

## **CIFA PART II SECTION 3**

## **CORPORATE FINANCE**

WEDNESDAY: 22 May 2019.

Time Allowed: 3 hours.

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

## **QUESTION ONE**

(a) Finance managers of organisations make financial decisions such as investment decisions, financing decisions, dividend decisions as well as liquidity decisions.

In light of the above statement, explain three ways in which financial decisions could impact on firm's value. (6 marks)

(b) Company A seeks to acquire company B. Relevant data for the two companies is provided below:

	Company A	Company B		
Pre-merger share price	Sh.80	Sh.48		
Number of outstanding ordinary shares	30 million	20 million		

As a result of the acquisition, the cost reduction synergy arising is Sh.180 million.

The deal is completed through a share transaction with an exchange ratio of 0.7

# Required:

Calculate the gain of the merger to the following:

(i) To the target.

(3 marks)

(ii) To the acquirer.

(2 marks)

(c) Vibe Sounds Limited has tasked you to determine its optimal capital structure. The company's capital structure consists of debt and equity. In order to estimate the cost of debt, the company has produced the following table:

Debt-to-total asset ratio	Equity-to-total asset ratio	Bond rating	Before tax cost of debt (%)
0.10	0.90	AA	7.0
0.20	0.80	Α	7.2
0.30	0.70	Α	8.0
0.40	0.60	BB	8.8
0.50	0.50	В	9.6

# Additional information:

- 1. The corporate tax rate is 30%.
- 2. The risk-free rate is 5% and the market risk premium is 6%.
- 3. The firm's unlevered beta is 1.0.

## Required:

(i) The firm's optimal capital structure.

(7 marks)

(ii) The company's weighted average cost of capital (WACC) based on the optimal capital structure in (c) (i) above. (2 marks)

(Total: 20 marks)

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### **QUESTION TWO**

(a) Examine two features of leveraged restructuring.

(2 marks)

(b) Assess four motivations for mergers and acquisitions in the global markets. (4 marks)

Fastline Printers Limited is considering investing in one of three mutually exclusive projects, X, Y and Z. The firm's (c) cost of capital is 15% and the risk-free rate is 10%. The firm has gathered the basic cash flow and risk index data for each project, as shown in the following table:

		Project	
	X	Y	Z
Initial investment (Sh.)	15,000	11,000	19,000
Year		Cash inflows (Sh.)	
and the second of the second	6,000	6,000	4,000
2	6,000	4,000	6,000
r <b>3</b> ki kirik barulan dan jerasar da	6,000	5,000	8,000
4	6,000	2,000	12,000
Risk index	1.80	1.00	0.60

# Required:

The net present value (NPV) of each project. Comment on the most preferable project.

(3 marks)

(ii) The risk-adjusted discount rate (RADR) for each project.

(3 marks)

The risk-adjusted NPV for each project. Comment on the most preferable project. (iii)

(3 marks)

- (iv) Compare your findings in (c) (i) and (c) (iii) above and advise on which project the firm should accept. (1 mark)
- (d) Millenium Airlines is contemplating investment in a new passenger aircraft, code name Millenia. The airline chief financial officer has gathered the following estimates:
  - 1. The cost of developing the Millenia is forecast at Sh.900 million, and this investment can be depreciated in 6 equal annual instalments.
  - Production of the plane is expected to take place at a steady annual rate over the following 6 years.

    The average price of Millenia is expected to be Sh.15.5 million.

    The fixed costs are forecasted at Sh.175 million per year.

    The variable costs are forecasted at Sh.8.5 million per unit.

    The corporate tax rate is 30% and the cost of capital is 10%. 2.
  - 3.
  - 4.
  - 5.
  - 6.

### Required:

Using the net present value (NPV) approach, determine the number of planes that Millenia Airline should sell in order to break-even. (4 marks)

(Total: 20 marks)

# **QUESTION THREE**

Global Industry Corporation has an equity capital of 12%, total equity of Sh.12 million, total debt of Sh.8 million and recorded sales of Sh.30 million last year.

