



**KINGDOM OF BAHRAIN
MINISTRY OF EDUCATION
INTERNAL EXAMS SECTION
SECONDRY EDUCATION / UNIFIED TRACK**

RESIT EXAM-3 - 2023/2024

COURSE NAME: FINANCIAL MATHEMATICS 2

TRACK: التجاري وتوحيد المسارات

COURSE CODE: 316مال

TIME: 2 Hours

QUESTION ONE:

22×½

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- A. Salman invested BD 10,000 for 6 years at 5% annually for the first two years, 6% annually for the following 3 years and 8% annually for the remaining years. **Find the future value and compound interest** at the end of the period?

$$\begin{aligned} FV &= PV \times (1+i)^n \\ &= 10000 / \times / (1.05)^2 \times / (1.06)^3 \times / (1.08)^1 \\ &= 10000 \times 1.1025 / \times 1.1910 / \times 1.08 / \\ &= \text{BD } 14181.237 / \end{aligned}$$

$$CI = FV - PV$$

$$CI = 14181.237 / - 10000 / = \text{BD } 4181.237 /$$

- B. Farah deposited BD3500 in a bank at an effective rate of 4% annually. If the interest is compounded semi-annually. Calculate her fund at the end of 10 years.

$$n = 10 \times 2 = 20 / \text{ times}$$

$$i = 4 \div 2 = 2\% \text{ semiannually/}$$

$$\begin{aligned} FV &= PV \times (1+i)^n \\ &= 3500 / \times / (1+2\%)^{20} \\ &= 3500 \times 1.4859 / = \text{BD } 5200.650 / \end{aligned}$$

- C. Find the interest rate for an investment of BD5,000 to be amount of BD7,969 at the end of 8 years.

$$(1+i)^n = FV \div PV$$

$$(1+i\%)^8 / = 7969 / \div 5000 /$$

$$= 1.5938 / \text{ we are choosing } n = 8 \text{ from table to find } \underline{i} = 6\% /$$

OR Press $\sqrt[8]{1.5938} / = 1.0599 \sim 1.06 - 1 = 0.06 \times 100 = 6\% /$

الإمام حسن السعدي

QUESTION TWO:

15×1

15

- 1- Ahmed paid an annuity of BD300 at the end of each year for 2 years at an interest rate of 4% thirdly. Find **The Future value (amount) at the end of the period.** (using interest table)

| | | TABLE (FV of Ordinary Annuity) (annuity in arrears ... end of period) | | | | | | | | |
|-------|---------|---|---------|---------|---------|---------|---------|---------|---------|--|
| n \ i | 4.00% | 5.00% | 6.00% | 7.00% | 8.00% | 9.00% | 10.00% | 11.00% | 12.00% | |
| 1 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | |
| 2 | 2.04000 | 2.05000 | 2.06000 | 2.07000 | 2.08000 | 2.09000 | 2.10000 | 2.11000 | 2.12000 | |
| 3 | 3.12160 | 3.15250 | 3.18360 | 3.21490 | 3.24640 | 3.27810 | 3.31000 | 3.34210 | 3.37440 | |
| 4 | 4.24646 | 4.31013 | 4.37462 | 4.43994 | 4.50611 | 4.57313 | 4.64100 | 4.70973 | 4.77933 | |
| 5 | 5.41632 | 5.52563 | 5.63709 | 5.75074 | 5.86660 | 5.98471 | 6.10510 | 6.22780 | 6.35285 | |
| 6 | 6.63298 | 6.80191 | 6.97532 | 7.15329 | 7.33593 | 7.52333 | 7.71561 | 7.91286 | 8.11519 | |

$$n = 2 / \times 3 = 6 / \text{ times}$$

$$1- \text{FV}_n = \text{PMT} \times \left[\frac{(1+i)^n - 1}{i} \right]$$

$$= 300 / \times 6.63298 / = \text{BD}1989.894 /$$

- 2- Amani paid an annuity of BD200 at the beginning of each year at an interest rate of 20 % annually compounded interest quarterly for **one year.** Find **the present value of the annuities.** (using interest table)

