

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
Житомирський державний університет імені Івана Франка

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Посібник-практикум для студентів
English for Engineering and Technology
Students

**спеціальностей «Автоматизація,
комп'ютерно-інтегровані технології та
робототехніка»**

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Посібник-практикум містить комплекс завдань, спрямованих на розвиток набутих знань, вмінь та навичок з іноземної мови (англійської). Посібник розроблений для проведення практичних занять та організації самостійної роботи з англійської мови для студентів фізико-математичного факультету. Матеріал у посібнику викладено за темами, які відповідають змісту фахових дисциплін. У виданні подано лексичні та граматичні вправи різної складності. Рекомендовано студентам денної та заочної форми навчання.

ЗМІСТ

ВСТУП.....	4-5
Модуль I. Fundamentals of Technical English.....	6-59
1. Student Life and Future Profession.....	6-10
2. Science and Technology in Modern Life.....	10-15
3. Computer-Integrated Technologies: Key Concepts.....	15-19
4. Automation in Industry.....	19-23
5. Robotics: Past, Present, and Future.....	24-28
6. Types of Robots and Their Applications.....	28-32
7. Smart Machines and Artificial Intelligence.....	32-37
8. Technical Professions and Career Opportunities.....	38-41
9. Parts of Machines and Mechanisms.....	41-46
10. Sensors and Control Systems.....	46-50
11. Programming for Automation and Robotics.....	50-55
12. Computer Hardware and Software.....	55-59
Модуль 2. Professional English for Automation and Robotics.....	60-102
13. Internet of Things (IoT) in Industry.....	60-64
14. Cybersecurity in Automation Systems.....	64-68
15. Industry 4.0 and Smart Factories.....	69-73
16. Engineering Documentation and Technical Drawings.....	73-78
17. Materials and Components in Robotics.....	78-82
18. Energy Sources for Robots and Machines.....	82-87
19. Safety at Work and Risk Management.....	87-91
20. Teamwork and Project Management in Engineering.....	91-96
21. Innovations and Future Trends in Robotics.....	96-101
Список використаної літератури.....	102

Вступ

Стрімкий розвиток концепцій «Індустрії 4.0» (Industry 4.0), промислового Інтернету речей (ІоТ), штучного інтелекту та кіберфізичних систем докорінно змінив вимоги до сучасного інженера. Сьогодні фахівець у галузі автоматизації та робототехніки має бути не лише технічно грамотним, а й мобільним на міжнародному ринку праці, здатним вільно інтегруватися у світовий науково-виробничий простір. Оскільки англійська мова є загальноприйнятим стандартом для технічної документації, мов програмування, мануалів до обладнання та наукових публікацій, володіння нею на професійному рівні стає базовою кваліфікаційною вимогою.

Цей практикум розроблено з метою формування та вдосконалення іншомовної професійної компетентності студентів інженерних спеціальностей, аспірантів та практикуючих фахівців, які прагнуть систематизувати свої знання з англійської мови за професійним спрямуванням (ESP — English for Specific Purposes).

Структура та особливості посібника

Матеріал практикуму розподілений за логічно послідовним модульним принципом і охоплює **21** тему, які разом складають два фундаментальні блоки: **Модуль I. Fundamentals of Technical English** — орієнтований на опанування загальнотехнічного базису: від властивостей матеріалів та електричних кіл до читання інженерних креслень і розуміння архітектури комп'ютерного заліза.

Модуль II. Professional English for Automation and Robotics — занурює у сучасний високотехнологічний дискурс, розглядаючи специфіку інтеграції ШІ в робототехніку, хмарне виробництво, протоколи кібербезпеки, а також алгоритми пошуку несправностей (Troubleshooting) та міжнародні стандарти охорони праці.

Методична концепція завдань

Головна відмінність цього практикуму — сувора симетрія та чітка дидактична структура. Кожна тема містить 5 різнопланових завдань по 15 речень у кожному, що дозволяє викладачеві гнучко нормувати навантаження, а студенту — поетапно переходити від теорії до автоматизованої навички:

Task 1 (Vocabulary & Context Clues): розвиває навички семантизації та розпізнавання термінів у контексті.

