	
Discounted at 14%	1	0,877	0,769	0,675	0,592	0,519	0,456	(1) 1 for 14%
Present value of cash flow	(800)	1 207	788	518	421	307	(113)	
∴ NPV	R2 329							(1) C <u>20</u>

MAX

(d) Specific (diversifiable) risk –

- is specific to an individual company, for example impact on cash flows resulting from a new competitor or a technology change, which makes one of the company's products obsolete,
- such as more popular films / better (improved) decoder.

(1)
Example

(1)
reason
must be
appl

Market (non-diversifiable) risk –

- arising from macroeconomic factors that affect the returns of all companies, for example in overall consumer demand due to spending ability
- for instance the impact which a recession would have on consumer spending.

(1)
Example
(1)
reason

4

(e) Risk assessment

R	EV per (c)	R – EV	(R – EV) ²	xP	σ
Rm	Rm	R'000	R		R
8	11.8	-3 800	14 440 000	0,2	2 888 000
10	11.8	-1 800	3 240 000	0,4	1 296 000
14	11.8	2 200	4 840 000	0,3	1 452 000
20	11.8	8 200	67 240 000	0,1	6 724 000
					<u>12 360 000</u>

(1) EV

(2)

(1)

(2)

R/W: If no's incorrect
max 3

$$\sigma = \sqrt{12\,360\,000}$$

$$= 3\,515,7$$

(1) C for calc. $\sqrt{\quad}$

$$\text{CoV} = \frac{\sigma}{\text{EV}}$$

$$= \frac{3\,515,7}{11\,800}$$

(1) C

$$= 0,298$$

Alt:
29,8%

(1) R/W

Comment:

- Risk is indicated by the relative dispersion in the probability distribution (coefficient of variation).
- The risk associated with the produced film sales is low as evidenced by the relatively low coefficient of variation and relatively low standard deviation. (2)

- (f) Capital allowances are usually granted for capital purchases that *accelerate* the write-off of these types of assets (eg. 40% : 20% : 20% : 20%). As they tend to reduce the tax payable during the initial periods, a *positive cash inflow* is also *initially accelerated*. Given the time value of money, *this contributes to a positive investment in capital and reduces the capital cost of the project.*
Increases NPV. (2)
max

- (g) Calculation of breakeven

$$\text{BEP} = \frac{34\,500 \times 38,50}{,35} = \frac{1\,328\,250}{,35} \quad \begin{array}{l} (1) \text{ R/W for top} \\ (1) \text{ R/W for bottom} \end{array}$$

$$= \text{R}3\,795\,000$$

- (h) **Pricing scenarios**

(i) <i>Minimum price</i>	R	
Materials (R123,65* 6 000)	741 900	(1) R/W
Variable o/h (24,60* 2,63* 6 000 units) W1	388 385	(1) R/W
Incremental FC	<u>28 500</u>	(1) R/W
Total	<u>1 158 785</u>	(1) C
Lowest SP per decoder (÷ 6 000)	193,13	(1) R/W

W1 *Cumulative average learning time per unit*

4 batches will be required (1) R/W

Col. 1 Batch	Col. 2 Average Time	Col. 1 x Col. 2 Cumulative	
1	5 463,0	5 463	(1) C for process
2	4 643,5	9 287	
4	3 947,0	15 788	

15 788 ÷ 6 000 = 2,63 hours per unit (1) R/W

OR

$$Y = aX^b$$

$$Y = 5\,463 \text{ hrs} \left(4^{\frac{\text{Log } 0,85}{\text{Log } 2}} \right)$$

$$Y = 3\,947,02$$

Total time for the first four batches: $4 \times 3\,947,02 = 15\,788 \text{ hrs}$

Time per unit ($\div 6\,000$ units) = 2,63 hrs per unit

Max

(1) Process
(1) R/W
6

(ii) *Impact of no loss*

- (a) Assume further orders from Hot TV
Current free capacity $34\,500 \times 70\%$
At 2,63 machine hours per unit this
equates to ($\div 2,63$)

= 24 150 hrs

(1) R/W

= 9 182 units

(1) C

The total price will have to recover the variable costs, the loss and the incremental fixed costs.