Two scenarios relating to the company are provided below:

The company has a target assets-to-sales ratio of 0.667, a target net profit margin of 0.04, a target debt-to-equity ratio of 0.667, and a target earnings retention ratio of 0.75.

The company has established for next year a target assets-to-sales ratio of 0.62, a target net profit margin of 0.05 and a target debt-to-equity ratio of 0.80. The company wishes to pay an annual dividend of Sh.0.3 million and raise Sh.1 million in equity capital next year.

#### Required:

(i) The sustainable growth rate for Scenario 1. (2 marks)

(ii) The sustainable growth rate for Scenario 2.

(2 marks)

Comment on the difference between the sustainable growth rates for the two scenarios in (a) (i) and (a) (ii) (iii) above. (2 marks) (b) In relation to financial distress, argue three cases why firms could prefer to use formal bankruptcies to restructure.

(3 marks)

(c) ABE Ltd. and BOO Ltd. are firms operating in the same industry and are considered to be in the same risk profile.

Each firm generates operating profit of Sh.25 million each year. The earnings are expected to remain constant each year in perpetuity.

The capital structures of both firms are given as follows:

	ABE Ltd. Sh. "million",	BOO Ltd. Sh. "million"
Equity (market value)	175	150
4% Debt (Trading at par)	<u>-</u>	<u>100</u>
Ţ.,	175	250

# Additional information:

- 1. Both firms adopt a 100% payout ratio as their dividend policy.
- 2. Corporate tax rate applicable is 30%.

# Required:

(i) Determine the weighted average cost of capital (WACC) for the two firms.

(2 marks)

- (ii) Advise Musa Mutembei who holds 5% of BOO Ltd.'s shares on the arbitrage opportunities available to him.

  (4 marks)
- (d) Enkare Company Ltd. is considering undertaking an expansion programme that will increase the firm's turnover significantly.

The firm is contemplating raising Sh.30 million from external sources to finance this investment activity.

Two alternative financing options available to the firm are given as follows:

# Option I

Issue new ordinary shares at par of Sh.20 each to raise the full amount.

#### Option II

Issue new ordinary shares at par of Sh.20 each to raise Sh.20 million and the remainder to be raised through the issue of new 14% debentures at par.

Corporation tax rate applicable is 30% and the firm's existing capital structure prior to raising the additional funds was as follows:

	Sh."000"
Ordinary share capital (Sh.20 each)	80,000
Reserves	10,000
12% Debt	10,000
	100.000

#### Required:

Compute the earnings before interest and tax (EBIT) and earnings per share (EPS) at the point of indifference in the firm's earnings under financing plan I and financing plan II above. (5 marks)

(Total: 20 marks)

# **QUESTION FOUR**

- (a) As the chief finance officer, CFO of Baobab Limited, you have received a letter from a major shareholder who needs information about the company's dividend policy. The shareholder is specifically wondering about the amount of dividend the company is likely to pay next year. You have not yet collected all the information about the expected dividend payment, but you do know the following:
  - 1. The company follows a residual dividend policy.
  - 2. The total capital budget for next year is likely to be one of three amounts depending on the results of capital budgeting studies that are currently underway. The capital expenditure amounts are Sh.2 million, Sh.3 million and Sh.4 million respectively.
  - 3. The forecasted level of potential retained earnings next year is Sh.2 million.
  - 4. The target or optimal capital structure is a debt ratio of 40%.

You have decided to respond by sending the shareholder the best information available to you through a letter.

Required:

(i) Explain the term "residual dividend policy".

- (2 marks)
- (ii) Compute the amount of dividend and the dividend payment ratio for each of the three capital expenditure amounts. (5 marks)
- (iii) Compare the amount of dividends computed in (a) (ii) above associated with each of the three capital expenditure amounts.
- (b) The following information was extracted from the books of Ravella Publishing Limited as at 31 December 2018:

1.	Total assets	'Sh.10,000,000.
2.	Earnings before interest and tax (EBIT)	Sh.2,000,000.
3.	Preference dividends	Sh.200,000.
4.	Corporation tax rate	30%.

