



**UNIVERSITI KUALA LUMPUR
BUSINESS SCHOOL**

**FINAL EXAMINATION
MARCH 2024 SEMESTER**

COURSE CODE : EIB11503
COURSE NAME : MANAGERIAL FINANCE
PROGRAMME NAME : BACHELOR OF BUSINESS ADMINISTRATION (HONS)
IN ISLAMIC FINANCE
DATE : 1 JULY 2024
TIME : 9.00 AM – 12.00 PM
DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please **CAREFULLY** read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of **FOUR (4)** questions.
4. Answer **ALL** question.
5. Please write your answers on the answer booklet provided.
6. All questions must be answered in **English** (any other language is not allowed).
7. Formulas and tables have been appended for your reference.
8. This question paper must not be removed from the examination hall.

THERE ARE FOURTEEN (14) PAGES OF QUESTIONS, INCLUDING THIS PAGE.

INSTRUCTION: Answer ALL questions.

Please use the answer booklet provided.

Question 1

Establish in 1990, Ajeez Dates is a well – known company as a leading importer and distributor of dried fruits and nuts, dates and other Middle East snacks and foods. In the year 2020, Ajeez Dates has been nominated as the Top Malaysian Brand Award. Mr Paa and Mr Muke are the owners of the business and planning to increase the sales by next year. Since the economy is getting better after the pandemic, Mr. Paa and Mr Muke are planning to introduce a new product to the market. With this new product, they forecast that the sales will increase to RM 2,500,000 by next year. Mr. Paa expects that the cost will be a fixed proportion of sales and the company will be running at full capacity. The interest payment is expected to increase as well since the central bank decided to increase variable financing rate. Business tax will remain the same at 40% for next year. They intend not to change the dividend payout ratio for the coming year. The company's Profit and Loss (P&L) statement and Statement of Financial Position (SOFP) are shown below.

Ajeez Dates	
Profit and Loss Statement for year ended 2023	
	RM ('000)
Sales	2,000
COGS	(1,800)
EBIT	200
Interest	(40)
EBT	160
Tax - 40%	(64)
Net Income	96
Dividends	64
Addition to Retain Earnings	32

Ajeez Dates			
Statement of Financial Position for year ended 2023			
ASSETS	RM	LIABILITIES	RM
Current Assets		Current Liabilities	
Cash	500	Account Payable	300
Account Receivable	300	Notes Payable	200
Inventories	900	Long - Term Debt	1,000
Total Current Asset	1,700	Total Liabilities	1,500
Fixed Asset		Stockholders' Equity	
Net Plant and Equipment	1,400	Common Stock	600
		Retained Earning	1,000
Total Asset	3,100	Total Liabilities and Equity	3,100

- (a) Before making any impulsive decision, Mr. Paa requires you to calculate the maximum growth rate and the expected sales as well that can be achieved without using any external financing. Can the expected sales be achieved with those rates? Advise your CFO regarding this matter.

(5 marks)

- (b) Mr Muke agrees with your recommendation and requests you to calculate the gap by preparing a pro forma statement and submit it at the next meeting. If the additional amount is more than RM 1 million, it will be brought to the board meeting for further discussion.

(20 marks)

- (c) The Board has decided not to raise the extra financing needed by using long-term debt or issuing common stock and they agreed to use notes payable instead to finance the extra fund. Mr Paa asked your opinion whether it is a good decision to make. Compute the new adjusted current ratio for Ajeez Dates and express your opinion on the changes in the company liquidity position.

(5 marks)

[TOTAL MARK: 30 MARKS]

Question 2

Deen Islamic Asset Management (DIAM) is an asset management company which offer innovative Shariah – compliance solutions to help diversify investment portfolio and achieve financial goals. You have just graduated and manage to get a position as a Junior Portfolio Executive, Equity. One of your tasks is to construct and manage investment portfolios consistent with the objectives of the clients.

Your first assignment is to handle a self-made entrepreneur Ms. Khatijah a 55-year-old woman and self – who running a security business, Pewaja Force. She wanted to invest RM 1 million with your bank and has instructed you to plan for a 1-year holding period. Further, your immediate supervisor has restricted you to the investment alternatives in the following table, shown with their probabilities and associated outcomes for three different financial stocks. SC, AM and MER. These three stocks are among the top gainers in the market. MDIB's forecasting staff has developed probability estimates for the state of economy; and its security analysis has developed a sophisticated computer program, which was used to estimate the rate of return on each alternative under each state of economy.

Table: Probability Distribution and Rate of Return.