| | | TABLE (PV of Annuity Due) (annuity in advance ... beginning of period) | | | | | | | |
|-------|---------|--|---------|---------|---------|---------|---------|---------|--|
| n \ i | 5.00% | 6.00% | 7.00% | 8.00% | 9.00% | 10.00% | 11.00% | 12.00% | |
| 1 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | 1.00000 | |
| 2 | 1.96154 | 1.94340 | 1.93458 | 1.92593 | 1.91743 | 1.90909 | 1.90090 | 1.89286 | |
| 3 | 2.88609 | 2.83339 | 2.80802 | 2.78326 | 2.75911 | 2.73554 | 2.71252 | 2.69005 | |
| 4 | 3.77509 | 3.67301 | 3.62432 | 3.57710 | 3.53129 | 3.48685 | 3.44371 | 3.40183 | |
| 5 | 4.62990 | 4.46511 | 4.38721 | 4.31213 | 4.23972 | 4.16987 | 4.10245 | 4.03735 | |
| 6 | 5.45182 | 5.21236 | 5.10020 | 4.99271 | 4.88965 | 4.79079 | 4.69590 | 4.60478 | |

$$n = 1 / \times 4 = 4 / \text{ times}$$

$$i = 20 / \div 4 = 5\% \text{ quarterly /}$$

$$\text{PV}_n = \text{PMT} \times \left[\frac{1 - (1+i)^{-n}}{i} \right]$$

$$\text{PV} = 200 / \times 3.77509 / = \text{BD}755.018 /$$

QUESTION THREE:

Wafaa Company has two potential projects, all with an initial cost of BD 30,000. Given the discount rates and future cash flow of each project.

Required: Which project do you accept? (Using **Payback Period Method**)

24×½

12

| Cash Flow | Project A BD | Project B BD |
|------------------|--------------|--------------|
| Cash flow year 1 | 7500 | 11000 |
| Cash flow year 2 | 7500 | 10000 |
| Cash flow year 3 | 7500 | 9000 |
| Cash flow year 4 | 7500 | 8000 |
| Cash flow year 5 | 7500 | 7000 |

Payback Period Method.**1. Project A (Fixed Cash Inflow)**

$$\frac{30000}{7500} // = 4 \text{ year} //$$

2. Project B: (Changeable Cash Inflow)

| Year | Cash Flow BD | Yet to be recovered BD | Payback Period Year |
|------|--------------|-----------------------------------|---------------------|
| 0 | -30000/ | | = 3 years/ |
| 1 | 11000/ | -30000 /+11000 /= -19000/ | |
| 2 | 10000/ | -19000/+10000 /= -9000 / | |
| 3 | 9000/ | -9000 /+9000 /= 0 / recovered) | |
| 4 | 8000/ | Not used in decision | |
| 5 | 7000/ | Not used in decision | |

- We can choose project B // because it has the lowest payback period. The company required 3 years to recover period less than projects A. //

QUESTION FOUR:

The Al-Amal Company sold 4000 units of television at BD320 per unit, and it had a variable cost of BD240 per unit. The total annual fixed cost is BD220,000.

Required:

- 1) Calculate contribution margin per unit.
- 2) Calculate contribution margin percentage.
- 3) Calculate break-even point sales in units.
- 4) Calculate Margin of safety in units.

14×1

14

Answers

1. Contribution margin per unit = $320 / - 240 / = \text{BD}80/$
2. contribution margin percentage = $\frac{320 / - 240 /}{320 /} \times 100 = 25 \% /$
3. Break – even point sales in units = $\frac{220000 /}{320 / - 240 /} = 2750 \text{ units} /$
4. Margin of safety in unit = $4000 / - 2750 / = 1250 \text{ units} /$

QUESTION FIVE

➤ From the following income statement for Al-Wazan

Calculate the following for year 2:

1. Gross profit margin percentage
2. Profit margin percentage

Answers

$$1. \text{Gross profit margin (\%)} = \frac{\text{Gross profit}}{\text{Revenue}} \times 100$$

$$\text{Year 2} = \frac{200 /}{300 /} \times 100 / = 66.67\% /$$

$$2. \text{Profit margin (\%)} = \frac{\text{Profit before tax}}{\text{Revenue}} \times 100$$

$$\text{Year 2} = \frac{170 /}{300 /} \times 100 / = 56.67\% /$$

8×1

8

| Al-Wazan company | BD million | |
|-------------------------|------------|--------|
| | Year 1 | Year 2 |
| Income statement | | |
| revenues | 200 | 300 |
| less cost of sales | 90 | 100 |
| gross profit | 110 | 200 |
| less expenses | 20 | 30 |
| profit before tax | 90 | 170 |
| less tax | 9 | 14 |
| profit after tax | 81 | 156 |
| of which | | |
| distrebution profit | 75 | 106 |
| retained profit | 6 | 50 |

END OF ANSWER

الإمام محمد بن عبد الوهاب