Task 2 (Grammar Focus): актуалізує граматичні структури (пасивний стан, умовні речення, модальні дієслова, герундій тощо) виключно через призму реальних технічних та інженерних ситуацій.

Task 3 (Technical Translation): формує вміння точного двомовного перекладу, позбавляючи мовлення штучних кальок та спрощень.

Task 4 (Correct the mistakes): розвиває критичне мислення та навички саморедагування технічних текстів.

Task 5 (Sentence Transformation & Synthesis): стимулює продуктивне використання мови, навчаючи студента варіювати синтаксичні конструкції для чіткого висловлення думки.

Практикум укомплектовано автентичним лексичним корпусом, відібраним за матеріалами провідних міжнародних видань (IEEE, MIT OpenCourseWare) та документації світових лідерів

автоматизації (Siemens, Festo). Він стане надійним інструментом як для аудиторної роботи під керівництвом викладача, так і для глибокого самостійного навчання.

МОДУЛЬ I. FUNDAMENTALS OF TECHNICAL ENGLISH

ТЕМА 1. Student Life and Future Profession

Grammar Focus: Present Simple vs. Present Continuous; Action and Nonaction Verbs.

Professional Vocabulary: automation engineer, robotics, circuit, software, laboratory, algorithm, hardware, university, lecture, engineering.

Task 1. Vocabulary & Context Clues

Fill in the blanks with the correct professional terms from the list: automation, engineers, laboratory, circuits, skills, programming, lectures, technologies, robot, field, degree, industry, software, equipment, students.

- 1) The rapid growth of the automation _____ creates thousands of new jobs worldwide.
- 2) First-year _____ at our university study the basics of modern engineering.
- 3) Modern _____ requires a deep understanding of both hardware and software components.
- 4) Every week, future robotics specialists attend detailed _____ on higher mathematics and physics.
- 5) In the computer _____, we assemble and test basic electronic devices.
- 6) Experienced automation _____ design complex control systems for manufacturing plants.
- 7) She wants to obtain a bachelor's _____ in computer-integrated technologies.
- 8) Our practical training involves programming a robotic _____ to perform precise movements.
- 9) Rapidly developing _____ change the way factories operate nowadays.

- 10) To program microcontrollers, you need strong digital _____ and logic.
- 11) This specialized _____ helps us simulate automated production lines before building them.
- 12) Engineering students often spend hours designing electronic _____ on their laptops.
- 13) Specialized software allows us to adjust advanced technical _____ without human error.
- 14) Choosing a proper career _____ in robotics guarantees excellent future opportunities.
- 15) I am currently developing my coding _____ during practical university workshops.

Task 2. Grammar Focus: Present Simple & Present Continuous

Put the verbs in brackets into the Present Simple or Present Continuous tense. Pay attention to action and nonaction verbs.

- 1) Microchips _____ (convey) electric signals to the main control unit of the machine.
- 2) At this moment, the professor _____ (explain) how a standard feedback loop works.
- 3) I _____ (know) the exact formula for calculating electrical resistance.
- 4) Look! The robotic arm _____ (move) the heavy metal components to the conveyor belt.
- 5) Automation engineers usually _____ (understand) complex algorithmic structures easily.
- 6) Right now, our team _____ (test) a new type of sensor in the laboratory.
- 7) This software _____ (belong) to the latest generation of industrial control systems.
- 8) Many smart devices _____ (depend) on continuous and stable internet connections.
- 9) Students _____ (write) a code for an automated conveyor system in today's class.
- 10) The system _____ (seem) stable, but we need to check the temperature parameters anyway.

- 11) He _____ (prefer) working with industrial hardware rather than writing purely abstract code.
- 12) Industrial processes _____ (require) precise calibration to avoid dangerous system failures.
- 13) Why _____ you _____ (look) at that digital oscilloscope so carefully right now?
- 14) This technical manual _____ (contain) fifteen pages of detailed circuit diagrams.
- 15) We _____ (believe) that automated systems drastically reduce human errors in production.

