UNIVERSITI SAINS MALAYSIA

Kolej Teknologi Pulau

Peperiksaan Semester Kedua
Sidang Akademik 2007/2008
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Program Ijazah Luaran
Ijazah Sarjana Muda Pengurusan (Kepujian)

ATW261 - Prinsip Kewangan
[Principles of Finance]

Masa: 3 jam
[Duration: 3 hours]

Sila pastikan bahawa kertas peperiksaan ini mengandungi **SEBELAS** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.

*[Please check that this examination paper consists of **ELEVEN** pages of printed material before you begin the examination.]*

Arahan: Jawab **EMPAT (4)** soalan.

*[**Instructions:** Answer **FOUR (4)** questions.]*

Soalan 1/*Question 1*

(a) Pulangan atas ekuiti Koplas Packaging pada tahun lalu hanya sebanyak 3 peratus. Namun, pihak pengurusan telah membangunkan pelan operasi untuk memperbaiki keadaan. Pelan berkenaan memerlukan nisbah hutang sebanyak 60 peratus yang mengakibatkan caj faedah sebanyak RM3000 setahun. Pihak pengurusan meramalkan pendapatan sebelum faedah dan cukai sebanyak RM10,000 berdasarkan jualan sebanyak RM100,000. Adalah dijangkakan pusing ganti jumlah aset syarikat ialah sebanyak 2.0. Di dalam keadaan di atas, kadar cukai yang dikenakan ialah sebanyak 30 peratus. Sekiranya perubahan tersebut dilakukan;

Koplas Packaging's Return on Equity (ROE) last year was only 3 percent, but its management has developed a new operating plan designed to improved things. The new plan calls for a total debt ratio of 60 percent, which will result in interest charges of RM3000 per year. Management projects an earnings before interest and taxes (EBIT) of RM10, 000 on sales of RM100,000 and it expects to have a total assets turnover ratio of 2.0. Under these conditions, the average tax rate will be 30 percent. If the changes are made;

(i) Berapakah pulangan atas ekuti yang diperolehi oleh Koplas?

What return on equity will Koplas earn?

[8 markah/*marks*]

(ii) Berapakah pulangan atas aset?

What is the Return on Assets (ROA)?

[4 markah/*marks*]

(b) Untuk membantu rancangan persaraannya dalam tempoh genap 42 tahun, Ghazz menganggarkan bahawa dia perlu mengumpul sebanyak RM220,000 pada penghujung tempoh 42 tahun dari sekarang. Beliau merancang untuk menyimpan sejumlah wang dengan amaun yang sama pada setiap hujung tahun di dalam simpanan yang menawarkan kadar faedah 8 peratus setahun.

To supplement his planned retirement in exactly 42 years, Ghazz estimate that he needs to accumulate RM220, 000 by the end of 42 years from today. He plans to make equal, annual, end-of-year deposits into an account paying 8% annual interest.

(i) Berapakah amaun simpanan tahunan yang diperlukan untuk mengumpul sejumlah RM220,000 pada penghujung tempoh 42 tahun berkenaan.

How large must the annual deposits be to create the RM220, 000 fund by the end of 42 years?

[4 markah/*marks*]

(ii)   Sekiranya beliau mampu menyimpan sebanyak RM600 setahun, berapakah jumlah wang yang terkumpul pada penghujung tempoh 42 tahun berkenaan?

If he can afford to deposit only RM600 per year into the account, how much will he accumulates by the end of the 42 years?

[4 markah/*marks*]

(c)   Briefly explain how does financial decisions affect shareholders wealth.

Terangkan secara ringkas tentang bagaimana keputusan-keputusan kewangan mempengaruhi kekayaan pemegang saham.

[5 markah/*marks*]

Soalan 2/*Question 2*

(a)   Zairiene memiliki portfolio saham yang megandungi pelaburan seimbang di dalam aset bebas risiko dan dua saham berlainan. Sekiranya saham yang pertama mempunyai beta sebanyak 1.75 dan portfolio berkenaan mempunyai risiko yang sama dengan pasaran, berapakah beta untuk satu lagi saham dalam portfolio beliau.

Zairiene own a stock portfolio which equally invested in a risk-free asset and two stocks. If one of the stocks has a beta of 1.75 and the total portfolio is equally as risky as the market, what must the beta be for the other stock in her portfolio?