In an effort to determine the optimal capital structure, the firm has assembled the following data:

Capital structure debt ratio (%)	Cost of debt, r <sub>d</sub> (%)	Number of ordinary shares	Required rate of return, r <sub>s</sub> (%)				
0	0	200,000	12				
15	8	'	13				
30	9		14				
45	12	110,000	16				
60	15	80,000	20				

# Required:

(i) Calculate the earnings per share (EPS) for each level of indebtedness.

(5 marks)

(ii) Price per share for each level of indebtedness using the results obtained in (b) (i) above.

(iii) Advise the management on the optimal capital structure. Justify your choice.

otal 20 marks

## **QUESTION FIVE**

(a) (i) Highlight three determinants of a firm's liquidity position.

(3 marks)

(ii) Given below are financial data extracts of Watamu Company Ltd. for the financial years ended 31 December:

	2017	2018
	Sh. "million"	Sh. "million"
Sales	240	245
Inventory of finished goods	, 10	12
Stock of raw materials	15	20
Stock of work-in-progress	5	8
Cost of sales	94	95
Cost of production	60	90
Debtors	13	15
Creditors	14	16

# Additional information:

- 1. The annual usage of raw materials for the year 2018 are estimated at Sh.235 million.
- 2. Assume all sales are on credit basis and 360 days in a year.

#### Required:

Compute the working capital operating cycle of the firm for the year 2018.

(6 marks)

(b) Explain the following financial contracts as used in Islamic Finance:

(i) Musharaka.

(1 mark)

(ii) Mudaraba.

(1 mark)

(iii) Murabaha.

(1 mark)

(iv) Ijara.

(1 mark)

(c) Alpha Company, a small machine shop, is contemplating acquiring a new machine that costs Sh.80,000. The machine can be leased or purchased. The firm is in the 30% tax bracket, and its after-tax cost of debt is 9%. The terms of the lease and purchase plans are as follows:

## Lease:

The firm would obtain a 5-year lease requiring annual end-of-year lease payments of Sh.19,800. All maintenance costs would be paid by the lessor, and insurance and other costs would be borne by the lessee. The lessee will exercise its option to purchase the asset for Sh.24,000 at termination of the lease.

# Purchase:

The firm would finance the purchase of the machine with a 14%, 5-year loan requiring end-of-year instalment payments of Sh.23,302. The machine would be depreciated under modified accelerated cost recovery system (MACRS) using a 5-year recovery period as follows:

Recovery year	Percentage by recovery year (%)
1	20
2	32
3	19
4	12
5	12

The firm will pay Sh.2,000 per year for a service contract that covers all maintenance costs, insurance and other costs will be borne by the firm. The firm plans to keep the equipment and use it beyond its 5-year recovery period.

Requir		(4 marks)
(i)	The after-tax cash outflows under each alternative.	(4 marks)
(ii)	The present value of each after tax cash outflow, using the after-tax cost of debt.	(2 marks)
(iii)	Advise the management on which alternative is viable based on your results in (c) (ii) above	(1 mark) (Total: 20 marks)
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		Silv

Present Value of 1 Received at the End of n Periods:

PVIF	_ = 1	/(1	+r)"	=(1	+1)	-//

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8963 8043 7224 6496 5847 5268 4751 4289 3875 3505 2875 2366 2149 1954 1619 1346 0398 0662 0472 0348 0874 7885 7014 5246 5568 4970 4440 3971 3555 3186 2567 2076 1869 1685 1372 1122 0757 0517 0357 0250 1878 7730 6810 5006 5303 4688 4150 3677 3262 2897 2292 1821 1625 1452 1163 0935 0610 0404 0271 0184 0775 0517 0357 0517 0357 0250 1870 07579 6611 5775 5051 4423 3378 3405 2992 2633 2046 1597 1413 1252 0985 0779 0492 0316 0205 0135 0813 7430 6419 5553 4810 4173 3624 3152 2745 2394 1827 1401 1229 1079 0835 0649 0397 0247 0155 0099 0858 0779 0492 0316 0205 0135 0699 0930 0768 0541 0320 0193 0118 0073 0858 0779 0492 0316 0205 0135 0099 0930 0768 0541 0320 0193 0118 0073 0858 0779 0492 0316 0205 0135 0099 0930 0768 0541 0320 0193 0118 0073 0946 0800 0591 5058 0369 0376 0205 0135 0099 0930 0768 0541 0320 0193 0118 0073 0946 0806 0591 5058 0366 0366 0369 0369 0369 0369 0369 0369	9														.2630	.2255	.1938	.1443	.1084	.0822	.0628
8874 7885 7014 6246 5568 4970 4440 3971 3555 3186 2567 2076 1869 1695 1372 1122 0757 0517 0357 0505 8787 7730 6810 6006 5303 4688 4150 3677 3262 2897 2292 1821 1625 1432 1163 0995 0779 0492 0316 0205 0135 8613 7430 6419 5553 4810 4473 3624 3152 2745 2394 1827 1401 1229 1079 0835 0649 0397 0247 0155 0099 8526 778 494 6232 5339 4581 3336 3387 2919 2519 22176 1631 1229 1069 0930 0708 0541 0320 0193 0118 0073 8444 7.142 6050 .5134 4363 3714 3166 2703 2311 1978 1456 1078 0929 0090 06451 0258 0150 0089 8277 6864 5703 4746 3957 3305 2765 2317 1945 1635 1161 0829 0703 0596 0431 0313 0168 0092 0051 0028 8195 6730 5537 4564 3769 3118 2584 2145 1784 1486 1037 0728 0611 0514 0365 0264 0002 0002 0001	10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
8787 7730 .6810 .6006 .5303 .4688 .4150 .3677 .3262 .2887 .2292 .1821 .1625 .1452 .1163 .0935 .0610 .0404 .0271 .0184 .8700 .7579 .6611 .5775 .5051 .4423 .3878 .3405 .2992 .2633 .2046 .1597 .1413 .1252 .0985 .0779 .0492 .0316 .0205 .0135 .8613 .7430 .6419 .5553 .4910 .4173 .3624 .3152 .2745 .2394 .1827 .1401 .1229 .1079 .0835 .0649 .0397 .0247 .0155 .0099 .8528 .7284 .6232 .5339 .4581 .3936 .3387 .2919 .2519 .2176 .1631 .1229 .1079 .0835 .0649 .0397 .0247 .0155 .0099 .8844 .7142 .6050 .5134 .4363 .3714 .3166 .2703 .2311 .1978 .1456 .1078 .0929 .0802 .0600 .0451 .0258 .9150 .0089 .0054 .8360 .7002 .5074 .4936 .4155 .3503 .2595 .2502 .2120 .1799 .1300 .0946 .0806 .091 .0508 .0376 .0208 .0118 .0068 .0038 .8277 .6864 .5703 .4746 .3957 .3305 .2765 .2317 .1945 .1635 .1161 .0829 .0703 .0596 .0431 .0313 .0168 .0922 .0051 .0029 .8195 .6730 .5537 .4564 .3769 .3118 .2584 .2145 .1784 .1486 .1037 .0728 .0611 .0514 .0365 .0261 .0135 .0072 .0039 .0021 .7798 .6095 .4776 .3751 .2953 .2330 .1842 .1460 .1160 .0923 .0588 .0378 .0304 .0245 .0160 .0105 .0046 .0021 .0010 .0005 .6717 .4529 .3066 .2063 .1420 .0972 .0668 .0460 .0318 .0221 .0107 .0053 .0037 .0022 .0031 .0007 .0002 .0001 .5504 .3048 .1697 .0951 .0535 .0303 .0173 .0099 .0057 .0033 .0011 .0004 .0002 .0001 .0005 .5504 .3048 .1697 .0951 .0535 .0303 .0173 .0099 .0057 .0033 .0011 .0004 .0002 .0001 .0005 .0006 .0003 .0001 .5504 .3048 .1697 .0951 .0535 .0303 .0173 .0099 .0057 .0033 .0011 .0004 .0002 .0001 .0005 .0004 .0002 .0001 .0005 .0005 .0006 .0003 .0001 .0005 .0006 .0003 .0001 .0005 .0006 .0003 .0001 .0005 .0006 .0003 .0001 .0005 .0006 .0003 .0001 .0005 .0006 .0003 .0001 .0005 .0006 .0003 .0001 .0005 .0006 .0003 .0001 .0005 .0006 .0003 .0001 .0006 .0005 .0006 .0	. 11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
98787 7730 6810 6006 5303 4688 4150 3677 3262 2897 2292 1821 1625 1452 1163 0335 0610 0404 0271 0184 8700 7579 6611 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 50511 5775 5051 57	12					.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	1685	.1372	.1122	.0757			.0250
$ \begin{array}{c} 8700 & .7579 & .6611 & .5775 & .5051 & .4423 & .3878 & .3405 & .2992 & .2633 & .2046 & .1597 & .1413 & .1252 & .0985 & .0779 & .0492 & .0316 & .0205 & .0135 & .0881 & .7430 & .6419 & .5553 & .4810 & .4173 & .3624 & .3152 & .2745 & .2394 & .1827 & .1401 & .1229 & .1069 & .0930 & .0768 & .0649 & .0397 & .0247 & .0155 & .0099 & .0825 & .0261 & .0320 & .0331 & .0258 & .0261 & .0320 & .0331 & .0268 & .0261 & .0320 & .0331 & .0268 & .0261 & .0320 & .0331 & .0268 & .0261 & .0320 & .0331 & .0268 & .0261 & .0320 & .0331 & .0268 & .0261 & .0320 & .0331 & .0268 & .0261 & .0320 & .0261 &$	13			.6810		.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163					.0184
8613 7,430 .6419 .5553 .4810 .4173 .3624 .3152 .2745 .2394 .1827 .1401 .1229 .1079 .0835 .0649 .0397 .0247 .0155 .0099 .8528 .7284 .6232 .5339 .4581 .3936 .3387 .2919 .2519 .2176 .1631 .1229 .1069 .0930 .0708 .0541 .0320 .0133 .0118 .0073 .8444 .7142 .6050 .5134 .4363 .3714 .3166 .2703 .2311 .1978 .1456 .1078 .0929 .0802 .0600 .0451 .0258 .0150 .0089 .0081 .8360 .7002 .5074 .4936 .4155 .3503 .2595 .2502 .2120 .1799 .1300 .0946 .0808 .0691 .0508 .0376 .0208 .0118 .0068 .0039 .8277 .6864 .5703 .4746 .3957 .3305 .2765 .2317 .1945 .1635 .1161 .0829 .0703 .0596 .0431 .0313 .0168 .0092 .0051 .0029 .8195 .6730 .5537 .4564 .3769 .3118 .2584 .2145 .1784 .1486 .1037 .0728 .0611 .0514 .0365 .0261 .0135 .0072 .0039 .0021 .7798 .6095 .4776 .3751 .2953 .2330 .1842 .1460 .1160 .0923 .0588 .0378 .0304 .0245 .0160 .0105 .0046 .0021 .0010 .6717 .4529 .3066 .2083 .1420 .0972 .0668 .0460 .0318 .0252 .0013 .0037 .0026 .0013 .0007 .0002 .0011 .6717 .4529 .3066 .2083 .1420 .0972 .0668 .0460 .0318 .0221 .0107 .0053 .0037 .0026 .0013 .0007 .0002 .0001 .5504 .3048 .1697 .0951 .0535 .0303 .0173 .0099 .0057 .0033 .0014 .0009 .0006 .0003 .0001 .5504 .3048 .1697 .0951 .0535 .0303 .0173 .0099 .0057 .0033 .0011 .0004 .0002 .0001	14						.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
