UNIVERSITI KUALA LUMPUR
BUSINESS SCHOOL

FINAL EXAMINATION
JULY 2025 SEMESTER

COURSE CODE	**: EBP00404**
COURSE NAME	**: INTRODUCTION TO FINANCE**
PROGRAMME NAME	**: FOUNDATION IN BUSINESS**
DATE	**: 16 DECEMBER 2025**
TIME	**: 09.00AM – 12.00PM**
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 **TWO (2) Sections; Section A and Section B**.
4. Answer **ALL** questions in **Section A and Section B**.
5. Please write your answers on the OMR answer sheet and the answer booklet provided.
6. All questions must be answered in **English** (any other language is not allowed).
7. The present value tables, future value tables and formula sheet is provided in the appendix
8. **This question paper must not be removed from the examination hall.**

THERE ARE TWELVE (12) PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer ALL questions.
Please use the objective answer sheet provided.

1. John Maynard Keynes divided businesses' demand for cash into there (3) segments which is
   A. Risk, investment and liquidity
   B. Transaction, speculative and precautionary
   C. Transaction, liquidity and speculative
   D. Transaction, speculative and risky

2. Top Builders, a construction company holding cash to anticipate a significant reduction in the price of steels is an example of the _____ motive for holding cash
   A. Transaction
   B. Speculative
   C. Hedging
   D. None of the above

3. Certificate of Deposits can be defined as
   A. A negotiable certificate of deposit.
   B. A corporate controlled disbursement account
   C. A commercial demand deposit
   D. A certified disbursement.

4. Banker's Acceptances are defined as
   A. Not "issued" in specialized denominations.
   B. Fully taxable at the federal, state and local levels
   C. Are sold on a discount basis and payable to the bearer
   D. All of the above

5. As financial manager, you are concerned with
   A. Striking a balance between holding too much and too little cash
   B. Maintaining high levels of profitability
   C. Minimizing the risk of insolvency
   D. All of the above

6. A trade credit discount such as 7/15 net 45 can be read as
   A. a 7% penalty is due after 45 days
   B. a 15% discount for cash on delivery and a 7% discount for payment within 45 days
   C. a 7% discount for payment within 45 days and a 15% penalty if payment is made after 45 days.
   D. a 7% discount if payment is made within 15 days, otherwise the total amount is due in 45 days.

7. Determine the effective annualized cost of foregoing the trade discount on terms 8/15 net 60
   A. 69.6%
   B. 66.9%
   C. 26.3%
   D. 20.6%

8. Which of the following is the motive that prompts a company with an unpredictable cash flow to hold a larger minimum cash balance because of things that might happen due to this uncertainty?
   A. Transaction
   B. Precautionary
   C. Speculative
   D. Common sense

9. What will happen if a business currently offers the credit terms of 1/10 net 30 and intends to change the existing terms to 3/10 net 30,
   A. Increase in bank loan
   B. An increase in accounts receivable turnover
   C. Anticipating a downturn in the economy
   D. Taking advantage of an anticipated decline in the price of raw materials.

10. Which of the following is generally under the control of the financial manager?
   A. The percentage of credit sales to total sales
   B. The actual level of sales.
   C. The credit policies
   D. The level of productions.

11. Which of the following are short term, unsecured notes issued by large corporations?
    A. Negotiable certificates of deposit
    B. Repurchase agreements
    C. Money market mutual funds
    D. Commercial paper

12. Which of the following is **FALSE** regarding usage of short term debt?
    A. It must be rolled over more often than long term debt.
    B. There is uncertainty connected with interest cost on short term debt from year to year
    C. The firm is subject to greater liquidity risk when using short term credit
    D. Interest rates are usually higher on short term debt

13. The extend to which inventory financing may be used depends on the
    A. Perishability of the goods
    B. Marketability of pledged goods
    C. Price stability of the goods
    D. All of the above

14. Short term creditors would be the most interested in the
    A. Quick ratio
    B. Times interest earned
    C. Current ratio
    D. Debt ratio

15. Berry Cakes is offered trade credit terms of 3/15 net 45. Unfortunately, the business decided not to take the discount offered and pays after 67 days of the invoice date. Calculate the annual cost of not taking the discount
    A. 23.48%
    B. 21.41%
    C. 22.95%
    D. 37.11%