State of Economy	Probability	Rate of Return		
		SC	AM	MER
Strong	0.3	0.8	0.2	– 0.2
Normal	0.4	0.14	0.15	0.16
Weak	0.3	– 0.60	– 0.05	– 0.4
Expected Return (ER)		11.60%	10.50%	12.40%
Standard Deviation (SD)		54.26%	10.36%	23.42%

Ms. Khatijah demands an investment that will reward her 10 percent return or more with a risk level below 10%. Based on the results above, all three showed a promising return but unfortunately, the risk level is quite high for Ms. Khatijah. Upon seeing the results, you plan to combine the stock to become a portfolio.

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- (a) Using all the information given, fulfill Ms. Khatijah demand by suggesting the appropriate combination of any **TWO (2)** stocks and defend your suggestion by preparing necessary calculation. Assuming Ms. Khatijah is willing to invest an equal percentage in both stocks.

(25 marks)

[TOTAL MARK: 25 MARKS]

Question 3

Since its establishment, Pewaja Securities (PS) has become one of the well – known companies in the security industry. Its biggest breakthrough was during the year 2020 when the company was chosen as the Most Trusted Security Company in its category. With the new era and new kind of threat in the securities industry, the demand for cybersecurity is increasing. Pewaja Securities Managing Director said in a statement during a press conference during RSA conferences, Pewaja Securities are looking forwards to getting involve in the industry and willing to spend its resources to give the best protection for its clients. The Research and Development (RnD) department estimated the initial investment for this new line of business is RM 1,000,000. Hearing this, you as the chief financial officer (CFO) intend to closely monitor the firm's cost of capital. There are main financing sources namely: long-term debt, preferred stock, and common stock. The target capital structure for PS is given by the weights in the following table.

Table: Source of Capital Weightage

Source of Capital	Weightage (%)
Long-Term Debt	30
Preferred Stock	20
Common Stock	50
TOTAL	100%

At the present time, PS can raise debt by selling 20 – year redeemable bonds with a RM 1,000 par value with a 4.5% annual coupon rate. Corporate tax rate is 40%, and the bond price is estimated to be sold at RM 850 with no flotation cost. Meanwhile PS's outstanding preferred stock pays a 9% annual dividend and has RM 100 per – share par value and is currently selling at RM 95. To track the cost of common stock, you use the capital asset pricing model (CAPM). The firm's investment advisors believe that the appropriate risk – free rate is 4% and the market expected return equals 13%. Using the data collected from the year 2021 through 2023, you estimate the firm's beta to be 1.3. You wish to get the current number of the weightage average cost of capital (WACC) of the firm.

- (a) Compute PS's current weightage average cost of capital (WACC)

(8 marks)

- (b) Based on your team analysis, they estimated the new project can generate at least RM 1,300,000 of net cash flow after a year. By using solely on the first-year analysis, the team try to investigate whether is it wise for them to proceed with the project on their own or hire a third-party vendor to develop the cybersecurity project.
- (5 marks)
- (c) During the board meeting, you propose the firm retire from using preferred stock as one source of finance and consider using debt financing where it will lead to a shift in the company capital structure long – term debt 50% and 50% common stock. If this happens, the beta is expected to increase by 0.2. Even though there are some increases in beta, you believe that it will lower the firm' WACC. Advise the board members by showing an appropriate calculation and advise the rest of the board members at least **TWO (2)** importance of WACC.

(12 marks)

[TOTAL MARK: 25 MARKS]

Question 4

The idea behind capital budgeting is to choose the most suitable project that meets your objective. Mr. Adam plans to help the small medium industries' entrepreneurs by investing some of his fortune in their business. For those who are interested in applying, they must send their business plan and must state the amount capital needed and forecasted cash flow for 5 years.

Since there are a lot of applications coming in, Mr. Adam decided to screen them accordingly so the business can serve his best interest. There are two stages of the screening process. For the company to get into the next stage, the company must be able to repay the capital within 3 years. In the second stage of screening, the company must be able to generate a positive and the highest NPV. Only one company will be chosen this year.

Below is the applications information and forecasted net cash flow from the entrepreneur who is interested in applying the financing with Mr. Adam. They managed to prepare 5 years forecasted net cash flow to be presented to Mr. Adam to be evaluate.

Company	Capital Required (RM)	Cash Flow (RM), Year				
		1	2	3	4	5
Cookies	35,000	8,000	10,000	12,000	15,000	17,000
Instant Mee	50,000	10,000	15,000	20,000	25,000	30,000
Hot Sauce	35,000	5,000	5,000	10,000	15,000	20,000
Pamelo	50,000	15,000	20,000	35,000	50,000	15,000
Chilli	55,000	10,000	10,000	10,000	10,000	10,000
Garlic Inc	40,000	5,000	15,000	25,000	5,000	15,000
Cheap Print	55,000	10,000	12,000	14,000	16,000	20,000

- (a) Based on the information above, screen out the company that may proceed to the next stage.