[6 markah/*marks*]

(b)   Anda memiliki potfolio yang terdiri dari saham-saham berikut:

You own a portfolio consisting of the following stocks:

Saham/ Stock	Peratus di dalam Portfolio/ *Percentage of Portfolio*	Beta	Pulangan Dijangka/ *Expected Return (%)*
1	15	1.25	12
2	20	1.05	11
3	35	0.75	9
4	30	1.60	14

Kadar bebas risiko ialah sebanyak 7.5 peratus manakala pulangan dijangka untuk potfolio pasaran ialah 11.5 peratus.

The risk free rate is 7.5 percent. Also, the expected return on the market portfolio is 11.5 percent.

(i)   Kira pulangan dijangka untuk portfolio anda.

Calculate the expected return of your portfolio.

[3 markah/*marks*]

(ii)   Kira beta untuk portfolio tersebut.

Calculate the portfolio beta

[3 markah/*marks*]

(iii)   Berdasarkan maklumat yang telah anda kira, lakar garis pasaran sekuriti. Lakarkan saham-saham di dalam portfolio anda di atas graf berkenaan.

Given the preceding information, plot the security market line. Plot the stocks from your portfolio on your graph.

[5 markah/*marks*]

(iv)   Berdasarkan lakaran di bahagian (iii), saham yang manakah memberikan keuntungan dan kerugian?

From your plot in part (iii), which stock appear to be your winners and which one to be losers?

[3 markah/*marks*]

(c)   Terangkan kenyataan berikut: "Pemegangan saham sebagai sebahagian dari portfolio umumnya kurang berisiko berbanding pemegangan saham secara individu".

Explain the following statement: "A stock held as part of a portfolio is generally less risky than the same stock held in isolation"

[5 markah/marks]

Soalan 3/*Question 3*

(a)   Kruz Krooz Bhd. menerbitkan saham keutamaan dengan menawarkan dividen tahunan sebanyak RM 8 yang dibayar secara berterusan.

Kruz Krooz Bhd. has issued preferred stock with RM 8 annual dividend that will be paid in perpetuity.

(i)   Sekiranya kadar diskaun ialah sebanyak 12 peratus, berapakah harga jualan saham berkenaan?

If the discount rate is 12 percent, at what price should the preferred sell?

[3 markah/*marks*]

(ii)   Berapakah harga jualan saham berkenaan setahun dari sekarang?

At what price should the stock sell 1 year from now?

[3 markah/*marks*]

(iii)   Berapakah kadar pulangan dijangka saham tersebut?

What is the expected rate of return of the stock?

[3 markah/marks]

(iv)   Andaikan kadar pulangan yang anda perlukan sebanyak 14 peratus, adakah anda patut membeli saham ini?

Assume that you have a required rate of return of 14 percent, should you purchase the stock?

[2 markah/*marks*]

(b)   Saham biasa McCracker Berhad menghasilkan dividen sebanyak RM1.20 sesaham pada tahun lepas Syarikat menjangkakan pertumbuhan pendapatan dan dividen berterusan pada kadar 5 peratus setahun.

McCracker Berhad common stock paid a dividend of RM1.20 per share last year. The company expects earnings and dividend growth at a rate of 5 percent per year for the foreseeable future.

(i)   Berapakah kadar pulangan yang diperlukan untuk membolehkan harga seunit saham ini menjadi RM28?

What required rate of return for this stock would result in a price per share of RM28?

[3 markah/*marks*]

(ii)   Sekiranya McCracker menjangka pendapatan dan dividen bertumbuh pada kadar 10 peratus setahun, apakah kadar pulangan yang diperlukan bagi membolehkan harga seunit saham menjadi RM28.

If McCracker expects both earnings and dividends to grow at an annual rate of 10 percent, what required rate of return would result in a price of RM28.

[3 markah/*marks*]

(iii)   Sekiranya peserta pasaran membuat tanggapan bahawa risiko firma akan meningkat dan menyebabkan kadar pulangan yang diperlukan meningkat kepada 20 peratus, berapakah nilai saham biasa berkenaan?