16. An inventory loan arrangement in which the collateral of the agreement is all the borrower's inventories termed as
    A. Floating lien agreement
    B. Filed warehouse-financing agreement
    C. Terminal warehouse agreement
    D. Chattel mortgage agreement

17. The determinant factor on the cost of bank financing is
    A. Discount rate.
    B. Nominal rate
    C. Effective rate
    D. Prime rate

18. As the period on a commercial bank loan outstanding is increased, considering other things being equal, would mean,
    A. An increase in the effective interest rate
    B. An increase in the principal amount borrowed
    C. A reduction in the effective interest rate
    D. None of the above

19. The main advantage of the trade credit is
    A. The amount of credit extended expands and contracts with the needs of the business
    B. Trade credit is conveniently obtained as a normal part of operations
    C. Nor formal agreements are generally involved in extending credit
    D. All of the above

20. The most important characteristic of using the inventories as collateral is its
    A. Security
    B. Marketability
    C. Perishability
    D. Speciality

21. Consider other factors are constant, the future value of an investment will increase if
    A. The investment has more risk
    B. The investment is compounded at a short period
    C. The investment is compounded at a higher interest rate
    D. None of the above

22. When will the cash flow of an ordinary annuity occurs?
    A. At the beginning of each period
    B. At the end of each period
    C. At the middle of each period
    D. At the beginning and the middle of each period

23. A perpetuity is an annuity with
    A. A life of more than 50 years
    B. A life of less than 50 years
    C. An infinite life
    D. A finite life

24. Which of the following statements is true assuming that money has a time value?
    A. An annuity will always have a greater present value than the present value of a perpetuity that has periodic payments of the same amount as the annuity
    B. The present value of a single sum will always be greater than its future value.
    C. An annuity due will always have a greater future value than an ordinary annuity.
    D. All of the above statements are true.

25. Which of the following statements best describes the concept of the time value of money?
    A. Money has the same value regardless of when it is received.
    B. Money received in the future is worth more than money received today.
    C. Money received today is worth more than money received in the future due to its potential earning capacity.
    D. Money loses its value over time due to inflation.

26. An annuity can best be defined as
    A. A series of payments for a specified period of time
    B. Any series of payments
    C. A series of equal payments for a specified number of years
    D. A series of equal payments occurring at equal intervals for a specified number of periods

27. Choose the statement that best describes annual compounding
    A. Interest is added to the principal four times a year.
    B. Interest is added to the principal monthly.
    C. Interest is added to the principal once a year.
    D. Interest is added to the principal twice a year.

28. What happens to the present value of the future cash flows when the discount rate increases without limit
    A. Gets larger without limit
    B. Stays unchanged
    C. Approaches zero
    D. Gets smaller without limit, that is approaches minus infinity

29. When an ordinary annuity is identical to an annuity due, the future value is
    A. greater
    B. less
    C. twice the amount
    D. half the amount

30. Calculate the present value of a RM600 payment expected to receive in 3 years if the interest rate is 12% compounded annually
    A. RM555
    B. RM498
    C. RM427
    D. RM526

31. The cash flows resulting from the termination of a project at the end of its life is called
    A. initial outlay
    B. the salvage value
    C. recovered net working capital
    D. the terminal value

32. Which are these processes being not involves in capital budgeting
    A. Generating long-term investment proposals, which are consistent with firm's long-term objectives.
    B. Estimating the relevant after-tax incremental cash flows for these projects proposals.
    C. Evaluating these cash flows.
    D. Reevaluating cash budgets

33. The cash flows resulting from the termination of a project at the end of its life is called
    A. Initial Outlay
    B. The salvage value
    C. Recovered net working capital
    D. The terminal value

34. Which of the following should be included in an analysis of a new project?
    A. Interest cost
    B. Sunk cost
    C. An increase in sales of existing products that would be gained if customers were expected to purchase a new related product
    D. none of the above

35. Capital budgeting consists of the items below, except
    A. Index
    B. Initial outlay
    C. Differential cash flow
    D. Terminal cash flow

36. Which of the following are NOT discounted cash flow methods:
    A. Internal rate of return
    B. Discounted payback period
    C. Loss index
    D. Modified internal rate of return

37. By accepting a project that gives a positive net present value, it represents
    A. Firm's value and shareholders' wealth are increasing.
    B. Firm's value and shareholders' wealth are decreasing.
    C. Firm's value and shareholders' wealth are consistent.
    D. None of the above.