(10 marks)

- (b) In the final stages, Mr. Adam will choose a company that manages to meet his criteria. Mr. Adam states that he will choose a company that has a positive and a high Net Present Value (NPV). His required rate of return for any project that he wants to invest

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in is 7%. Show a detailed calculation of which company manages to get capital from Mr. Adam and conclude your finding.

(10 marks)

[TOTAL MARK: 20 MARKS]

END OF QUESTION PAPER

FORMULA

- Depreciation = [Cost - Salvage Value] / n
- DPR = (Dividend / Net Income) x 100
- $PV = PMT \times \frac{[1 - (\frac{1}{(1+r)^n})]}{r}$
- $FVA = PMT \left(\frac{(1+r)^n - 1}{r} \right)$
- $E(R) = \sum (P \times R)$
- $\sigma = \sqrt{\sum P (R - E(R))^2}$
- $COV_{a,b} = \sum [r_a - E(R)_a] [r_b - E(R)_b] (P)$
- $Corr_{a,b} = COV_{a,b} / (\sigma_a)(\sigma_b)$
- $E(R)_p = w_x E(R)_x + w_y E(R)_y$
- $Var(R_p) = (W_a \times SD_a)^2 + (W_b \times SD_b)^2 + 2(W_a W_b Corr_{a,b} SD_a SD_b)$
- $SD = \sqrt{VAR(R_p)}$
- WACC = Sum of ([w] x cost of capital)
- NPV = sum of PV – CF₀
- $K_i = YTM$
- $K_d = k_i(1 - \text{tax})$
- $K_{ps} = D / (MP - FC)$
- $K_{Re} = [D_1 / (MP)] + g$
- $K_{ncs} = [D_1 / (MP - FC)] + g$
- $Vc/s = \text{Dividend} / k$
- $Vc/s = D_1 / (k - g)$
- $Vc/s = [D_1 / (1+K)^n] + \dots + [D_n / \{ (k-g)(1+k) \}]$