If the firm's risk as perceived by market participations suddenly increases, causing the required rate of return to rise to 20 percent, what will be the common stock value?

[3 markah/marks]

(c)   Bon bagi Air Express Corporation mempunyai nilai par RM1,000 dan membayar faedah 5 peratus setahun serta memiliki tempoh sehingga matang selama 12 tahun. Anda boleh membeli bon berkenaan pada harga RM915.

Air Express Corporation's RM1,000 bonds pay 5 percent interest annually and have 12 years until maturity. You can purchase the bond for RM915.

    (i)   Berapakah pulangan dijangka yang boleh anda perolehi dari bon ini?

    What return do you expect to earn on this bond?

[3 markah/marks]

    (ii)   Adakah anda akan membeli bon berkenaan sekiranya kadar pulangan yang anda perlukan ialah sebanyak 9 peratus?

    Should you purchase the bond if your required rate of return is 9 percent?

[2 markah/marks]

Soalan 4/*Question 4*

(a)   Kitchenware Shoppe sedang menimbang satu projek baru bagi melengkapi perniagaan sedia ada. Mesin yang diperlukan untuk projek tersebut berharga RM20 juta. Jabatan Pemasaran syarikat menjangkakan jualan dari projek berkenaan sebanyak RM1.2 juta setahun selama empat tahun dan projek tersebut berakhir selepas tempoh tersebut. Mesin itu akan disusutnilai sehingga sifar selama empat tahun iaitu jangka hayat penggunaan ekonomi nya dengan kaedah garis lurus. Kos barang dijual dan perbelanjaan operasi berkaitan dengan projek ini dianggar sebanyak 25 peratus dari jumlah jualan. Kitchenware juga perlu menambah segera modal kerja bersih sebanyak RM100,000. Tambahan modal kerja tersebut akan diperolehi semula sepenuhnya pada akhir tempoh projek. Cukai korporat yang dikenakan ialah sebanyak 35 peratus manakala kadar pulangan yang diperlukan oleh Kitchenware ialah sebanyak 14 peratus.

Kitchenware Shoppe is considering a new project that complements its existing business. The machine require for the project costs RM20 million. The marketing department predicts that sales related to the project will be RM1.2 million for the next four years, after which the market will cease to exist. The machine will be depreciated down to zero over its four-year economic life using the straight-line method. Costs of good sold and operating expenses related to the project are predicted to be 25 percent of sales. Kitchenware also needs to add net working capital of RM100,000 immediately. The additional working capital will be recovered in full at the end of the project's life. The corporate tax rate is 35 percent. The required rate of return for Kitchenware is 14 percent.

Adakah Kitchenware perlu meneruskan projek ini?

Should Kitchenware proceed with project?

[14 markah/*marks*]

(b)   Kos ekuiti untuk Air Roll Company ialah sebanyak 16 peratus, kos hutang sebelum cukai sebanyak 13 peratus manakala cukai korporat dikenakan pada kadar 40 peratus. Dengan menggunakan kunci kira-kira dibawah, kira kos modal purata berwajaran selepas cukai bagi Air Roll Company.

ASET (RM Ribu)		LIABILITI DAN EKUITI (RM Ribu)	
Tunai	RM120	Hutang Jangka Panjang	RM1152
Akaun Belum Bayar	240	Ekuiti	1728
Inventori	360		
Loji dan Mesin Bersih	2160		
Jumlah Aset	2880	Total Liabiliti dan Ekuiti	2880

The Air Roll Company's cost of equity is 16 percent. Its before tax cost of debt is 13 percent, and its tax rate is 40 percent. Using the following balance sheet, calculate Air Roll's after-tax weighted average cost of capital:

ASSETS (RM thousands)		LIABILITIES AND EQUITY (RM thousands)	
Cash	*RM120*	*Long-term debt*	*RM1152*
Accounts Receivable	*240*	*Equity*	*1728*
Inventories	*360*		
Net Plant and equipment	*2160*		
Total Assets	*2880*	*Total Liabilities and Euity*	*2880*

[6 markah/*marks*]

(c)   Apakah perbezaan di antara dividen saham dan pecahan saham? Sebagai pemilik saham, adakah anda berminat dengan perisytiharan syarikat untuk dividen saham 100 peratus atau pecahan saham dua untuk satu? Andaikan kedua-dua tindakan boleh dilaksanakan.