38. If a proposed project utilizes the building currently owned by the firm, it should be conducted with
    A. Depreciation post.
    B. An opportunity cost.
    C. Sunk cost.
    D. All of the above.

39. Which of the following is a disadvantage of internal rate of return?
    A. It applies the time value concept of money.
    B. This method is tedious and time-consuming, as it normally requires a trial-and error basis to determine the internal rate of return.
    C. It uses cash flows.
    D. Reflected the true timing of the benefits and costs involved with a project.

40. The net investment of a replacement project excluded
    A. Import duties of the new assets
    B. Purchase price of new assets
    C. Interest expenses arising from the funds used.
    D. Sales proceeds from the sale of the old asset.

SECTION B (Total: 60 marks)

INSTRUCTION: Answer ALL questions.
Please use the answer booklet provided.

Question 1

Profitty Cakes is a company that manufactures chocolate cakes which to be sold in all Petronas Select shops in Peninsular Malaysia.
To produce chocolate cakes, the factory requires 80,000 kg of cake flour per year with RM400 as the ordering cost. In addition, the holding cost for the cake flour is RM2 for each kilogram annually. For info, the constant rate of cake flour is used for the year.
The sale of cakes to Select Shops are on credit. Currently, the average collection period is 45 days, and the bad debts is 2% of sales. Profitty Cakes sell 60,000 units of cakes in a year. The price and variable cost of each cakes sold is RM30 and RM26 respectively.
Profitty Cakes is also considering relaxing the credit standards. Several conditions are determined when the credit standard is relaxed:

i. The bad debts will increase to 3% of sales
ii. The average collection period will increase to 55 days
iii. Sales will increase to 66,000

Required:

a) Calculate economic order quantity of Profitty Cakes inventories of cake flour.
(2 marks)

b) Determined the reorder point of the cake flour for Profitty Cakes to forecast their inventory requirements if the supplier takes 25 days to deliver the cake flour.
(2 marks)

c) Calculate the profit or loss from the proposed changes of the existing credit standard considering Profitty Cakes has a required rate of return on investment of 15%.
(10 marks)

d) Should Profitty Cakes relax its credit standard?
(1 mark)

Question 2

KKF Mart, a grocery chain stores in Klang Valley requires RM1million to fund their working capital for increasing the number of inventories in their chain stores to meet the new MySara Scheme for all Malaysian. As the Corporate Finance Manager handling the financial affairs of KKF Mart, the business has four possible solutions to fund the required amount.

1. A bank loan from SME Bank at 15% discount interest. The bank requires 8% compensating balance as part of the financing requirements.
2. A bank loan from EXIM Bank at a simple interest rate of 8%. However, 13% compensating balance is required to obtain financing from this bank. KKF Mart currently have a deposit of RM150,000 with the bank.
3. Issuing commercial paper via CKF Investment Bank. The interest rate for this issuance is 11%. A floatation cost of RM80,000 and placement fee of RM50,000 will be incurred for each issuance. The maturity of this issuance is 270 days.
4. A line of credit of RM1.75million from AFC Bank at an interest rate of 14% and a commitment fee of 9% on the unused balance.

Required:

Calculate the effective annual cost of each source of fund and advise the company on which source of financing to choose. Explain the reason(s) of your choice. Assume 360 days/year.

(15 marks)

Question 3

Mim & Nun is graduating in the next 2 years. They are planning to start a mobile pastries business in Klang Valley.

As a start-up, they require RM95,000 to acquire the vehicle including the baking tools attached to the vehicle. To acquire the vehicle, they are planning to take hire purchase financing from SME Bank. As per standard financing requirements, they need to have at least 10% deposit, and the bank will finance 90% of the remaining amount of the vehicle.

The 90% financing will be on loan for 10 years with the interest of 4% per annum.

Required:

a. If they need to accumulate the total of RM9,500 in the next 2 years, calculate the amount needed by Mim and Nun to deposit in term deposit account with 16% interest per annum (2 marks)

b. Calculate the equal amount of payment for the 90% financing taken with SME Bank for 10 years at 5% interest per annum (13 marks)

Question 4

Jolly Bee Fried Chicken, a franchise of the largest Philippines fast food chain is considering expanding the existing restaurant in Kuala Lumpur. Among the initiatives of the expansion is to replace the deep fryer equipment to meet the demand for its expansion.