Task 3. Technical Translation

Translate the following sentences into English using professional terminology.

- 1) Першокурсники зараз вивчають основи програмування промислових контролерів.
- 2) Робототехніка поєднує в собі механіку, електроніку та комп'ютерні науки.
- 3) Наш професор зараз демонструє, як автоматизована система реагує на помилки.
- 4) Я розумію важливість автоматизації для сучасного масового виробництва.
- 5) Інженери з автоматизації щодня проєкструють складні плати та системи керування.
- 6) Цей датчик зараз вимірює точну температуру всередині працюючого двигуна.
- 7) Сучасні студенти технічних спеціальностей потребують багато практичних занять.
- 8) Комп'ютерно-інтегровані технології забезпечують швидкий контроль якості на заводах.
- 9) Чому ця роботизована система зараз працює так повільно під час тестування?
- 10) Професійна англійська мова допомагає інженерам читати міжнародну документацію.
- 11) Ця лабораторія має все необхідне обладнання для створення мікросхем.
- 12) Майбутні фахівці зараз аналізують алгоритми штучного інтелекту.
- 13) Автоматизація зменшує витрати виробництва і підвищує безпеку праці.

- 14) Наразі ми оновлюємо програмне забезпечення для нашого нового лабораторного робота.
- 15) Кожен студент мріє отримати високооплачувану роботу в галузі робототехніки.

Task 4. Correction

Identify and correct one grammatical or lexical error in each of the following sentences.

- 1) The automation engineer is knowing exactly how to fix this complex system failure.
- 2) Students are rarely attending lectures on weekends because the university is closed.
- 3) Right now, the robotic system process thousands of data packets per second.
- 4) I am believing that computer-integrated technologies are essential for modern factories.
- 5) Water is boiling at 100 degrees Celsius, which are important for automated thermal systems.
- 6) Look! The technical assistant measures the voltage on the main control panel.
- 7) This electronic component is belonging to the automated assembly line over there.
- 8) We are usually starting our laboratory classes at nine o'clock in the morning.
- 9) The software update is seeming perfect, but we must test it on real hardware.
- 10) Why do you modifying the code of the controller at this very moment?
- 11) Good automation systems requires high-quality sensors and reliable software.
- 12) I am not understanding this part of the technical diagram about robotics.
- 13) Currently, the factory replaces its manual machines with fully automated systems.
- 14) That dangerous machine always is stopping automatically when someone approaches it.

15) The student is wanting to specialize in intelligent autonomous robotic systems.

Task 5. Sentence Transformation & Synthesis

Rewrite or combine the sentences according to the instructions in brackets, maintaining a professional context.

- 1) The robot sorts components. It also packs them into boxes. (Combine using *not only... but also*)
- 2) Students design digital microchips in the lab every Tuesday. (Change into a question starting with *When*)
- 3) The engineers are checking the calibration of the sensors right now. (Change into a negative sentence)
- 4) I understand the manual. I am reading it at the moment. (Combine using *because*)
- 5) Automated factories reduce human errors. Automated factories work faster than people. (Combine using *which*)
- 6) The programming process is difficult. It takes a lot of time. (Combine into one sentence using *and*)
- 7) We test the new hardware now. We want to find any systematic bugs. (Combine using *to infinitive*)
- 8) The system requires a complete reboot. It is currently overloaded. (Combine using *as*)
- 9) Smart machines save a lot of energy. This is important for eco-friendly industries. (Combine using *which*)
- 10) The technician measures pressure. He does it every single hour. (Rewrite starting with *Every single hour...*)
- 11) This student is studying robotics. He wants to build drones in the future. (Combine using *who*)
- 12) The laboratory assistant is not adjusting the equipment now. He is writing a report. (Combine using *instead of*)
- 13) Automation modifies production lines. It improves general safety standards. (Combine using *by + -ing verb*)
- 14) Software controls the engine speed. This software runs on a central server. (Combine using *that*)
- 15) He works as an automation engineer. He travels to different automated plants. (Combine using *and regularly*)

TEMA 2. Science and Technology in Modern Life

Grammar Focus: Future Forms (Present Continuous for arrangements, Going to for intentions/plans, Will/Won't for predictions/spontaneous decisions).