What is the difference between a stock dividend and stock split? As a stockholder, would your prefer to see your company declare a 100 percent stock dividend or a 2-for-1 split? Assume that either action is feasible.

[5 markah/*marks*]

Soalan 5/Question 5

(a) Railway Man Company sedang menimbang dua projek yang saling menyingkiri di mana kos dan aliran tunai ditunjukkan di dalam jadual di bawah:

Railway Man Company is considering two mutually exclusive projects whose costs and cash flows are shown in the following table:

Tahun/ *Year*	Projek Alpha *Project Alpha* (RM juta/ *RM thousands*)	Projek Beta *Project Beta* ((RM juta/ *RM thousands*)
0	(2500)	(2500)
1	2000	0
2	900	1800
3	100	1000
4	100	900

Kedua-dua projek mempunyai risiko yang setara dengan kadar pulangan yang diinginkan oleh syarikat sebanyak 14 peratus. Sebagai Ketua Pegawai Kewangan, anda dikehendaki mencadangkan projek yang perlu dipilih. Untuk menentukan pilihan yang sesuai, kira nilai kini bersih (NPV) dan kadar pulangan dalaman (IRR) kedua-dua projek.

The projects are equally risky and the company's required rate of return is 14 percent. As a Chief financial Officer, you must make a recommendation concerning which project should be purchased. To determine which is more appropriate, compute the Net present Value (NPV) and Internal Rate of Return (IRR) of the project.

[13 markah/marks]

(b) Penyata Pendapatan Lumber Creator untuk tahun 2007 adalah seperti berikut:

LUMBER CREATOR
PENYATA PENDAPATAN PADA TEMPOH BERAKHIR 31
DISEMBER, 2007 (RM RIBU)

Jualan	36,000
Kos Barang Dijual	(25,200)
Untung Kasar	10,800
Belanja Operasi Tetap	(6,480)
Pendapatan Sebelum Faedah dan Cukai	4,320
Faedah	(2,880)
Pendapatan Sebelum Cukai	1,440
Cukai (40%)	(576)
Pendapatan Bersih	864
Dividen (50%)	432

Lumber Creator's 2007 income statement is shown here:

LUMBER CREATOR
INCOME STATEMENT FOR DECEMBER 31, 2007
(RM THOUSANDS)

Sales	36,000
Cost of goods sold	(25,200)
Gross Profit	10,800
Fixed Operating Costs	(6,480)
Earnings before interest and taxes	4,320
Interest	(2,880)
Earnings Before Tax	1,440
Taxes (40%)	(576)
Net Income	864
Dividend (50%)	432

(i)   Kira tahap keumpilan operasi (DOL), tahap keumpilan kewangan (DFL) dan tahap keumpilan gabungan (DCL) untuk Lumber Creator.

Compute the degree of operating leverage (DOL), degree of financial leverage (DFL) and degree of combined leverage (DCL) for Lumber Creator.

[9 markah/*marks*]

(ii)   Tafsirkan maksud setiap nilai tahap keumpilan yang anda kira dalam bahagian (i).

Interpret the meaning of each of the numerical values you computed in part (i).

[3 markah/marks]

TABLE I

Future Value Interest Factor (FVIF) ($1 at i% for n years):