8444 .7142 .6050 .5134 .4363 .3714 .3166 .2703 .2311 .1978 .1456 .1078 .0929 .0802 .0600 .0451 .0258 .0150 .0089 .0054 .8360 .70025674 .4936 .4155 .3503 .2959 .2502 .2120 .1799 .1300 .0946 .8088 .0691 .0508 .0376 .0208 .0118 .0068 .0033 .8277 .8864 .5703 .4746 .3957 .3305 .2765 .2317 .1945 .1635 .1161 .0829 .0703 .0596 .0431 .0313 .0168 .0092 .0051 .0228 .8195 .6730 .5537 .4564 .3769 .3118 .2584 .2145 .1784 .1486 .1037 .0728 .0611 .0514 .0365 .0261 .0135 .0072 .0039 .0021 .7798 .6095 .4776 .3751 .2953 .2330 .1842 .1460 .1160 .0923 .0588 .0378 .0304 .0245 .0160 .0105 .0046 .0021 .0010 .0005 .7419 .5521 .4120 .3083 .2314 .1741 .1314 .0994 .0754 .0573 .0334 .0196 .0151 .0116 .0070 .0042 .0016 .0006 .0002 .0001 .6717 .4529 .3066 .2083 .1420 .0972 .0668 .0460 .0318 .0221 .0107 .0053 .0037 .0026 .0013 .0007 .0002 .0001 .5504 .3048 .1697 .0951 .0535 .0303 .0173 .0099 .0057 .0033 .0011 .0004 .0002 .0001	15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397			0099
8444 7142 6050 5134 4363 3714 .3166 .2703 .2311 .1978 .1456 .1078 .0929 .0802 .0600 .0451 .0258 .0150 .0089 .0054 .8360 .7002 .0574 .4936 .4155 .3503 .2959 .2502 .2120 .1799 .1300 .0946 .0808 .0691 .0508 .0376 .0208 .0118 .0068 .0039 .8277 .6864 .5703 .4746 .3957 .3305 .2765 .2317 .1945 .1635 .1161 .0829 .0703 .0596 .0431 .0313 .0168 .0092 .0051 .0028 .8195 .6730 .5537 .4564 .3769 .3118 .2584 .2145 .1784 .1486 .1037 .0728 .0611 .0514 .0365 .0261 .0135 .0072 .0039 .0021 .7798 .6095 .4776 .3751 .2953 .2330 .1842 .1460 .1160 .0923 .0588 .0378 .0304 .0245 .0160 .0105 .0046 .0021 .0010 .0005 .7419 .5521 .4120 .3083 .2314 .1741 .1314 .0994 .0754 .0573 .0334 .0196 .0151 .0116 .0070 .0042 .0016 .0006 .0002 .6080 .3715 .2281 .1407 .0972 .0668 .0460 .0318 .0221 .0107 .0053 .0037 .0026 .0013 .0007 .0002 .0001 .5080 .3715 .2281 .1407 .0972 .0543 .0339 .0213 .0134 .0085 .0035 .0014 .0009 .0006 .0003 .0001 .5504 .3048 .1697 .0951 .0535 .0303 .0173 .0099 .0057 .0033 .0011 .0004 .0002 .0001	16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	0193	0118	0073
8860 . 7002674 . 4936415535032959250221201799130009460808069105080376020801180068003902776864570347463957330527652317194516351161082907030596043103130168009200510029819567305537456437693118258421451784148603707280611051403650261013500720039002177986955477637512953233018421460116009230588037803040245016000150046002100100057741955214120308323141741131409940754057303340196015101160070004200160006000200016717452930662083142009720668 . 046003180221010700530037002600130007000200015080371522811407087205430339021301340085003500140009000600030001	17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703												