Professional Vocabulary: invention, breakthrough, artificial intelligence, internet, digital, development, efficiency, device, automation, prediction, network, expert, upgrade, install.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **breakthrough, technology, artificial, efficiency, devices, internet, automatic, global, smart, networks, communication, systems, engineers, research, digital.***

- 1) The invention of the silicon microchip was a major _____ in industrial history.
- 2) Modern digital _____ allows people to transfer engineering data across continents instantly.
- 3) In the near future, _____ intelligence will manage most heavy manufacturing processes.
- 4) Many domestic _____ like washing machines and refrigerators now use automation.
- 5) High-speed _____ connections allow engineers to control robotic arms remotely.
- 6) The continuous development of _____ systems makes human labor safer and faster.
- 7) Scientists conduct extensive _____ to find new ways of increasing solar panel _____.
- 8) Tomorrow, our technical team will install several _____ sensors around the factory floor.
- 9) Wireless data _____ help automated machines exchange telemetry data in real time.
- 10) The world is moving toward a completely _____ economy driven by automated logistics.
- 11) New industrial _____ protect sensitive software from dangerous external cyberattacks.
- 12) Automated control _____ prevent accidents by instantly cutting power during emergencies.
- 13) Young _____ must constantly update their knowledge to keep up with scientific progress.
- 14) This new technology guarantees a significant reduction in total energy _____.
- 15) We are going to implement an _____ backup solution for all engineering databases next month.

Task 2. Grammar Focus: Future Forms

Complete the sentences with the correct future form of the verbs in brackets (will/won't, going to, or Present Continuous).

- 1) According to the official schedule, we _____ (meet) the chief automation developer tomorrow at 10 AM.
- 2) I think that artificial intelligence _____ (replace) traditional programming languages in twenty years.
- 3) Look at those loose wires! The control panel _____ (short-circuit) if you turn it on.
- 4) Next semester, our university _____ (open) a brand-new laboratory for drone engineering.
- 5) Wait, I see a bug in your script; I _____ (help) you fix it right now.
- 6) The company _____ (invest) millions of dollars into fully automated factories next year; it's their official strategy.
- 7) Experts predict that robots _____ (not/take) all human jobs, but they will change them.
- 8) I _____ (buy) a new digital multimeter this afternoon because my old one broke yesterday.
- 9) Tomorrow at noon, the technician _____ (install) the new robotic software module.
- 10) Technology _____ (become) even more integrated into our bodies in the distant future.
- 11) Careful! That industrial robotic arm _____ (hit) the safety barrier if you don't press stop!
- 12) We _____ (not/conduct) any field experiments next week because the main facility is undergoing maintenance.
- 13) I promise I _____ (send) you the technical layout of the computer-integrated system tonight.
- 14) Our university group _____ (visit) the automated automobile assembly plant next Thursday morning.
- 15) Do you think that smart machines _____ (learn) to fix themselves without human intervention?

Task 3. Technical Translation

Translate the following sentences into English using appropriate future forms and technical terms.

- 1) Завтра о дев'ятій годині ми тестуватимемо нову систему автоматизації в лабораторії.
- 2) Я впевнений, що технології штучного інтелекту змінять наше життя через десять років.