$$FVIF = (1 + i)^n; \quad FV_n = PV_0(FVIF_{i,n})$$

PERIOD n	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	24%	28%	32%	36%	40%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	1.140	1.150	1.160	1.170	1.180	1.190	1.200	1.240	1.280	1.320	1.360	1.400
2	1.020	1.040	1.061	1.082	1.102	1.124	1.145	1.166	1.188	1.210	1.232	1.254	1.277	1.300	1.322	1.346	1.369	1.392	1.416	1.440	1.538	1.638	1.742	1.850	1.960
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331	1.368	1.405	1.443	1.482	1.521	1.561	1.602	1.643	1.685	1.728	1.907	2.067	2.300	2.515	2.744
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464	1.518	1.574	1.630	1.689	1.749	1.811	1.874	1.939	2.005	2.074	2.364	2.684	3.036	3.421	3.842
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611	1.685	1.762	1.842	1.925	2.011	2.100	2.192	2.288	2.386	2.488	2.932	3.436	4.007	4.653	5.378
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772	1.870	1.974	2.082	2.195	2.313	2.436	2.565	2.700	2.840	2.986	3.635	4.398	5.290	6.328	7.530
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949	2.076	2.211	2.353	2.502	2.660	2.826	3.001	3.185	3.379	3.583	4.508	5.629	6.983	8.605	10.541
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144	2.305	2.476	2.658	2.853	3.059	3.278	3.511	3.759	4.021	4.300	5.590	7.206	9.217	11.703	14.758
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358	2.558	2.773	3.004	3.252	3.518	3.803	4.108	4.435	4.785	5.160	6.931	9.223	12.166	15.917	20.661
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594	2.839	3.106	3.395	3.707	4.046	4.411	4.807	5.234	5.695	6.192	8.594	11.806	16.060	21.647	28.925
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853	3.152	3.479	3.836	4.226	4.652	5.117	5.624	6.176	6.777	7.430	10.657	15.112	21.199	29.439	40.496
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138	3.498	3.896	4.335	4.818	5.350	5.936	6.580	7.288	8.064	8.916	13.215	19.343	27.983	40.037	56.694
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452	3.883	4.363	4.898	5.492	6.153	6.886	7.699	8.599	9.596	10.699	16.386	24.759	36.937	54.451	79.872
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797	4.310	4.887	5.535	6.261	7.076	7.988	9.007	10.147	11.420	12.839	20.319	31.691	48.757	74.053	111.120
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177	4.785	5.474	6.254	7.138	8.137	9.266	10.539	11.974	13.590	15.407	25.196	40.565	64.359	100.712	155.568
16	1.173	1.373	1.605	1.873	2.183	2.540	2.952	3.426	3.970	4.595	5.311	6.130	7.067	8.137	9.358	10.748	12.330	14.129	16.172	18.488	31.243	51.923	84.954	136.969	217.795
17	1.184	1.400	1.653	1.948	2.292	2.693	3.159	3.700	4.328	5.054	5.895	6.866	7.986	9.276	10.761	12.468	14.426	16.672	19.244	22.186	38.741	66.461	112.139	186.278	304.914
18	1.196	1.428	1.702	2.026	2.407	2.854	3.380	3.996	4.717	5.560	6.544	7.690	9.024	10.575	12.375	14.463	16.879	19.673	22.901	26.623	48.039	85.071	148.024	253.338	426.879
19	1.208	1.457	1.754	2.107	2.527	3.026	3.617	4.316	5.142	6.116	7.263	8.613	10.197	12.056	14.232	16.777	19.748	23.214	27.252	31.948	59.568	108.890	195.391	344.540	597.630
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.728	8.062	9.646	11.523	13.743	16.367	19.461	23.106	27.393	32.429	38.338	73.864	139.380	257.916	468.574	836.683
24	1.270	1.608	2.033	2.563	3.225	4.049	5.072	6.341	7.911	9.850	12.239	15.179	18.790	23.212	28.625	35.236	43.297	53.109	65.032	79.497	174.631	374.144	574.144	1,603.025	3,214.20
25	1.282	1.641	2.094	2.666	3.386	4.292	5.427	6.848	8.623	10.835	13.585	17.000	21.231	26.462	32.919	40.874	50.658	62.669	77.388	95.396	216.542	478.905	785.025	2,180.08	4,499.88
30	1.348	1.811	2.427	3.243	4.322	5.743	7.612	10.063	13.268	17.449	22.892	29.960	39.116	50.950	66.212	85.850	111.065	143.371	184.675	237.376	634.820	1,645.50	4,142.07	10,143.0	24,201.4
40	1.489	2.208	3.262	4.801	7.040	10.286	14.974	21.725	31.409	45.259	65.001	93.051	132.782	188.884	267.864	378.721	533.869	750.378	1,051.67	1,469.77	5,455.91	19,426.7	66,520.8	219,562	700,058
50	1.645	2.692	4.384	7.107	11.467	18.420	29.457	46.902	74.358	117.391	184.565	289.002	450.736	700.233	1,083.66	1,670.70	2,566.22	3,927.36	5,988.91	9,100.44	46,890.4	229,850	*	*	*
60	1.817	3.281	5.892	10.520	18.679	32.988	57.946	101.257	176.031	304.482	524.057	897.597	1,530.05	2,595.92	4,384.00	7,370.20	12,335.4	20,555.1	34,105.0	56,347.5	409,995	*	*	*	*

*These interest factors exceed 1,000,000.