8277	18	.8360	.7002	.5674	.4936	.4155	.3503										1				
8195 .6730 .5537 .4564 .3769 .3118 .2584 .2145 .1784 .1486 1037 .0728 .0611 .0514 .0365 .0261 .0135 .0072 .0039 .0021 .7798 .6095 .4776 .3751 .2953 .2330 .1842 .1460 .1160 .0923 .0588 .0378 .0304 .0245 .0160 .0105 .0046 .0021 .0010 .0005 .7419 .5521 .4120 .3083 .2314 .1741 .1314 .0994 .0754 .0573 .0334 .0196 .0151 .0116 .0070 .0042 .0016 .0006 .0002 .6717 .4529 .3066 .2083 .1420 .0972 .0668 .0460 .0318 .0221 .0107 .0053 .0037 .0026 .0013 .0007 .0002 .0001 .5080 .3715 .2281 .1407 .0872 .0543 .0339 .0213 .0134 .0085 .0035 .0014 .0009 .0006 .0003 .0001 .5504 .3048 .1697 .0951 .0535 .0303 .0173 .0099 .0057 .0033 .0011 .0004 .0002 .0001  PVIF $_{c1} = \sum_{l=1}^{n} \frac{1}{(l+r)^{l}} = \frac{1}{(l+r)^{l}} = \frac{1}{(l+r)^{l}}$	19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635										
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%	20	.8195	.6730	.5537	.4564	.3769	.3118	.2584									0261	0135	0072	0039	0021
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%	25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	1460	1160	0923	0588	0378	0304	0245	0160	0105	0046	0021	0010	0005
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%	30	.7419	.5521	.4120													0042	0016	0006	0000	0003
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%	40																0007	0003	0000	.0002	1000.
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%	50																0001	.0002	.0001		
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%	60															.0003	1000.				
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%										.0001	.0000	.0011	.0001	.0002	.0001						. ,
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%	The fac	tor is ze	ero to fo	ur decim	nal place	es															-x0
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%																					0
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%																				V	7,
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%											D .	1.0	n							20	
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%			P	resen	it Val	ue of	an A	nnuit	yot	1 Per	Pen	od to	rnPe	erious	5.				0	5	
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%								1											V.C	<b>)</b>	
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%							1-	L	_										1.1		
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%					,,,			(1+r)	Y'									1	1.		
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%			D	VIE	= 7	_ 1	_ =											11/2			
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%			P	AIL	t /=/	(1+	r)'	r										12			
2% 3% 4% 5% 6% 7% 8% 9% 10% 12% 14% 15% 15% 15% 15%					1-1	(11)	')								,		,				
	19/	201						1,51													
10% 20% 28%	1%	2%	3%	4%	. 5	%	6%	7%	8%	9%	10%	12%	6 14	1% 1	5%	16%	18%	20%	24%	28%	32%