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Table A-1 Future Value Interest Factors for One Dollar Compounded at k Percent for n Periods: $FVIF_{k,n} = (1 + k)^n$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	1.0100	1.0200	1.0300	1.0400	1.0500	1.0600	1.0700	1.0800	1.0900	1.1000	1.1100	1.1200	1.1300	1.1400	1.1500	1.1600	1.2000	1.2400	1.2500	1.3000
2	1.0201	1.0404	1.0609	1.0816	1.1025	1.1236	1.1449	1.1664	1.1881	1.2100	1.2321	1.2544	1.2769	1.2996	1.3225	1.3456	1.4400	1.5376	1.5625	1.6900
3	1.0303	1.0612	1.0927	1.1249	1.1576	1.1910	1.2250	1.2597	1.2950	1.3310	1.3676	1.4049	1.4429	1.4815	1.5209	1.5609	1.7280	1.9066	1.9531	2.1970
4	1.0406	1.0824	1.1255	1.1699	1.2155	1.2625	1.3108	1.3605	1.4116	1.4641	1.5181	1.5735	1.6306	1.6890	1.7490	1.8106	2.0736	2.3642	2.4414	2.8561
5	1.0510	1.1041	1.1593	1.2167	1.2763	1.3382	1.4026	1.4693	1.5386	1.6105	1.6851	1.7623	1.8424	1.9254	2.0114	2.1003	2.4883	2.9316	3.0518	3.7129
6	1.0615	1.1262	1.1941	1.2653	1.3401	1.4185	1.5007	1.5869	1.6771	1.7716	1.8704	1.9738	2.0820	2.1950	2.3131	2.4364	2.9860	3.6352	3.8147	4.8268
7	1.0721	1.1487	1.2299	1.3169	1.4071	1.5036	1.6058	1.7138	1.8280	1.9487	2.0762	2.2107	2.3526	2.5023	2.6600	2.8262	3.5832	4.5077	4.7684	6.2749
8	1.0829	1.1717	1.2668	1.3686	1.4775	1.5938	1.7182	1.8509	1.9926	2.1436	2.3045	2.4760	2.6584	2.8526	3.0590	3.2784	4.2998	5.5895	5.9605	8.1573
9	1.0937	1.1951	1.3048	1.4233	1.5513	1.6895	1.8385	1.9990	2.1719	2.3579	2.5580	2.7731	3.0040	3.2519	3.5179	3.8030	5.1598	6.9310	7.4506	10.604
10	1.1046	1.2190	1.3439	1.4802	1.6289	1.7908	1.9672	2.1589	2.3674	2.5937	2.8394	3.1058	3.3946	3.7072	4.0456	4.4114	6.1917	8.5944	9.3132	13.786
11	1.1157	1.2434	1.3842	1.5395	1.7103	1.8983	2.1049	2.3316	2.5804	2.8531	3.1518	3.4765	3.8359	4.2262	4.6524	5.1173	7.4301	10.657	11.642	17.922
12	1.1268	1.2682	1.4258	1.6010	1.7959	2.0122	2.2522	2.5182	2.8127	3.1384	3.4985	3.8960	4.3345	4.8179	5.3503	5.9360	8.9161	13.215	14.552	23.298
13	1.1381	1.2936	1.4685	1.6651	1.8856	2.1329	2.4098	2.7196	3.0658	3.4523	3.8833	4.3635	4.8980	5.4924	6.1528	6.8858	10.699	16.386	18.190	30.288
14	1.1495	1.3195	1.5126	1.7317	1.9799	2.2609	2.5785	2.9372	3.3417	3.7975	4.3104	4.8871	5.5348	6.2613	7.0757	7.9875	12.839	20.319	22.737	39.374
15	1.1610	1.3459	1.5580	1.8009	2.0789	2.3966	2.7590	3.1722	3.6425	4.1772	4.7846	5.4736	6.2543	7.1379	8.1371	9.2655	15.407	25.196	28.422	51.186
16	1.1726	1.3728	1.6047	1.8730	2.1829	2.5404	2.9522	3.4259	3.9703	4.5950	5.3109	6.1304	7.0673	8.1372	9.3576	10.748	18.488	31.243	35.527	66.542
17	1.1843	1.4002	1.6328	1.9479	2.2920	2.6928	3.1588	3.7000	4.3276	5.0545	5.8951	6.8660	7.9861	9.2765	10.761	12.468	22.186	38.741	44.409	86.504
18	1.1961	1.4282	1.7024	2.0258	2.4066	2.8543	3.3799	3.9960	4.7171	5.5599	6.5436	7.6900	9.0243	10.575	12.375	14.463	26.623	48.039	55.511	112.455
19	1.2081	1.4568	1.7635	2.1068	2.5270	3.0256	3.6165	4.3157	5.1417	6.1159	7.2633	8.6128	10.197	12.056	14.232	16.777	31.948	59.568	69.389	146.192
20	1.2202	1.4859	1.8061	2.1911	2.6533	3.2071	3.8697	4.6610	5.6044	6.7275	8.0623	9.6463	11.523	13.743	16.367	19.461	38.338	73.864	86.736	190.950
21	1.2324	1.5157	1.8603	2.2788	2.7860	3.3996	4.1406	5.0338	6.1088	7.4002	8.9492	10.804	13.021	15.668	18.822	22.574	46.005	91.592	108.420	247.065
22	1.2447	1.5460	1.9161	2.3699	2.9253	3.6035	4.4304	5.4365	6.6586	8.1403	9.9336	12.100	14.714	17.861	21.645	26.186	55.206	113.574	135.525	321.184
23	1.2572	1.5769	1.9736	2.4647	3.0715	3.8197	4.7405	5.8715	7.2579	8.9543	11.026	13.552	16.627	20.362	24.891	30.376	66.247	140.831	169.407	417.539
24	1.2697	1.6084	2.0328	2.5633	3.2251	4.0489	5.0724	6.3412	7.9111	9.8497	12.239	15.179	18.788	23.212	28.625	35.236	79.497	174.631	211.758	542.801
25	1.2824	1.6406	2.0938	2.6658	3.3864	4.2919	5.4274	6.8485	8.6231	10.835	13.585	17.000	21.231	26.462	32.919	40.874	95.396	216.542	264.698	705.641
30	1.3478	1.8114	2.4273	3.2434	4.3219	5.7435	7.6123	10.063	13.268	17.449	22.892	29.960	39.116	50.950	66.212	85.850	237.376	634.820	807.794	*
35	1.4166	1.9999	2.8139	3.9461	5.5160	7.6861	10.677	14.785	20.414	28.102	38.575	52.900	72.069	98.100	133.176	180.314	590.668	*	*	*
36	1.4308	2.0399	2.8983	4.1039	5.7918	8.1473	11.424	15.968	22.251	30.913	42.818	59.136	81.437	111.834	153.152	209.164	708.802	*	*	*
40	1.4889	2.2060	3.2620	4.8010	7.0400	10.286	14.974	21.725	31.409	45.259	65.001	93.051	132.782	188.884	267.864	378.721	*	*	*	*
50	1.6446	2.6916	4.3839	7.1067	11.467	18.420	29.457	46.902	74.358	117.391	184.565	289.002	450.736	700.233	*	*	*	*	*	*

