THE OPEN UNIVERSITY OF SRI LANKA
COMMONWEALTH EXECUTIVE MASTER OF BUSINESS ADMINISTRATION / PUBLIC ADMINISTRATION PROGRAMME
FINAL EXAMIATION -2013/14
CORPORATE FINANCE – MCP2610
DURATION: THREE (03) HOURS

DATE: 16.08.2014	TIME: 1.30 pm – 4.30 pm

INSTRUCTIONS TO CANDIDATES;

1. **This question paper consists of eight (08) questions**
2. **Answer any five (05) questions only**
3. **All questions carry equal marks**
4. **Begin each answer on a separate page**
5. **Use of non programmable Calculators are allowed**
6. **Financial tables and formula sheet are attached at the end of the paper**

Question No.1

a. Explain how the profit maximization objective of a firm differs from that of wealth maximization. *(3 marks)*

b. Discuss the following key financial management decisions
   - Financing decisions
   - Investment decisions
   - Dividend policy decisions *(9 marks)*

c. With respect to the "Agency Theory", in the context of corporate setting, explain the following concepts.
   - Agency conflicts
   - Goal congruence *(8 marks)*

(Total 20 Marks)

Question No.2

a. Briefly explain as to why a rational investor prefers to receive Rs.100/- today rather than having the same tomorrow. *(2 marks)*

b. Explain, with suitable real life examples, what is meant by "*ordinary annuity*" and "*annuity due*" *(4 marks)*

c. Alpha PLC has decided to make a deposit Rs.10, 000,000/- surplus funds in a bank fixed deposit for a one year period. The bank nominal interest rate is 12%.

- What is the value of the deposit at the end of the year if the bank compounds interest monthly basis?
- What is the effective rate of interest that Alpha PLC earns for the deposit? *(4 marks)*

d. Beta PLC expects to redeem Rs.500mn worth of debentures after ten (10) years from now. In order to raise the cash required for this redemption, management of Beta PLC decided to make an equal annual cash saving in a bank account at the end of each year for ten years. Bank's constant rate of interest applicable to the deposit is 12% and the interest is compounded annually. Advice the management of Beta PLC how much they should deposit in the bank account annually. *(4 marks)*

e. You are the financial controller of Charley PLC. On behalf of your organization you are required to negotiate a bank loan of Rs.5,000,000/- from ABC Bank. As per the negotiation made with the credit officer of the bank some of the agreed terms of the loan are given below.
   - Loan is to be paid in five (5) equal annual installments.
   - Interest rate 15% (fixed)

   i. What is the value of the annual loan installment?
   ii. Prepare the loan repayment schedule for the period of five years.

(6 marks)
(Total 20 Marks)

Question No.3

a. List two (02) sources of finance available for a high levered company which is currently under financial distress. *(2 marks)*

b. State four (04) factors you should consider when selecting a source of finance *(4 marks)*

c. Galadari Hotel PLC has recently restructured its balance sheet (Statement of Financial Position) by converting its long term interest bearing debt capital to equity. Discuss how this decision would affect on the followings in the long run.
   - EPS
   - Share price *(4 marks)*
   -

d. Lucky Lanka Milk Processing Company Ltd. has recently made an IPO to raise Rs.300mn by way of issuing 38mn ordinary shares at Rs.6/- and 24mn ordinary nonvoting shares at Rs.3/-.

State the advantages of going for public issue and listing the shares in the Colombo Stock Exchange (CSE). *(4 marks)*

e. State the difference between **capital market** and **money market** and give two examples for instruments that are traded in each market. *(6 marks)*

(Total 20 Marks)

Question No.4

a. List the differences between the followings
   - Ordinary shares and preference shares
   - Right issue and bonus issue *(6 marks)*

b. The balance sheet (Statement of Financial Position) of Alpha PLC as at 31 March 2014 is given below.

Statement of financial position as at 31 March 2014 (LKR)

Equity and liabilities		**Assets**	
Stated capital (5000,000 shares)	50,000,000	Noncurrent assets	60,000,000
Reserves	25,000,000		
Current liabilities	5,000,000	Current assets	20,000,000
Equity and total liabilities	**80,000,000**	**Total assets**	**80,000,000**

On 1 April 2014 The management of Alpha PLC decided to make a right issue of 1 new ordinary share for every 2 existing shares at an issue price of Rs.12 per share. All shareholders subscribed for the shares on due date. You are required to calculate;

1. Amount of cash flow generated from the right issue
2. Book value per share soon after the right issue *(5 marks)*

c. The draft balance sheet (Statement of financial position) of Beta PLC as at 31 March 2014 is given below.

Statement of financial position as at 31 March 2014 (LKR)

Equity and liabilities		**Assets**	
Stated capital (1000,000 shares)	10,000,000	Noncurrent assets	85,000,000
Reserves	85,000,000		
Current liabilities	5,000,000	Current assets	15,000,000
Equity and total liabilities	**100,000,000**	**Total assets**	**100,000,000**

On 1 April 2014 directors of Beta PLC decided to make bonus issue of 2 new shares for every 5 existing shares. For the capitalization purpose a bonus share was valued at Rs.15.

