Tackling Professorial Expert Bias: Using ChatGPT to Enhance Student Comprehension and Performance in Financial Accounting Midterm Exams

Authors blinded for review

Supplemental Material: Exam texts translated to English
Instructor-written Exercise Text Part A

InnoFurnaceTec AG is registered in Eckernförde, Schleswig-Holstein, and produces high-performance furnaces operated with ultra-high vacuums (UHV), which are used in the industrial production of semiconductor components. In order to prepare the annual financial statements for the firm, which, due to its capital market orientation, prepares its accounts in accordance with international accounting standards, only the accounting events set out below need to be taken into account in order to answer the questions posed. In the current market environment, a market interest rate of 4.5% prevails.

On January 20, 2022, InnoFurnaceTec AG sold three UHV furnaces to a firm from the semiconductor industry at a price of € 375,000 each with a payment term set in the invoice. On 07 February 2022, InnoFurnaceTec AG received the bank transfer for the sale of the three UHV furnaces, for which the customer has claimed a discount of 3%, which is granted to him on the condition that he settles the invoice issued to him within 21 days after the date of sale. In addition, the firm decided to insure the UHV furnaces in stock and concluded an insurance contract as of 01 August 2022, at the beginning of which the insurance premium for one year was paid in the amount of € 180,000. The premium payment was taken into account in the determination of the annual profit. On September 09, 2022, InnoFurnaceTec AG purchased a new property with plant building and operating equipment, the appraisal of which showed a value for the plant building of € 2.5 million and an amount attributable to the property of 40% of the purchase price, for the development of monitoring software relating to the industrial furnaces for a total of € 4.25 million. The transaction was carried out under agreement of a payment term.

InnoFurnaceTec AG owns a commercial property located next to its production site, which it acquired on January 01, 2013 for a purchase price of € 16 million with a payment term, the use of which for the storage of technical components has been discontinued by the firm and has since been rented out for € 560,000 per year. The period of use of the commercial property estimated by InnoFurnaceTec AG at the time was 15 years, with the firm expecting a residual value of € 2.8 million at the end of its use. InnoFurnaceTec AG opted for the linear depreciation method on the basis of the expected course of technical wear. At the end of 2020, InnoFurnaceTec AG finds out that a waste incineration plant is to be built in the same industrial park in the next year and expects that, due to the unpleasant smell, the market value of the commercial property will fall to 55% of the current carrying amount on the balance sheet date (depreciation for 2020 taken into account). The unpleasant smell has a negative impact on the rental level, so that the expected rental income is reduced to € 525,000 and the expected residual value at the end of the period of use falls to € 1.95 million. As of the balance sheet date December 31, 2021, InnoFurnaceTec AG notices that the plans to build the waste incineration plant have been discarded, resulting in a reassessed fair value as of December 31, 2021 of € 8.75 million. The building was sold to an investor for € 5.17 million on January 01, 2024, the invoice amount was settled by bank transfer.

InnoFurnaceTec AG also distributes purchased spare parts, including high-precision industrial thermostats, to ensure ongoing precise control of the UHV furnaces. While there were no thermostats in stock at the beginning of 2022, the following stock movements occurred during the year: Additions of 6 units (acquisition cost per unit: € 1,140) in April and 8 units (acquisition cost per unit: € 1,210) in May, as well as disposals of 3 units in October through a sale on target and 7 units in November through a sale by bank transfer. Assume that the following sales prices per unit are achieved for the disposals: € 2,400 for the disposals in October; € 1,600 for the disposals in November.
Task A.1: Accounting records (9 points, 3 points each)
Enter the required accounting records in the fields provided on the solution sheet. If no accounting record is required, enter "No accounting required".

(1) Form the accounting record for the incoming payment on the bank account of InnoFurnaceTec AG on 07 February 2022.
(2) Form the accounting record for the accrual of the insurance premium for the InnoFurnaceTec AG on December 31, 2022.
(3) Form the accounting record for the purchase of the property with plant building and operating equipment of InnoFurnaceTec AG on September 09, 2022.

Task A.2: Depreciation and impairment (13 points)
Fill in your answers on the answers sheet. Enter accounting records in the spaces provided on the solution sheet. If no accounting record is required, enter "No entry required".

(1) Report the value in use for the commercial property as of December 31, 2020. (2 points)
(2) Report the fair value of the commercial property as of December 31, 2020. (2 points)
(3) Form the accounting record for the impairment of the commercial property as of December 31, 2020. (2 points)
(4) Report the amount of scheduled depreciation in 2022. (2 points)
(5) Report the amount of impairment reversal as of December 31, 2021, using the cost model. (2 points)
(6) Form the accounting record for the sale of the building. In doing so, assume that the reversal of the impairment loss, as opposed to the impairment loss, did not occur. (3 points)

Task A.3: Inventory valuation (8 points)
Fill in your answers on the answers sheet. Enter accounting records in the spaces provided on the solution sheet. If no accounting record is required, enter "No entry required".