Table A-2 Future Value Interest Factors for a One-Dollar Annuity Compounded at k Percent for n Periods: $FVIFA_{k,n} = [(1 + k)^n - 1] / k$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	1.0000	1.0200	1.0300	1.0400	1.0500	1.0600	1.0700	1.0800	1.0900	1.1000	1.1100	1.1200	1.1300	1.1400	1.1500	1.1600	1.2000	1.2400	1.2500	1.3000
2	2.0100	2.0400	2.0600	2.0800	2.0900	2.1000	2.1100	2.1200	2.1300	2.1400	2.1500	2.1600	2.1700	2.1800	2.1900	2.2000	2.2400	2.2800	2.2900	2.3400
3	3.0301	3.0604	3.0809	3.1016	3.1225	3.1436	3.1649	3.1864	3.2081	3.2299	3.2519	3.2740	3.2963	3.3188	3.3414	3.3642	3.4080	3.4528	3.4680	3.5280
4	4.0604	4.1216	4.1836	4.2465	4.3101	4.3746	4.4399	4.5061	4.5731	4.6410	4.7097	4.7793	4.8498	4.9211	4.9934	5.0665	5.1380	5.2100	5.2270	5.3000
5	5.1010	5.2040	5.3091	5.4163	5.5256	5.6371	5.7507	5.8666	5.9847	6.1051	6.2278	6.3528	6.4803	6.6101	6.7424	6.8771	7.0000	7.0750	7.1000	7.2000
6	6.1520	6.3081	6.4684	6.6330	6.8019	6.9753	7.1533	7.3359	7.5233	7.7156	7.9128	8.1152	8.3227	8.5355	8.7537	8.9775	9.1999	9.3200	9.3500	9.5000
7	7.2135	7.4343	7.6625	7.8983	8.1420	8.3938	8.6540	8.9228	9.2004	9.4872	9.7833	10.089	10.405	10.730	11.067	11.414	11.750	11.875	11.900	12.100
8	8.2957	8.5810	8.8723	9.1702	9.4759	9.7897	10.1119	10.4428	10.7825	11.1310	11.4883	11.8545	12.2297	12.6139	12.9971	13.3793	13.7500	13.875	13.900	14.100
9	9.3885	9.7246	10.0689	10.4216	10.7829	11.1529	11.5318	11.9197	12.3167	12.7228	13.1380	13.5623	13.9957	14.4381	14.8895	15.3499	15.7000	15.825	15.850	16.050
10	10.462	10.850	11.2464	11.6512	12.0646	12.4868	12.9179	13.3580	13.8081	14.2682	14.7383	15.2185	15.7087	16.2000	16.6923	17.1955	17.5000	17.625	17.650	17.850
11	11.567	12.000	12.4408	12.8909	13.3505	13.8197	14.2986	14.7874	15.2861	15.7948	16.3135	16.8423	17.3811	17.9200	18.4689	19.0279	19.2500	19.375	19.400	19.600
12	12.683	13.162	13.6512	14.1502	14.6592	15.1783	15.7074	16.2466	16.7959	17.3553	17.9248	18.5043	19.0938	19.6933	20.2928	20.9023	21.1000	21.225	21.250	21.450
13	13.808	14.330	14.8627	15.4062	15.9597	16.5233	17.0970	17.6808	18.2747	18.8787	19.4928	20.1169	20.7511	21.3953	22.0495	22.7137	22.8500	22.975	23.000	23.200
14	14.947	15.514	16.0927	16.6822	17.2819	17.8927	18.5146	19.1476	19.7917	20.4459	21.1102	21.7845	22.4687	23.1629	23.8671	24.5813	24.6500	24.775	24.800	25.000
15	16.097	16.709	17.3427	17.9882	18.6457	19.3152	19.9967	20.6892	21.3927	22.1072	22.8327	23.5692	24.3167	25.0751	25.8443	26.6245	26.5500	26.675	26.700	26.900
16	17.258	17.916	18.5957	19.2872	19.9902	20.7047	21.4307	22.1682	22.9172	23.6777	24.4497	25.2332	26.0283	26.8350	27.6533	28.4833	28.3000	28.425	28.450	28.650
17	18.430	19.134	19.8597	20.5972	21.3467	22.1082	22.8817	23.6672	24.4647	25.2742	26.0957	26.9292	27.7747	28.6322	29.5017	30.3832	30.1000	30.225	30.250	30.450
18	19.615	20.366	21.1327	21.9152	22.7142	23.5297	24.3617	25.2102	26.0752	26.9567	27.8537	28.7672	29.6972	30.6442	31.6072	32.5872	32.2000	32.325	32.350	32.550
19	20.811	21.610	22.4327	23.2812	24.1562	25.0477	25.9557	26.8802	27.8212	28.7787	29.7527	30.7432	31.7502	32.7732	33.8122	34.8672	34.3500	34.475	34.500	34.700
20	22.019	22.857	23.7157	24.6052	25.5262	26.4687	27.4327	28.4182	29.4252	30.4537	31.5042	32.5767	33.6712	34.7872	35.9242	37.0832	36.4000	36.525	36.550	36.750
21	23.239	24.116	25.0227	25.9672	26.9427	27.9392	28.9567	30.0052	31.0857	32.1982	33.3427	34.5192	35.7272	36.9662	38.2362	39.5382	38.6500	38.775	38.800	39.000
22	24.472	25.390	26.3327	27.3072	28.3127	29.3492	30.4167	31.5152	32.6457	33.8082	34.9927	36.2082	37.4542	38.7302	40.0372	41.3742	40.3000	40.425	40.450	40.650
23	25.716	26.674	27.6527	28.6672	29.7127	30.7892	31.8967	33.0352	34.2057	35.4082	36.6427	37.9082	39.2042	40.5302	41.8872	43.2742	42.1000	42.225	42.250	42.450
24	26.973	27.972	28.9827	30.0372	31.1272	32.2527	33.4142	34.6127	35.8482	37.1207	38.4302	39.7742	41.1502	42.5642	44.0122	45.4942	44.2000	44.325	44.350	44.550