Required

1. Redraft the balance sheet of Beta PLC soon after the bonus issue
2. Discuss the impact of a bonus issue on EPS and DPS in the short run

(5 marks)

d. Hayley's MGT Knitting Mills (MGT) made the following announcement regarding a right issue to the Colombo Stock Exchange.

Date of announcement:- 11 June 2014
Proportion:- Four (04) new ordinary shares for every eleven (11) existing ordinary shares held.
Issue price:- Rs.9.50

Assume the market price per share of MGT on the date of announcement was Rs.12.50

Required

1. Compute the theoretical ex-right price of a share of MGT.
2. State how an existing shareholder of MGT may respond to the right issue

(4 marks)

(Total 20 marks)

Question No.5

a. You are the head of finance of Alpha PLC. You are planning to mobilize 20% of your company's funds from government T-Bills to the share market. What are the factors you should consider when deciding to invest in the share market? *(4 marks)*

b. Briefly explain what is meant by an investment portfolio and advantages of investing in a portfolio rather than investing in a single asset. *(4 marks)*

c. Explain what is meant by "risk" in the context of corporate finance and discuss the difference between the **systematic risk** and **unsystematic risk.** *(6 marks)*

d. *"An investor may diversify the risk in full by maintaining a well diversified investment portfolio"* Do you agree with this statement? Discuss. *(4 marks)*

e. Explain briefly the relationship that exists between risk and return *(2 marks)*

(Total 20 marks)

Question No.6

a. Explain with a suitable example what is meant by capital structure of a firm. *(4 marks)*

b. Discuss the advantages and disadvantages of using debt capital over equity capital *(4 marks)*

c. The capital structure of Alpha PLC includes Debt capital and Equity capital only. Debt capital represents 40% of the capital structure. Interest rate payable on debt is 16%. Corporate tax rate is 30%. Cost of equity has been estimated at 24%. Compute Alpha's weighted average cost of capital (WACC) *(5 marks)*

d. Beta PLC has recently paid a Dividend Per Share (DPS) of Rs.4/- per share which is expected to grow at a constant rate of 5% for ever. Current market price per share of Beta PLC is Rs.40/-. Using the dividend growth model (Gordon's Modal) compute the cost of equity capital (K_e). *(3 marks)*

e. The capital structure of Charley PLC represents 80% equity and 20% debt capital. The after tax cost of debt capital is 15%. The government treasury bond rate is 12% (approximately a risk free rate) and the market risk premium is 8%. The beta value of Charley is 1.5.
    1. Compute the cost of equity (K_e) (using the Capital Assets Pricing Model (CAPM)
    2. The weighted average cost of capital (WACC) of Charley PLC

(4 marks)

(Total 20 marks)

Question No.7

a.) Lanka Guardian Ltd, an investment company, expects to buy shares of United Motors PLC (UML) and hold for a period of one year. It is expected that UML will pay a dividend per share of Rs. 12 for the next year. It is also expected that the market price per share of UML at the end of the year will be Rs.148/-. If Lanka Guardian's required rate of return is 15% estimate the value per share of UML. If the current share price of UML is Rs.130 give your recommendation. *(4 marks)*

b.) Lanka Guardian Ltd, expects to buy shares of Watawala Plantations PLC (WATA) and hold for a period of three years. It is expected that WATA

will pay a dividend per share of cents 60, cents 75 and Rs.1/- respectively for the next three years. Lanka Guardian expects to dispose the share at the end of the third year for Rs.22/-. If the required rate of return of Lanka Guardian is 15%, estimate the value per share of WATA. If shares of WATA currently traded in the market at Rs.13.80, give your recommendation to Lanka Guardian. ***(4 marks)***

c.) It is said *"when an investor acquires a share of a company he enjoys the all future dividends that are expected to generate in the company's life time"* Do you agree? Discuss. ***(2 marks)***

d.) Bravo PLC has recently paid a dividend per share of Rs.9/-. It is expected this dividend will be constant for the future years. If the investors' average expected rate of return is 15%, what is the price per share of Bravo PLC. ***(2 marks)***

e.) Charley PLC has reported an EPS of Rs.10/- for the prior period. Charley adopts a dividend payout policy of 80% of its earnings. Company's return on investment (ROI) is 25%. Investors' average expected rate of return is 15%.

a. What is the expected dividend growth rate of Charley PLC?
b. Estimate the value per share of Charley PLC using the dividend growth model ***(4 marks)***

f.) Delta PLC has recently paid a dividend per share of Rs.10. It is expected this dividend will grow at 10% for the next three years and afterwards at a constant rate of 5% forever. If the investors' average expected rate of return is 15% determine the value per share of Delta PLC. ***(4 marks)***

Question No.8

a. List four (04) non-financial factors to be considered when analyzing the feasibility of an investment project. ***(2 marks)***

b. Lanka Constructors Ltd. currently considers two alternative investment projects, Project A and Project B. Information relevant to the two projects are given below.