The existing equipment was bought 5 years ago for RM120,000. It is estimated that the equipment can be used for another 5 years with zero salvage value. The market value of the equipment is RM50,000.

The maintenance expenses and repair expenses of the equipment are RM8,000 and RM6,000 per annum respectively. The equipment is currently handled by three employees. Each employee is paid RM15,000 per annum of salary and other benefits. Unfortunately, only two employees are required to operate the new equipment if it is bought and the management decided to terminate one of the three employees. In return, the terminated employee will be compensated with RM60,000 one-off payment upon termination.

The price of the new equipment is RM200,000. The additional costs to be incurred is shipping and import tax of RM5,000 and RM15,000 respectively. Training cost to operate the new equipment amount of RM20,000. At the end of the useful life of 5 years, the salvage value of the equipment is expected to be RM20,000.

Jolly Bee requires to borrow RM100,000 at 10% interest per annum from SME Bank. The financing will increase the cost of interest expense of RM10,000 annually.

The equipment will increase the production and efficiency. Due to that, RM30,000 of additional inventories will be purchased to meet the demand. RM20,000 of the inventories will be bought in cash and the balance will be on credit. On the other hand, the annual maintenance and defect cost of the new equipment are expected to be RM10,000 and RM3,000 respectively.

The sales of the foods will increase by RM60,000 per annum if the new equipment is fully utilized. The fixed cost incurred is RM30,000 annually.

The deprecations of non-current assets of the business will be on straight line method. The cost of capital is 14% while the tax rate is 25%. The maximum desired payback period is 5 years.

Required:

Calculate the followings for Jolly Bee's Kuala Lumpur franchise:

a) Initial outlay
b) Differential cash flow
c) Terminal cash flow
d) Payback period
e) NPV

(15 marks)

END OF EXAMINATION PAPER

Appendix 1: List of Formulas

Current Assets Management

1. Total Inventory Cost = Total Ordering Cost + Total Holding Costs
2. $\text{EOQ} = \sqrt{2 \times \text{S} \times \text{O/H}}$
3. $\text{Order Cost} = \text{O} \times \left(\frac{\text{S}}{\text{Q}}\right)$
4. $\text{Holding Cost} = \text{H} \times \left(\frac{\text{Q}}{2}\right)$
5. $\text{Total Cost} = (\text{O} \times \text{S/Q}) + (\text{H} \times \text{Q/2})$
6. Reorder Point = No of days lead time × Amount used daily
7. Annualized opportunity cost of foregoing the discount = [a/(1-a)] ×[360/(c-b)]

Management of Current Liabilities

1. $\text{i} = \frac{\text{a}}{(1-\text{a})} \times \frac{360}{(\text{c}-\text{b})}$
2. $\text{EAR} = \frac{\text{Interest}}{\text{AmountReceived}}$

Time Value of Money

1. $FV_n = PV\ (1+i)^n$
2. $PV_n = \frac{FV_n}{(1+r)^n}$
3. $FV_n = CF_1 \times \{\frac{(1+r)^n - 1}{(r)}\}$
4. $FV_n = PMT \times FVIFA_{\,i,n}$
5. $PV_0 = \left(\frac{CF_1}{r}\right) \times \{1 - \frac{1}{(1+r)^n}\}$
6. $PV_n = PMT \times PVIFA_{\,i,n}$
7. $FVA_n = CF_0 \times \left\{\frac{(1+r)^n - 1}{(r)}\right\} \times (1+r)$
8. $FVA_n = PMT\left(FVIFA_{\,i,n}\right)(1+r)$
9. $PV_0 = \left(\frac{CF_0}{r}\right) \times \left\{1 - \frac{1}{(1+r)^n}\right\} \times (1+r)$
10. $PVA_n = PMT \times \left(PVIFA_{\,i,n}\right)(1+r)$
11. $CF_1 = (PV_0 \times r) \div \left\{1 - \frac{1}{(1+r)^n}\right\}$
12. $PVIFA_{i,\infty} = PMT \times \frac{1}{i}$