(1) Calculate the value of thermostats in stock as of December 31, 2022, using the weighted average method (2 points).
(2) What is the book value of the November disposal using the FIFO method? (2 points)
(3) Form the accounting record for the November sale under the FIFO method. (4 points)
The firm InnoFurnaceTec AG is based in Eckernförde in Schleswig-Holstein and manufactures special high-performance furnaces used in the production of semiconductors. For their annual financial statements they use international accounting rules. When solving the tasks, only the following accounting events should be taken into account. Currently, the market interest rate is 4.5%.

On January 20, 2022, InnoFurnaceTec AG sold three of its special furnaces to a semiconductor company for € 375,000 each. This firm paid by bank transfer on February 7, 2022, receiving a 3% discount for paying within 21 days of purchase. InnoFurnaceTec AG also decided to insure their furnaces in stock. For this they paid € 180,000 for an annual subscription on August 1, 2022. This payment was included in the calculation of the annual profit. On September 9, 2022, the firm purchased land with a building and other equipment for € 4.25 million to develop software for their furnaces. The value of the building is € 2.5 million and the land is worth 40% of the total price. They have agreed with the seller to pay later.

InnoFurnaceTec AG has a building next to their factory which they bought on January 1, 2013 for € 16 million. They were previously using it to store parts, but now they rent it out for € 560,000 a year. They thought the building would last 15 years and still be worth €2.8 million after that. So they depreciated it evenly every year. But at the end of 2020, they heard that a waste facility was going to be built nearby. Because of the smell, they thought the building would be worth only 55% of its current value and they would only get €525,000 in rent. They also thought it would end up being worth only €1.95 million. But by the end of 2021, they realized that the waste facility would not be built and estimated that the building would be worth €8.75 million. On January 1, 2024, they sold the building for € 5.17 million and the money was transferred.

InnoFurnaceTec AG also sells spare parts for their furnaces, including special thermostats. At the beginning of 2022, they had no thermostats in stock, but during the year the following happened: In April they bought 6 thermostats for € 1,140 each and in May 8 thermostats for € 1,210 each. In October they sold 3 thermostats for € 2,400 each on invoice and in November 7 thermostats for € 1,600 each, which were transferred directly.
**Task A.1: Accounting records (9 points, 3 points each)**
Enter the required accounting records in the fields provided on the solution sheet. If no accounting record is required, enter "No accounting required".

(4) Form the accounting record for the incoming payment on the bank account of InnoFurnaceTec AG on 07 February 2022.
(5) Form the accounting record for the accrual of the insurance premium for the InnoFurnaceTec AG on December 31, 2022.
(6) Form the accounting record for the purchase of the property with plant building and operating equipment of InnoFurnaceTec AG on September 09, 2022.

**Task A.2: Depreciation and impairment (13 points)**
Fill in your answers on the answers sheet. Enter accounting records in the spaces provided on the solution sheet. If no accounting record is required, enter "No entry required".

(7) Report the value in use for the commercial property as of December 31, 2020. (2 points)
(8) Report the fair value of the commercial property as of December 31, 2020. (2 points)
(9) Form the accounting record for the impairment of the commercial property as of December 31, 2020. (2 points)
(10) Report the amount of scheduled depreciation in 2022. (2 points)
(11) Report the amount of impairment reversal as of December 31, 2021, using the cost model. (2 points)
(12) Form the accounting record for the sale of the building. In doing so, assume that the reversal of the impairment loss, as opposed to the impairment loss, did not occur. (3 points)

**Task A.3: Inventory valuation (8 points)**
Fill in your answers on the answers sheet. Enter accounting records in the spaces provided on the solution sheet. If no accounting record is required, enter "No entry required".

(4) Calculate the value of thermostats in stock as of December 31, 2022, using the weighted average method (2 points).
(5) What is the book value of the November disposal using the FIFO method? (2 points)
(1) Form the accounting record for the November sale under the FIFO method. (4 points)
Instructor-written Exercise Text Part B

SolarTech Energy Solutions AG is based in Bremerhaven and specializes in the production, installation and maintenance of photovoltaic systems for private customers. In order to prepare the annual financial statements for the firm, which prepares its accounts in accordance with international accounting standards due to its capital market orientation, only the business transactions detailed below are to be taken into account for answering the questions posed. In the current market environment, a market interest rate of 4.5% prevails.