- 3) Обережно! Робот зараз впаде, якщо ти не вимкнеш живлення негайно!
- 4) Наступного місяця керівництво збирається придбати три нові лазерні датчики.
- 5) Зачекайте, я зараз принесу вам технічну інструкцію до цього контролера.
- 6) Наступного вівторка студенти складають важливий іспит з комп'ютерно-інтегрованих технологій.
- 7) Вчені вважають, що у майбутньому заводи взагалі не використовуватимуть ручну працю.
- 8) Ми збираємося розробити новий алгоритм для керування цим роботом-маніпулятором.
- 9) Ця комп'ютерна програма не працюватиме без спеціального оновлення безпеки.
- 10) Я надішлю вам результати лабораторного експерименту, як тільки комп'ютер завершить аналіз.
- 11) Наступного року наша кафедра купує сучасний 3D-принтер для друку деталей роботів.
- 12) Робототехніка розвиватиметься ще швидше завдяки використанню нових матеріалів.
- 13) Подивіться на цей графік перегріву! Система скоро вимкнеться автоматично.
- 14) Наступного тижня ми зустрічаємося з представниками міжнародної інженерної компанії.
- 15) Чи замінять комп'ютери професію інженера з автоматизації у найближчому майбутньому?

Task 4. Correct the mistakes

Identify and correct one grammatical or lexical error in each of the following sentences.

- 1) I will going to study industrial robotics because I love smart machines and automation.
- 2) The conference on computer-integrated technologies is starting tomorrow at nine, as agreed.
- 3) Look at the temperature monitor! The boiler will explode because the pressure is too high!
- 4) I think robots are helping doctors perform complex surgical operations in twenty years.
- 5) We are meeting the factory representatives tomorrow, we already bought the train tickets.

- 6) The software won't working properly if you don't install the latest security patch.
- 7) I'm helping you to configure that programmable logic controller if you want.
- 8) Scientists are going to discover a new superpower source before the end of this century.
- 9) The automated production line is being closed for modernization next month.
- 10) I promise I am calling you as soon as the robotic system finishes its calibration cycle.
- 11) Artificial intelligence will definitely to dominate the technical job market in the future.
- 12) Our group is visit the science museum next Friday to see historical automation devices.
- 13) Be careful! You are burning your fingers if you touch that hot soldering iron!
- 14) This technical device isn't going to operate without a permanent power supply system.
- 15) I will studying for my automation exam all evening, so don't call me, please.

Task 5. Sentence Transformation & Synthesis

Rewrite or combine the sentences according to the instructions in brackets, focusing on future meaning.

- 1) We plan to build a new automated warehouse next summer. (Rewrite using *going to*)
- 2) The machine will stop. It will happen immediately after you press the emergency button. (Combine using *as soon as*)
- 3) The university arranged a special technical workshop for us this Friday. (Rewrite using *Present Continuous for future*)
- 4) I expect a great breakthrough in green energy technology very soon. (Rewrite starting with *A great breakthrough...*)
- 5) I intend to write a program for this microcontroller tonight. (Rewrite using *going to*)
- 6) The engineering team will test the circuits. First, they must receive the necessary equipment. (Combine using *once*)
- 7) Perhaps machines will replace human assembly workers completely. (Rewrite using *will probably*)
- 8) Look at that unstable robot arm! It is clear that it will drop the sensor. (Rewrite using *going to*)
- 9) I promise to fix this line of code for you. (Rewrite using *will*)

- 10) We have an official arrangement to install the software on Wednesday morning. (Rewrite using *Present Continuous*)
- 11) The technician will update the system. The power supply will be stable. (Combine using *provided that*)
- 12) Scientists won't find a solution. They need to analyze more experimental data first. (Combine using *unless*)
- 13) They plan to automate the entire sorting process by winter. (Rewrite using *going to*)
- 14) I will finish the schematic diagram. Then I will go home immediately. (Combine using *after*)
- 15) Technology changes constantly. It will create many new engineering professions. (Combine using *which will*)

TEMA 3. Computer-Integrated Technologies: Key Concepts

Grammar Focus: Present Perfect vs. Simple Past.

