

**Valuation of coupon bonds**

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**Coupon bonds**

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Bonds from which interest is paid and which are taken out at face value

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**To calculate the price of the coupon bond you need:**

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- values and dates of future cash flows (interest + face value)
- required rate of return on investment

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### Valuation of coupon bonds

$$P = \sum_{t=1}^n \frac{C_t}{(1+r)^t}$$

P – bond price

$C_t$  – cash flow from bond

r – market rate of return

t – the period in which the payment of interest takes place

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### When interest is paid more than once a year

$$P = \sum_{t=1}^n \frac{C_t}{\left(1 + \frac{r}{m}\right)^t}$$

P – bond price

$C_t$  – cash flow from bonds

r – market rate of return

t – the period in which the payment of interest takes place

m – number of interest payments during the year

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### Valuation of bonds using ordinary annuity

$$P = I \times \left[ \frac{1 - \frac{1}{\left(1 + \frac{r}{m}\right)^n}}{\frac{r}{m}} \right] + \frac{FV}{\left(1 + \frac{r}{m}\right)^n}$$

P – bond price

I – the value of coupon interest

r – market rate of return

n – total number of period of payments

m – number of interest payments during the year

FV – face value

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### Perpetual bonds

Bonds that are not taken out and their holder receives interest indefinitely

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### Valuation of perpetual bonds

$$P = \frac{I}{r \div m}$$

P – bond price  
 I – the value of coupon interest  
 r – market rate of return  
 m – number of interest payments during the year

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### Task 1-2\*

#### Principles related to the valuation of bonds

- when the rate of return is lower than interest rate, then, if interest is paid more often, the value of the bonds is higher
- when the rate of return equals the interest rate, the payment frequency does not affect the price of the bond
- when the rate of return is higher than interest rate, then, if interest is paid more often, the value of the bonds is lower

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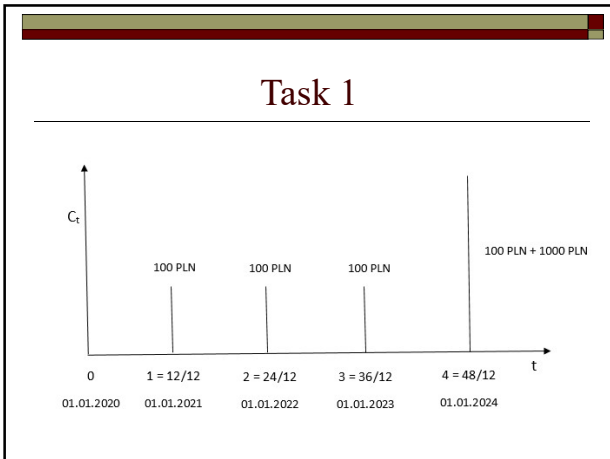
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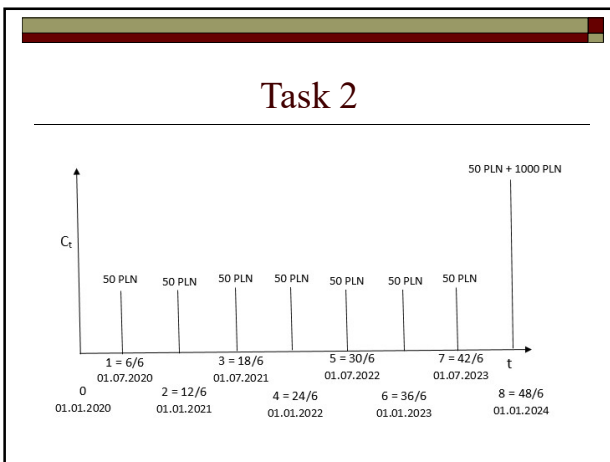
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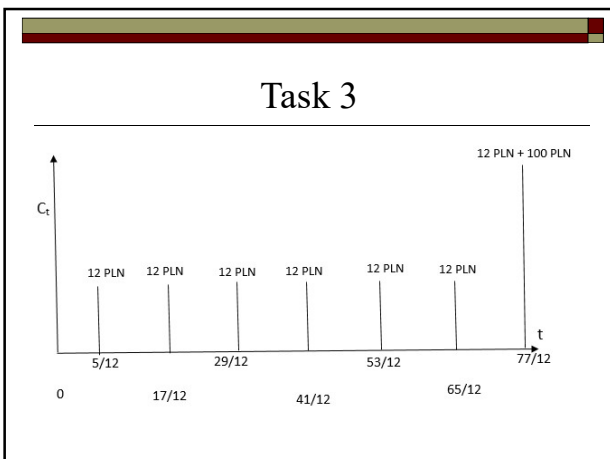
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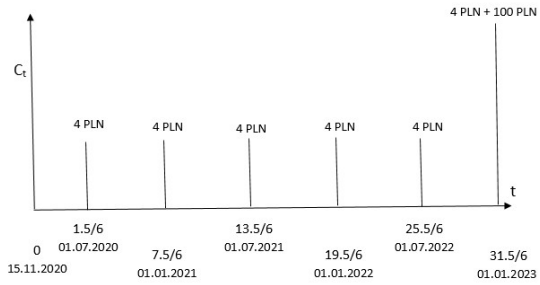
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### Task 4




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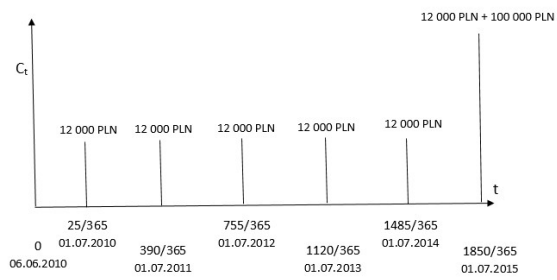
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### Task 5




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