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	1.6305	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	1.3159	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	3.4785	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	1.6528	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	1.7535	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	190.050
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	52.800	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	2.2080	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	2.0200	2.0300	2.0400	2.0500	2.0600	2.0700	2.0800	2.0900	2.1000	2.1100	2.1200	2.1300	2.1400	2.1500	2.1600	2.2000	2.2400	2.2500	2.3000
3	3.0301	3.0604	3.0909	3.1216	3.1525	3.1836	3.2149	3.2464	3.2781	3.3100	3.3421	3.3744	3.4069	3.4396	3.4725	3.5056	3.6400	3.7776	3.8125	3.9900
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	5.3680	5.6842	5.7656	6.1870
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	7.4416	8.0484	8.2070	9.0431
6	6.1520	6.3081	6.4684	6.6330	6.8019	6.9753	7.1533	7.3359	7.5233	7.7156	7.9129	8.1152	8.3227	8.5355	8.7537	8.9775	9.9299	10.980	11.259	12.756
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	12.916	14.615	15.073	17.583
8	8.2857	8.5830	8.8923	9.2142	9.5491	9.8975	10.260	10.637	11.028	11.436	11.859	12.300	12.757	13.233	13.727	14.240	16.499	19.123	19.842	23.858
9	9.3685	9.7546	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	20.799	24.712	25.802	32.015
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	25.959	31.643	33.253	42.619
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	32.150	40.238	42.566	56.405
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	39.581	50.895	54.208	74.327
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	48.497	64.110	68.760	97.625
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	59.196	80.496	86.949	127.913
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	72.035	100.815	109.687	167.286
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	87.442	126.011	138.109	218.472
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	105.931	157.253	173.636	285.014
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	128.117	195.994	218.045	371.518
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	154.740	244.033	273.556	483.973
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	186.688	303.601	342.945	630.165
21	23.239	25.783	28.676	31.969	35.719	39.993	44.865	50.423	56.765	64.002	72.265	81.699	92.470	104.768	118.810	134.841	225.026	377.465	429.681	820.215
22	24.472	27.299	30.537	34.248	38.505	43.392	49.006	55.457	62.873	71.403	81.214	92.503	105.491	120.436	137.632	157.415	271.031	469.056	538.101	*
23	25.716	28.845	32.453	36.618	41.430	46.996	53.436	60.893	69.532	79.543	91.148	104.603	120.205	138.297	159.276	183.601	326.237	582.630	673.626	*
24	26.973	30.422	34.426	39.083	44.502	50.816	58.177	66.765	76.790	88.497	102.174	118.155	136.831	158.659	184.168	213.978	392.484	723.461	843.033	*
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	471.981	898.092	*	*
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	530.312	*	*	*	*
35	41.660	49.994	60.462	73.652	90.320	111.435	138.237	172.317	215.711	271.024	341.590	431.663	546.681	693.573	881.170	*	*	*	*	*
36	43.077	51.994	63.276	77.598	95.836	119.121	148.913	187.102	236.125	299.127	380.164	484.463	618.749	791.673	*	*	*	*	*	*
40	48.886	60.402	75.401	95.026	120.800	154.762	199.635	259.057	337.882	442.593	581.826	767.091	*	*	*	*	*	*	*	*
50	64.463	84.579	112.797	152.667	209.348	290.336	406.529	573.770	815.084	*	*	*	*	*	*	*	*	*	*	*

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	0.7692
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	0.2697	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
11	0.8963	0.8043	0.7224	0.6496	0.5847	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	0.3186	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	0.1625	0.1452	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	0.4581	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	0.5134	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	0.0946	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	0.3118	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	0.4120	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	0.0668	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	0.7692
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	1.6681	1.6467	1.6257	1.6052	1.5278	1.4568	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	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	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	9.9856	9.3936	8.8527	8.3577	7.9038	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	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6106	3.9616	3.8241	3.2487
15	13.865	12.849	11.938	11.118	10.380	9.7122	9.1079	8.5595	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	4.6755	4.0013	3.8593	3.2682
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	12.166	11.274	10.477	9.7632	9.1216	8.5436	8.0216	7.5488	7.1196	6.7291	6.3729	6.0472	5.7487	4.7746	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	18.665	16.374	14.498	12.948	11.655	10.567	9.6442	8.8552	8.1755	7.5856	7.0700	6.6166	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	11.925	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	10.962	9.9148	9.0417	8.3045	7.6752	7.1327	6.6605	6.2463	4.9995	4.1666	3.9999	3.3333