25	28.243	29.282	30.3327	31.4272	32.5572	33.7227	34.9282	36.1742	37.4607	38.7882	40.1562	41.5642	43.0122	44.5002	46.0322	47.6042	46.2000	46.325	46.350	46.550
26	29.528	30.607	31.6827	32.8172	33.9827	35.1927	36.4482	37.7502	39.0982	40.4922	41.9322	43.4172	44.9472	46.5222	48.1442	49.8062	48.3000	48.425	48.450	48.650
27	30.830	31.950	33.0327	34.2672	35.4827	36.7427	38.0527	39.4122	40.8122	42.2522	43.7322	45.2522	46.8122	48.4122	50.0522	51.7322	50.1000	50.225	50.250	50.450
28	32.148	33.307	34.4827	35.7372	36.9927	38.3027	39.6622	41.0722	42.5222	44.0122	45.5422	47.1622	48.7722	50.4722	52.2622	54.0922	52.3000	52.425	52.450	52.650
29	33.483	34.682	35.8827	37.1872	38.4927	39.8527	41.2622	42.6722	44.1222	45.6722	47.2622	48.8922	50.5622	52.2722	54.0222	55.8122	53.9000	54.025	54.050	54.250
30	34.835	36.072	37.3227	38.6372	39.9927	41.4027	42.8122	44.2622	45.7622	47.3522	48.9822	50.6522	52.3622	54.1122	55.9022	57.7322	55.6000	55.725	55.750	55.950
31	36.205	37.482	38.7827	40.0872	41.4927	42.9027	44.3622	45.9122	47.5022	49.1322	50.8022	52.5122	54.2622	56.0522	57.8822	59.7522	57.4000	57.525	57.550	57.750
32	37.593	38.912	40.2327	41.5872	43.0027	44.4527	46.0022	47.6022	49.2422	50.9222	52.6422	54.4022	56.2022	58.0422	59.9222	61.8422	59.3000	59.425	59.450	59.650
33	39.000	40.362	41.7527	43.1372	44.5927	46.1927	47.7922	49.4422	51.1322	52.8622	54.6322	56.4422	58.2922	60.1822	62.1122	64.0822	61.4000	61.525	61.550	61.750
34	40.425	41.832	43.2727	44.7172	46.2027	47.9127	49.5622	51.2622	52.9922	54.7622	56.5722	58.4222	60.3122	62.2422	64.2122	66.2222	63.5000	63.625	63.650	63.850
35	41.868	43.312	44.8127	46.2872	47.8327	49.6427	51.3522	53.1022	54.8922	56.7222	58.5922	60.5022	62.4522	64.4422	66.4722	68.5422	65.7000	65.825	65.850	66.050
36	43.330	44.842	46.3827	47.8972	49.5427	51.3827	53.1722	55.0122	56.8922	58.8122	60.7722	62.7722	64.8122	66.8922	69.0122	71.1722	68.0000	68.125	68.150	68.350
37	44.810	46.362	47.9427	49.5072	51.2927	53.1827	55.0322	56.9322	58.8722	60.8522	62.8722	64.9322	67.0322	69.1722	71.3522	73.5722	70.2000	70.325	70.350	70.550
38	46.310	47.862	49.4527	51.0972	52.9227	54.8527	56.8322	58.8622	60.9322	63.0422	65.1922	67.3822	69.6122	71.8822	74.1922	76.5422	73.0000	73.125	73.150	73.350
39	47.830	49.412	51.0027	52.6472	54.5127	56.5027	58.5422	60.6322	62.7622	64.9322	67.1422	69.3922	71.6822	74.0122	76.3822	78.7922	75.0000	75.125	75.150	75.350
40	49.370	51.002	52.6027	54.2372	56.2427	58.3027	60.4122	62.5622	64.7522	66.9822	69.2522	71.5622	73.9122	76.3022	78.7322	81.2022	77.0000	77.125	77.150	77.350
41	50.930	52.552	54.1927	55.8472	57.9027	60.0127	62.1722	64.3722	66.6122	68.8922	71.2122	73.5722	75.9722	78.4122	80.8922	83.4122	78.5000	78.625	78.650	78.850
42	52.510	54.142	55.7827	57.4872	59.5927	61.7527	63.9622	66.2122	68.5022	70.8322	73.2022	75.6122	78.0622	80.5522	83.0822	85.6522	80.0000	80.125	80.150	80.350
43	54.110	55.762	57.4027	59.1072	61.2627	63.4727	65.7322	68.0322	70.3722	72.7522	75.1722	77.6322	80.1322	82.6722	85.2522	87.8722	82.0000	82.125	82.150	82.350
44	55.730	57.442	59.1227	60.8472	63.0527	65.3127	67.6222	69.9722	72.3622	74.7922	77.2622	79.7722	82.3222	84.9122	87.5422	90.2122	84.0000	84.125	84.150	84.350
45	57.370	59.082	60.8427	62.6272	64.8627	67.1527	69.4922	71.8822	74.3122	76.7822	79.2922	81.8422	84.4322	87.0622	89.7322	92.4422	85.5000	85.625	85.650	85.850
46	59.030	60.782	62.5927	64.4272	66.7227	69.0727	71.4622	73.9022	76.3822	78.9022	81.4522	84.0422	86.6722	89.3422	92.0522	94.8022	87.0000	87.125	87.150	87.350
47	60.710	62.442	64.2327	66.0472	68.4127	70.8227	73.2722	75.7622	78.2922	80.8622	83.4722	86.1222	88.8122	91.5422	94.3122	97.1222	88.5000	88.625	88.650	88.850
48	62.410	64.182	65.9027	67.6872	70.1027	72.5527	75.0422	77.5722	80.1422	82.7522	85.4022	88.0922	90.8222	93.5922	96.4022	99.2522	89.5000	89.625	89.650	89.850
49	64.130	65.942	67.7027	69.5272	72.0027	74.4927	77.0222	79.5922	82.2022	84.8522	87.5422	90.2722	93.0422	95.8522	98.7022	101.5922	90.5000	90.625	90.650	90.850
50	65.870	67.682	69.5227	71.3872	73.9327															