TABLE II

Present Value Interest Factor (PVIF) ($1 at i% for n years);

$$PV_0 = FV_n(PVIF_{i,n}); \quad PVIF = \frac{1}{(1 + i)^n}$$

PERIOD n	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	24%	28%	32%	36%	40%
0	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	0.806	0.781	0.758	0.735	0.714
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	0.650	0.610	0.574	0.541	0.510
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	0.524	0.477	0.435	0.398	0.364
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	0.423	0.373	0.329	0.292	0.260
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	0.341	0.291	0.250	0.215	0.186
6	0.942	0.888	0.838	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	0.275	0.227	0.189	0.158	0.133
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	0.222	0.178	0.143	0.116	0.095
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	0.179	0.139	0.108	0.085	0.068
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	0.144	0.108	0.082	0.063	0.048
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	0.116	0.085	0.062	0.046	0.035
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	0.094	0.066	0.047	0.034	0.025
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	0.076	0.052	0.036	0.025	0.018
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	0.061	0.040	0.027	0.018	0.013
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	0.049	0.032	0.021	0.014	0.009
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	0.040	0.025	0.016	0.010	0.006
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054	0.032	0.019	0.012	0.007	0.005
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045	0.026	0.015	0.009	0.005	0.003
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038	0.021	0.012	0.007	0.004	0.002
19	0.828	0.686	0.570	0.475	0.396	0.331	0.276	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031	0.017	0.009	0.005	0.003	0.002
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026	0.014	0.007	0.004	0.002	0.001
24	0.788	0.622	0.492	0.390	0.310	0.247	0.197	0.158	0.126	0.102	0.082	0.066	0.053	0.043	0.035	0.028	0.023	0.019	0.015	0.013	0.006	0.003	0.001	0.001	0.000
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010	0.005	0.002	0.001	0.001	0.000
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057	0.044	0.033	0.026	0.020	0.015	0.012	0.009	0.007	0.005	0.004	0.002	0.001	0.000	0.000	0.000
40	0.672	0.453	0.307	0.208	0.142	0.097	0.067	0.046	0.032	0.022	0.015	0.011	0.008	0.005	0.004	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000
50	0.608	0.372	0.228	0.141	0.087	0.054	0.034	0.021	0.013	0.009	0.005	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	0.550	0.305	0.170	0.095	0.054	0.030	0.017	0.010	0.006	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

TABLE III

Future Value of an Annuity Interest Factor (FVIFA) ($1 per year at $i\%$ for n years);