(2)

W2 *Budgeted profit (loss)*

	R	
Contribution ($R3\,627\,000 \times 35\%$) $\times 30\%$	380 835	(1) R/W
Fixed costs ($34\,500 \times 38,50$)	<u>(1 328 250)</u>	(1) R/W
Profit (loss)	<u><u>(947 415)</u></u>	
Materials ($R123,65 \times 9\,182$)	1 135 354	(1) C
Variable overhead ($R24,60 \times 24\,150\text{h}$)	<u>594 090</u>	(1) C
	1 729 444	
<i>Add:</i> Incremental fixed costs	28 500	(1) R/W
Loss for the year	<u>947 415</u>	(1) C
	<u><u>2 705 359</u></u>	
Price per unit ($\div 9\,182$)	R294,64	(1) C

In this case Hot TV can sell the decoders at **R305** which gives them a profit of **R10,36** per unit.

Total direct profit = $R10,36 \times 9\,182$

= R95 126

(2) R/W
(1) C

(b) *Assume the order remains at 6 000*

	R	
Total cost as before	1 158 785	(1) C
Loss for the year	<u>947 415</u>	(1) C
	<u><u>2 106 200</u></u>	

Cost per unit (\div 6 000)	R351,03	(1) C
In this case Hot TV can sell the decoders at R400 and make a profit of R48,97 per decoder.		
		(2) R/W
Total direct profit = R48,97 x 6 000	R293 820	<u>(1) C</u>
	Max	<u>15</u>

Recommend

We recommend a purchase of 6 000 decoders at a unit cost of R351,03 each. (1) C

Based on all the information presented to us, Hot TV will make a profit of

- R293 820 on 6 000 units bought and sold
- R95 126 on 9 182 units bought and sold.

If Hot TV is convinced that they can recover the **differential profit** of R198 694 through **additional subscriptions** and that their **growth** is the more important factor, you should recommend the higher production figure of 9 182 decoders.

(3)
(1)
 Max 4

(i) **Subsidization process**

- The numbers currently involved are *low*, for a *new entrant*, so it should be sustainable for some time. (2)
- It is a policy actively and successfully pursued by the major player in the market. (1)
- It is based on the premise that it will generate repeat and continuous income from the subscriber – *recurring income*. (1)
- Subscribers may more easily *convert* to more expensive bouquets and thereby increase income. (1)
- The sales adage that it is cheaper to hold onto an existing customer than to obtain new customers is the fundamental base. (1)
- Possible additional income from guarantees and insurance. (1)
- The process appears reasonable and sustainable from a business perspective. (1)

Max 5

(j)(i) Overhead allocation

Production falls in the range 1 100 – 1 500 and the high–low method should be applied to this range

$$\begin{aligned} \therefore \text{VC} &= \frac{37\,950 - 36\,115}{1\,500 - 1\,100} \\ &= \frac{1\,835}{400} \\ &= R4,59 && (1) \text{ R/W} \\ \therefore \text{FC} &= 36\,115 - (1\,100 \times 4,59) \\ &= R31\,066 \text{ (based on rounded off figures)} && (1) \text{ R/W} \end{aligned}$$

Average for range: 1 300

$$\begin{aligned} \therefore \text{FOH rate} &= 31\,066 \div 1\,300 \\ &= R23,897 \text{ per unit} && (1) \text{ R/W} \\ \text{FOH allocated (x 1 320)} &= R31\,544,04 && (1) \text{ R/W} \\ \text{Budget} &R31\,066,00 \\ \text{Over – allocated} &R478,04 && \underline{(2)} \text{ 1 for over} \\ &&& \text{1 amount} \\ &&& \underline{6} \end{aligned}$$

(ii) Normal loss

Production cost	R	
Material and labour		
[(19 800 + 17 754)/1 320] x 132	3 755,40	(1) R/W
VOH (132 x 4,59)	605,88	(1) R/W
FOH (132 x 23,897)	3 154,40	(1) R/W
Recovery (132 x 10)	<u>(1 320,00)</u>	<u>(1) R/W</u>
Net loss for September	<u>6 195,68</u>	<u>4</u>