Table A.3 Present Value Interest Factors for One Dollar Discounted at k Percent for n Periods: $PVIF_{k,n} = 1 / (1 + k)^n$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7592
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944	0.6504	0.6400	0.5917
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787	0.5245	0.5120	0.4552
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823	0.4230	0.4096	0.3501
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019	0.3411	0.3277	0.2693
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104	0.3349	0.2751	0.2621	0.2072
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538	0.2791	0.2218	0.2097	0.1594
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050	0.2326	0.1789	0.1678	0.1226
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630	0.1938	0.1443	0.1342	0.0943
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2687	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
11	0.8963	0.8043	0.7224	0.6496	0.5817	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954	0.1346	0.0938	0.0859	0.0558
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3185	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685	0.1122	0.0757	0.0687	0.0429
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821	0.1635	0.1462	0.0935	0.0610	0.0550	0.0330
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252	0.0779	0.0492	0.0440	0.0254
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401	0.1229	0.1079	0.0649	0.0397	0.0352	0.0195
16	0.8528	0.7284	0.6232	0.5339	0.4591	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229	0.1069	0.0930	0.0541	0.0320	0.0281	0.0150
17	0.8444	0.7142	0.6050	0.5124	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078	0.0929	0.0802	0.0451	0.0258	0.0225	0.0116
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0945	0.0808	0.0691	0.0376	0.0208	0.0180	0.0089
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1377	0.1161	0.0981	0.0829	0.0703	0.0596	0.0313	0.0168	0.0144	0.0068
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3116	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728	0.0611	0.0514	0.0261	0.0135	0.0115	0.0053
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638	0.0531	0.0443	0.0217	0.0109	0.0092	0.0040
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0680	0.0560	0.0462	0.0382	0.0181	0.0088	0.0074	0.0031
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491	0.0402	0.0329	0.0151	0.0071	0.0059	0.0024
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015	0.0817	0.0659	0.0532	0.0431	0.0349	0.0284	0.0126	0.0057	0.0047	0.0018
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378	0.0304	0.0245	0.0105	0.0046	0.0038	0.0014
30	0.7419	0.5521	0.4129	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0256	0.0196	0.0151	0.0116	0.0042	0.0016	0.0012	*
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0139	0.0102	0.0075	0.0055	0.0017	0.0005	*	*
36	0.6989	0.4902	0.3450	0.2437	0.1727	0.1227	0.0875	0.0626	0.0449	0.0323	0.0234	0.0169	0.0123	0.0089	0.0065	0.0048	0.0014	*	*	*
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0658	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053	0.0037	0.0026	0.0007	*	*	*
50	0.6080	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085	0.0054	0.0035	0.0022	0.0014	0.0009	0.0006	*	*	*	*