$$FVIFA = \frac{(1+i)^n - 1}{i} \; ; \; FVAN_n = PMT(FVIFA_{i,n})$$

PERIOD, n	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	24%	28%	32%	36%	40%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.010	2.020	2.030	2.040	2.050	2.060	2.070	2.080	2.090	2.100	2.110	2.120	2.130	2.140	2.150	2.160	2.170	2.180	2.190	2.200	2.240	2.280	2.320	2.360	2.400
3	3.030	3.060	3.091	3.122	3.152	3.184	3.215	3.246	3.278	3.310	3.342	3.374	3.407	3.440	3.473	3.506	3.539	3.572	3.606	3.640	3.778	3.918	4.062	4.210	4.360
4	4.060	4.122	4.184	4.246	4.310	4.375	4.440	4.506	4.573	4.641	4.710	4.779	4.850	4.921	4.993	5.066	5.141	5.215	5.291	5.368	5.684	6.016	6.362	6.725	7.104
5	5.101	5.204	5.309	5.416	5.526	5.637	5.751	5.867	5.985	6.105	6.228	6.353	6.480	6.610	6.742	6.877	7.014	7.154	7.297	7.442	8.048	8.700	9.398	10.146	10.846
6	6.152	6.308	6.468	6.633	6.802	6.975	7.153	7.336	7.523	7.716	7.913	8.115	8.323	8.536	8.754	8.977	9.207	9.442	9.683	9.930	10.980	12.136	13.406	14.799	16.324
7	7.214	7.434	7.662	7.898	8.142	8.394	8.654	8.923	9.200	9.487	9.783	10.089	10.405	10.730	11.067	11.414	11.772	12.142	12.523	12.916	14.615	16.534	18.696	21.126	23.853
8	8.286	8.583	8.892	9.214	9.549	9.897	10.260	10.637	11.028	11.436	11.859	12.300	12.757	13.233	13.727	14.240	14.773	15.327	15.902	16.499	19.123	22.163	25.678	29.732	34.395
9	9.369	9.755	10.159	10.583	11.027	11.491	11.978	12.488	13.021	13.579	14.164	14.776	15.416	16.085	16.786	17.518	18.285	19.086	19.923	20.799	24.712	29.369	34.895	41.435	49.153
10	10.462	10.950	11.464	12.006	12.578	13.181	13.816	14.487	15.193	15.937	16.722	17.549	18.420	19.337	20.304	21.321	22.393	23.521	24.709	25.959	31.643	38.592	47.062	57.352	69.814
11	11.567	12.169	12.808	13.486	14.207	14.972	15.784	16.645	17.560	18.531	19.561	20.655	21.814	23.044	24.349	25.733	27.200	28.755	30.404	32.150	40.238	50.399	63.122	78.998	98.739
12	12.683	13.412	14.192	15.026	15.917	16.870	17.888	18.977	20.141	21.384	22.713	24.133	25.650	27.271	29.002	30.850	32.824	34.931	37.180	39.580	50.985	65.510	84.320	108.437	139.235
13	13.809	14.680	15.618	16.627	17.713	18.882	20.141	21.495	22.953	24.523	26.212	28.029	29.985	32.089	34.352	36.786	39.404	42.219	45.244	48.497	64.110	84.853	112.303	148.475	195.929
14	14.947	15.974	17.086	18.292	19.599	21.051	22.550	24.215	26.019	27.975	30.095	32.393	34.883	37.581	40.505	43.672	47.103	50.818	54.841	59.196	80.496	109.612	149.240	202.926	275.300
15	16.097	17.293	18.599	20.024	21.579	23.276	25.129	27.152	29.361	31.772	34.405	37.280	40.417	43.842	47.580	51.660	56.110	60.965	66.261	72.035	100.815	141.303	197.997	276.979	386.420
16	17.258	18.639	20.157	21.825	23.657	25.673	27.888	30.324	33.003	35.950	39.190	42.753	46.672	50.980	55.717	60.925	66.649	72.939	79.850	87.442	126.011	181.868	262.356	377.692	541.988
17	18.430	20.012	21.762	23.698	25.840	28.213	30.840	33.750	36.974	40.545	44.501	48.884	53.739	59.118	65.075	71.673	78.979	87.068	96.022	105.931	157.253	233.791	347.310	514.661	759.784
18	19.615	21.412	23.414	25.645	28.132	30.906	33.999	37.450	41.301	45.599	50.396	55.750	61.725	68.394	75.836	84.141	93.406	103.740	115.266	128.117	195.994	300.252	459.449	700.939	1,064.70
19	20.811	22.841	25.117	27.671	30.539	33.760	37.379	41.446	46.018	51.159	56.939	63.440	70.749	78.969	88.212	98.603	110.285	123.414	138.166	154.740	244.033	385.323	607.472	954.277	1,491.58
20	22.019	24.297	26.870	29.778	33.066	36.786	40.995	45.762	51.160	57.275	64.203	72.052	80.947	91.025	102.444	115.380	130.033	146.628	165.418	186.688	303.601	494.213	802.863	1,298.82	2,089.21
24	26.973	30.422	34.426	39.083	44.502	50.816	58.117	66.765	76.790	88.497	102.174	118.155	136.831	158.659	184.168	213.978	248.808	289.494	337.010	392.484	723.461	1,322.66	2,443.82	4,450.00	8,033.00
25	28.243	32.030	36.459	41.646	47.727	54.865	63.249	73.106	84.701	98.347	114.413	133.334	155.620	181.871	212.793	249.214	292.105	342.603	402.042	471.981	898.092	1,706.80	3,226.84	6,053.00	11,247.2
30	34.785	40.568	47.575	56.085	66.439	79.058	94.461	113.283	136.308	164.494	199.021	241.333	293.199	356.787	434.745	530.321	647.439	790.948	966.712	1,181.88	2,640.92	5,873.23	12,940.9	28,172.3	60,501.1
40	48.886	60.402	75.401	95.026	120.080	154.762	199.635	259.057	337.882	442.593	581.826	767.091	1,013.70	1,342.03	1,779.09	2,360.76	3,134.52	4,163.21	5,529.83	7,343.86	22,728.8	69,377.5	207,874	609,890	*
50	64.463	84.572	112.797	152.667	209.348	290.336	406.529	573.770	815.084	1,163.91	1,668.77	2,400.02	3,459.51	4,994.52	7,217.72	10,435.6	15,089.5	21,813.1	31,515.3	45,497.2	195,373	819,103	*	*	*
60	81.670	114.052	163.053	237.991	353.584	533.128	813.520	1,253.21	1,944.79	3,034.82	4,755.07	7,471.64	11,761.9	18,535.1	29,220.0	46,057.5	72,555.0	114,190	179,495	281,733	*	*	*	*	*