	Project A	**Project B**
Initial investment	Rs.500mn	Rs.500mn
Project life	5 years	5 years
Scrap value	Rs.100mn	Rs.200mn
Annual net cash flow		
Year 1	Rs.250mn	Rs.100mn
Year 2	Rs.150mn	Rs.100mn
Year 3	Rs.100mn	Rs.200mn
Year 4	Rs.100mn	Rs.200mn
Year 5	Rs.100mn	Rs.400mn

Required

1. Recommend the best project based on Payback Period and Accounting Rate of Return (ARR). ***(8 marks)***
   Note. *Compute the ARR based on Average investment*

c Lanka Builders PLC expects to undertake a new business a BOI project which entitles for five (05) years tax holiday. Initial investment of the project is Rs.500mn and it is expected that the scrap value of the business at the end of the project will be Rs.100mn. You are given the following additional information.

Year	1	2	3	4	5
Demand in units	50,000	60,000	80,000	80,000	60,000
Selling price per unit	Rs.7,000	Rs.7,000	Rs.8,000	Rs.8,000	Rs.8,000
Variable cost per unit	Rs.2,500	Rs.2,500	Rs.3,000	Rs.3,000	Rs.3,000

Working capital at the beginning of year 2 is 50mn
Project life 5 years
Annual fixed overhead cost (Excluding depreciation) 100mn
80% of the Working capital will be realized at the end of the project
Project cost of capital is 15%

You are required to calculate,

1. Project Net Cash flow ***(6 marks)***
2. Net Present Value ***(4 marks)***

(Total 20 Marks)

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Formulae Sheet

Present value of a single cash flow $= FV \times 1/(1+r)^n$

Future value $= PV \times (1+r)^n$

Future value if the interest is compounded several times per year

$$= PV \times (1+r/m)^{n \times m}$$

Present Value of an Annuity $= A \left[\frac{1-1/(1+r)^n}{r} \right]$

Future Value of an Annuity $= A \left[\frac{(1+r)^n - 1}{r} \right]$

Effective interest rate $= (1 + r/m)^m - 1$

r = interest rate, n = number of years, m = no. of interest compounding times per year

Cost of equity (*Ke*)

According to the dividend growth modal (Gordon's Model)

$$Ke = \frac{D_0(1+g)}{P0} + g$$

Where "P_0" current market price, "g" is the annual growth rate, D_0 is recently paid dividend

According to the CAPM

$$Ke = Rf + (Rm - Rf)\beta$$

Where R_f is the Risk free rate of return, R_m is the average market return and β is the asset beta

Dividend Valuation modals

Zero growth model - Value per share $= Do/Ke$

Dividend Growth model - Value per share $= Do(1+g)/Ke-g$

Growth rate : - Retention rate x ROI

Where "g" is the annual growth rate, "Ke" is the required rate of return of the investors, "*Do* "- is the recent dividend paid. ROI – Return On Investment.

Future value interest factor of $1 per period at i% for n periods, FVIF(i,n).																	
Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%
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
2	1.020	1.040	1.061	1.082	1.103	1.124	1.145	1.166	1.188	1.210	1.232	1.254	1.277	1.300	1.323	1.346	1.369
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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	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
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.727	8.062	9.646	11.523	13.743	16.367	19.461	23.106

Future value interest factor of an ordinary annuity of $1 per period at i% for n periods, FVIFA(i,n).

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%
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
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
3	3.030	3.060	3.091	3.122	3.153	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
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	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
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
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
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
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	17.519	18.285	19.086
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
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	23.045	24.349	25.733	27.200	28.755
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
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
14	14.947	15.974	17.086	18.292	19.599	21.015	22.550	24.215	26.019	27.975	30.095	32.393	34.883	37.581	40.505	43.672	47.103	50.818
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
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
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
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	103.74
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	110.28	123.41
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	102.44	115.38	130.03	146.63

Present value interest factor of $1 per period at i% for n periods, PVIF(i,n).

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%
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
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
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
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
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
6	0.942	0.888	0.837	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
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
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
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
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
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
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
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
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
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
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
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
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
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043
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
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
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
35	0.706	0.500	0.355	0.253	0.181	0.130	0.094	0.068	0.049	0.036	0.026	0.019	0.014	0.010	0.008	0.006	0.004	0.003
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
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	0.001	0.000	0.000

Present value interest factor of an (ordinary) annuity of $1 per period at i% for n periods, PVIFA(i,n).																
Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%
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
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
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
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
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
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	4.231	4.111	3.998	3.889	3.784	3.685	3.589
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
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
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
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
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
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
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
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
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
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824	7.379	6.974	6.604	6.265	5.954	5.668	5.405
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
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
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
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514	7.963	7.469	7.025	6.623	6.259	5.929	5.628
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
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.427	8.694	8.055	7.496	7.003	6.566	6.177	5.829
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.644	8.855	8.176	7.586	7.070	6.617	6.215	5.858
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
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