Table A-4 Present Value Interest Factors for a One-Dollar Annuity Discounted at k Percent for n Periods: $PVIFA = [1 - 1/(1 + k)^n] / k$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7652
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6684	1.6467	1.6257	1.6052	1.5278	1.4588	1.4400	1.3609
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.1065	1.9813	1.9520	1.8161
4	3.9020	3.8077	3.7171	3.6289	3.5460	3.4651	3.3872	3.3121	3.2397	3.1698	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.5887	2.4043	2.3616	2.1662
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	2.9906	2.7454	2.6893	2.4356
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.3255	3.0205	2.9514	2.6427
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.6046	3.2423	3.1611	2.8021
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	3.8372	3.4212	3.3289	2.9247
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.0310	3.5655	3.4631	3.0190
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.8892	5.6502	5.4262	5.2161	5.0188	4.8332	4.1925	3.6819	3.5705	3.0915
11	10.368	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.3271	3.7757	3.6564	3.1473
12	11.255	10.575	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4206	5.1971	4.4392	3.8514	3.7251	3.1903
13	12.134	11.348	10.635	9.9656	9.3336	8.7527	8.2577	7.8038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	4.5327	3.9124	3.7801	3.2233
14	13.004	12.106	11.296	10.563	9.8966	9.2950	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6106	3.9516	3.8241	3.2487
15	13.865	12.849	11.938	11.118	10.380	9.7122	9.1079	8.5985	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	4.6755	4.0013	3.8593	3.2692
16	14.718	13.578	12.561	11.652	10.838	10.106	9.4466	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	4.7296	4.0333	3.8874	3.2832
17	15.562	14.292	13.166	12.168	11.274	10.477	9.7632	9.1216	8.5436	8.0216	7.5488	7.1196	6.7281	6.3729	6.0472	5.7487	4.7745	4.0591	3.9099	3.2948
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	4.8122	4.0799	3.9279	3.3037
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	4.8435	4.0967	3.9424	3.3105
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.8181	9.1285	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	4.8696	4.1103	3.9539	3.3158
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	4.8913	4.1212	3.9631	3.3198
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.4424	8.7715	8.1757	7.6446	7.1695	6.7429	6.3587	6.0113	4.9094	4.1300	3.9705	3.3230
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.5802	8.8832	8.2664	7.7184	7.2297	6.7921	6.3988	6.0442	4.9245	4.1371	3.9764	3.3254
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	4.9371	4.1428	3.9811	3.3272
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.8226	9.0770	8.4217	7.8431	7.3300	6.8729	6.4641	6.0971	4.9476	4.1474	3.9849	3.3286
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.4269	8.6938	8.0552	7.4957	7.0027	6.5660	6.1772	4.9789	4.1601	3.9950	3.3321
35	29.409	24.999	21.487	18.565	16.374	14.496	12.948	11.655	10.567	9.6442	8.8552	8.1755	7.5856	7.0700	6.6165	6.2153	4.9915	4.1644	3.9984	3.3330
36	30.108	25.489	21.832	18.908	16.547	14.621	13.035	11.717	10.612	9.6765	8.8786	8.1924	7.5979	7.0790	6.6231	6.2201	4.9929	4.1649	3.9987	3.3331
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.928	10.757	9.7791	8.9511	8.2438	7.6344	7.1050	6.6418	6.2335	4.9966	4.1659	3.9995	3.3332
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.952	9.9148	9.0417	8.3045	7.6762	7.1327	6.6605	6.2463	4.9995	4.1666	3.9999	3.3333