<sup>\*</sup> The factor is zero to four decimal places

$$PVIF_{rt} = \sum_{i=1}^{n} \frac{1}{(1+r)^{i}} = \frac{1-\frac{1}{(1+r)^{i}}}{r}$$

rumber at																			
payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.8929	0.8772	0.8696	0.8621	0.8475	0.8333			
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355		1.6467	1.6257	1.6052	1.5656	William Co.	0.8065	0.7813	0.7576
3	2.9410	2,8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313		2.4018	2.3216	2.2832			1.5278	1.4568	1.3916	1.3315
4	3.9020	3.8077		3.6299		3.4651	3.3872	3.3121	3 2397	3 1699	3 0373	2 9137	20550	2 7002	2.1743	2.1065	1.9813	1.8684	1.7663
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6048	3 4331	3 3522	2.1302	2.6901	2.5887	2.4043	2.2410	2.0957
												0.4001	3.3322	3.2143	3.1212	2.9906	2.1454	2.5320	2.3452
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.1114	3.8887	3.7845	3.6847	2 4070	3.3255	2 2005		
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.5638		4.1604	4.0386	3.8115		3.0205	2.7594	2.5342
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349		4.6389	4.4873	4.3436			3.2423	2.9370	2.6775
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469		5.7590	and the second second	4.9464	4.7716	4.6065	4.0776	3.8372	3.4212	3.0758	2.7860
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6 1446	5.6502	5 2161	5.0100	4.0003	4.3030	4.0310	3.5655	3.1842	2.8681
											0.0002	3.2101	3.0100	4.0332	4.4941	4.1925	3.6819	3.2689	2.9304
. 11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	5 9377	5.4527	5.2337	F 0000					
12	11.2551	10.5753	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.1944	5.6603		5.0286	4.6560		3.7757	3.3351	2.9776
13	12.1337	11.3484	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.4235	5.8424	5.4206	5.1971		4.4392	3.8514		3.0133
14	13.0037	12.1062	11.2961	10.5631	9.8986	9.2950	8.7455		7.7862	7.3667	6.6282		5.5831	5.3423	4.9095	4.5327	3.9124	3.4272	3.0404
15	13.8651	12.8493	11.9379	11.1184	10.3797							6.0021	5.7245	5.4675	5.0081	4.6106	3.9616	3.4587	3.0609
							0.1070	0.0055	0.0007	1.0001	6.8109	6.1422	5.8474	5.5755	5.0916	4.6755	4.0013	3.4834	3.0764
16	14.7179	13.5777	12.5611	11.6523	10.8378	10 1059	9 4466	8 8514	8.3126	7 0227	C 0740	0.0054							
17	15.5623	14.2919	13,1661	12,1657	11.2741	10 4773	9.7632	9 1216	8.5436			6.2651		5.6685	5.1624		4.0333	3.5026	3.0882
18	16.3983	14,9920	13.7535	12.6593	11.6896	10 8276	10.0591	9.3710	8.7556		7.1196	6.3729	6.0472	5.7487	5.2223		4.0591	3.5177	3.0971
19	17.2260	15,6785	14.3238	13.1339	12.0853	11 1581	10.3356	9 6036	8.9501	8.2014		6.4674	6.1280	5.8178	5.2732		4.0799	3.5294	3.1039
20	18.0456	16.3514	14.8775	13.5903	12.4622	11 4699	10.5940	9.8181	0.9301	8.3649	7.3658	6.5504	6.1982	5.8775	5.3162		4.0967	3.5386	3.1090
							10.5540	3.0101	3.1203	8.3136	1.4694	6.6231	6.2593	5.9288	5.3527	4.8696	4.1103	3.5458	3 1129
25	22.0232	19.5235	17,4131	15,6221	14.0939	12 7834	11 6536	10 6749	0 0226	0.0770	7.0424								
30	25.8077	22.3965	19,6004	17.2920	15.3725	13 7648	12 4090	11 2570	10 2727	9.0770	7.8431		6.4641	6.0971	5.4669		4.1474	3.5640	3.1220
40	32.8347	27.3555	23,1148	19.7928	17.1591	15 0463	13 3317	11 9246	10.2/3/	9.4269	0.0552	7.0027	6.5660	6.1772	5.5168		4.1601	3.5693	3 1242
50	39.1961	31,4236	25.7298	21.4822	18.2559	15 7619	13.8007	12 2225	10.7574	0.0440			6.6418	6.2335	5.5482		4.1659	3.5712	3.1250
60	44.9550	34,7609	27.6756	22.6235	18.9293	16 1614	14 0392	12.2335	11.9617	9.9148	8.3045	7.1327	6.6605	6.2463	5.5541				3.1250
					. 5.5255	10.1014	14.0332	12.3766	11.0480	9.9672	8,3240	7.1401	6.6651	6.2402	5.5553	4.9999	4.1667	3.5714	3 1250