*These interest factors exceed 1,000,000

TABLE IV

Present Value of an Annuity Interest Factor (PVIFA) ($1 per year at $i\%$ for n years);

$$PVIFA = \frac{1 - \dfrac{1}{(1+i)^n}}{i} \; ; \; PVAN = PMT(PVIFA_{i,n})$$

PERIOD, n	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	24%	28%	32%	36%	40%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	0.806	0.781	0.758	0.735	0.714
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528	1.457	1.392	1.332	1.276	1.224
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106	1.981	1.868	1.766	1.674	1.589
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589	2.404	2.241	2.096	1.966	1.849
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991	2.745	2.532	2.345	2.181	2.035
6	5.795	5.601	5.417	5.242	5.076	4.917	4.766	4.623	4.486	4.355	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326	3.020	2.759	2.534	2.339	2.168
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605	3.242	2.937	2.678	2.455	2.263
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837	3.421	3.076	2.786	2.540	2.331
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031	3.566	3.184	2.868	2.603	2.379
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192	3.682	3.269	2.930	2.650	2.414
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327	3.776	3.335	2.978	2.683	2.438
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439	3.851	3.387	3.013	2.708	2.456
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533	3.912	3.427	3.040	2.727	2.469
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611	3.962	3.459	3.061	2.740	2.478
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675	4.001	3.483	3.076	2.750	2.484
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.312	7.824	7.379	6.974	6.604	6.265	5.954	5.669	5.405	5.162	4.938	4.730	4.033	3.503	3.088	2.758	2.489
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775	4.059	3.518	3.097	2.763	2.492
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812	4.080	3.529	3.104	2.767	2.494
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.844	4.097	3.539	3.109	2.770	2.496
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.128	8.514	7.963	7.469	7.025	6.623	6.259	5.929	5.628	5.353	5.101	4.870	4.110	3.546	3.113	2.772	2.497
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.707	8.985	8.348	7.784	7.283	6.835	6.434	6.073	5.746	5.451	5.182	4.937	4.143	3.562	3.121	2.776	2.499
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.823	9.077	8.422	7.843	7.330	6.873	6.464	6.097	5.766	5.467	5.195	4.948	4.147	3.564	3.122	2.776	2.499
30	25.808	22.397	19.600	17.292	15.373	13.765	12.409	11.258	10.274	9.427	8.694	8.055	7.496	7.003	6.566	6.177	5.829	5.517	5.235	4.979	4.160	3.569	3.124	2.778	2.500
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.779	8.951	8.244	7.634	7.105	6.642	6.233	5.871	5.548	5.258	4.997	4.166	3.571	3.125	2.778	2.500
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.915	9.042	8.304	7.675	7.133	6.661	6.246	5.880	5.554	5.262	4.999	4.167	3.571	3.125	2.778	2.500
60	44.955	34.761	27.676	22.623	18.929	16.161	14.039	12.377	11.048	9.967	9.074	8.324	7.687	7.140	6.665	6.249	5.882	5.555	5.263	5.000	4.167	3.571	3.125	2.778	2.500