On May 26, 2022, SolarTech Energy Solutions AG covered the roof of a single-family house with an area of 125 square meters, including a solar power storage system with manufacturing costs of € 12,500 for a total invoice amount of € 22,500, which is to be settled with a payment term of 30 days. The client is offered a discount of 4 %, which is granted to him, provided that he settles the invoice issued to him within 15 days after the date of the invoice by bank transfer. Due to the increased demand, SolarTech Energy Solutions AG has also decided to expand its location for the production of photovoltaic systems and has rented an additional plot of land with a production hall for this purpose since July 15, 2022, for which a rental payment of € 65,000 for 8 months was made in advance at the beginning of the contract. The rental payment was taken into account in the determination of the profit for the year. Due to a technical glitch, the remuneration of the workers for December 2022, which has not yet been recognized in the accounts and amounts to € 17,000, was not paid by SolarTech Energy AG until mid-January 2023.

Property, plant and equipment of SolarTech Energy Solutions AG includes a machine for the production of lithium-ion batteries, which are used as components in the solar power storage system, acquired on January 01, 2016 at a purchase price of € 4 million and paid by bank transfer. The useful life is estimated by SolarTech Energy Solutions AG to be 7 years with a total of 26,000 operating hours, assuming a residual value of € 750,000 at the end. During the useful life, the intensity of use changes, with 5,000 hours each in 2016 and 2017, 4,000 each in 2018 and 2019, and 3,000 each in 2020 and 2021. Since the technical abrasion is strongly dependent on the performance rendered by the machine in the respective years, SolarTech Energy Solutions AG opts for the application of the performance-based depreciation method. In 2018, a drastic reduction in demand occurred, so that the fair value of the machine fell to 80 % of the scheduled carrying amount as of December 31, 2018, but the residual value remained constant. As of the balance sheet date December 31, 2019, there is an increased demand for photovoltaic equipment due to regulatory interventions in the building energy supply, which lead to a revision of the estimates of SolarTech Energy Solutions AG and results in a fair value as of December 31, 2019 in the amount of € 1.8 million. The machine will be sold on January 01, 2020 against transfer of € 2.1 million to an electric car manufacturer.

In addition, SolarTech Energy Solutions AG is - among other producers - the manufacturer of the roof mounting rails, with the help of which the photovoltaic modules can be fixed interlocking and tension-free in the on-roof system. At the beginning of the year 2022, there are still 3,400 self-manufactured mounting rails in stock, the manufacturing costs of which amounted to € 0.70. Purchases in March of 4,600 pieces (acquisition cost per piece: € 0.90) and 4,800 pieces (acquisition cost per piece: € 0.50) in May have supplemented the stock, and disposals of 5,500 pieces in June through a sale by bank transfer and 3,700 pieces in August through a sale with a four-week payment term have reduced the inventory. Assume that the following sales prices per unit are achieved for the disposals: € 6,600 for the disposals in June; € 5,180 for the disposals in August.
Task B.1: Accounting records (9 points, 3 points each)
Fill in the correct accounting records in the fields provided on the solution sheet. If no accounting record is required, enter "No accounting record required".

(1) Form the accounting record for the sale at target of SolarTech Energy Solutions AG on May 26, 2022.
(2) Form the accounting record for the accrual of the rental payment for the property with production hall of SolarTech Energy AG on December 31, 2022.
(3) Form the accounting record for the accounting entry of the previously unposted wages on December 31, 2022.

Task B.2: Depreciation and impairment (13 points)
Fill in your answers on the solution sheet. Enter accountng records in the spaces provided on the solution sheet. If no accounting record is required, enter "No accounting record required".

(1) What would be the depreciation amount of the machine on the balance sheet date December 31, 2017, if SolarTech Energy Solutions AG had opted for the geometric-degressive depreciation method? (2 points)
(2) State the fair value of the machine at the balance sheet date of December 31, 2018. (2 points)
(3) Form the accounting record for the impairment of the machine at the balance sheet date of December 31, 2018. (2 points)
(4) Report the amount of scheduled depreciation in 2019 using the unit-of-production method. (2 points)
(5) Report the amount of impairment reversal as of December 31, 2019 using the cost model. (2 points)
(6) Form the accounting record for the sale of the machine. In doing so, assume that the reversal of the impairment loss, as opposed to the impairment loss, did not occur. (3 points)

Task B.3: Inventory valuation (8 points)
Fill in your answers on the solution sheet. Enter posting records in the spaces provided on the solution sheet. If no posting record is required, enter "No accounting record required".

(1) Calculate the value of assembly rails in inventory as of December 31, 2022 using the weighted average method (2 points).
(2) What is the book value of the June disposal using the FIFO method? (2 points)
(3) What is the accounting record for the August sale under the FIFO method? (4 points)