Professional Vocabulary: integration, manufacturing, software, database, hardware, network, monitoring, feedback, controller, process, efficiency, upgrade, digitalize, collect, introduce.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **integration, hardware, software, process, system, collected, optimized, manufacturing, digitized, monitoring, introduced, controller, efficiency, data, network.***

- 1) Computer-integrated _____ combines all stages of production into a single digital system.
- 2) The team has already _____ the entire production process using a new software algorithm.
- 3) Yesterday, the lab assistant connected the central computer to the local area _____.
- 4) We have recently installed a new programmable logic _____ to handle the automated sorting.
- 5) In 1970, engineers _____ the first basic digital control systems to heavy industries.
- 6) The sensor has just _____ real-time data about the pressure inside the main pipe.
- 7) Effective data _____ allows managers to see production speed and errors instantly.

- 8) They have already _____ all the technical blueprints from paper into digital formats.
- 9) This computer program analyzes incoming engineering _____ to predict equipment failures.
- 10) The complete _____ of software and hardware components took three months last year.
- 11) Our university laboratory bought new computer _____ for simulating complex robotic systems.
- 12) The plant manager announced that automation has increased factory _____ by thirty percent.
- 13) They changed the system settings yesterday to make the continuous chemical _____ safer.
- 14) The continuous automated _____ of temperature prevents the machinery from overheating.
- 15) Have you ever configured a computer-integrated manufacturing _____ before?

Task 2. Grammar Focus: Present Perfect vs. Simple Past

Put the verbs in brackets into the Present Perfect or Simple Past tense.

- 1) Last year, our university _____ (purchase) five advanced robotic arms for student research.
- 2) The lead engineer _____ (just / update) the central database with the new technical specifications.
- 3) I _____ (already / complete) my practical assignment on computer-integrated systems.
- 4) In 2021, the factory _____ (replace) its old analog hardware with digital controllers.
- 5) Mechanics _____ (not / finish) repairing the main automated conveyor belt yet.
- 6) When _____ you _____ (install) this specific automation software on your PC?
- 7) We _____ (test) the pressure sensors three times yesterday morning.
- 8) The digital monitoring system _____ (never / failed) since we started using it.
- 9) The automated system _____ (send) an emergency notification to the technician two minutes ago.
- 10) Thousands of industries _____ (become) fully digitized over the last decade.
- 11) Our professor _____ (work) as a senior systems engineer for ten years before he joined the university.

- 12) _____ you ever _____ (see) a fully automated smart factory in real life?
- 13) The operators _____ (not / notice) the system error during the previous test cycle.
- 14) I _____ (lose) my flash drive containing the microchip layouts; I can't find it anywhere now.
- 15) The team _____ (successfully / integrate) the new sensor network last week.

Task 3. Technical Translation

Translate the following sentences into English using Present Perfect or Simple Past appropriately.

- 1) Минулого тижня студенти створили алгоритм для автоматизованої системи сортування.
- 2) Головний інженер щойно підключив контролер до центральної комп'ютерної мережі.
- 3) Ви коли-небудь працювали зі спеціалізованим програмним забезпеченням для роботів?
- 4) У 2023 році компанія модернізувала всі свої комп'ютерно-інтегровані системи.
- 5) Наш лаборант ще не перевіряв нове цифрове обладнання для вимірювання напруги.
- 6) Коли саме ви помітили цю помилку в коді керування автоматикою?
- 7) Автоматизація виробництва значно підвищила точність виготовлення деталей за останні роки.
- 8) Вчора система моніторингу зафіксувала різке зниження тиску в компресорі.
- 9) Я вже написав звіт про практичне застосування промислових контролерів.
- 10) Вони не оновлювали це програмне забезпечення з минулого літа.
- 11) Дві години тому датчики надіслали перші дані про температуру двигуна.
- 12) Наша команда успішно завершила проект інтеграції робототехніки минулого місяця.
- 13) Цей студент ніколи не бачив, як працює сучасний промисловий маніпулятор.
- 14) Ми змінили налаштування безпеки конвеєра дві хвилини тому.
- 15) Комп'ютерні технології повністю змінили вигляд сучасних заводів за останні двадцять років.

Task 4. Correct the mistakes

Identify and correct one grammatical or lexical error in each of the following sentences.

- 1) The automation department has bought three new digital oscilloscopes last Friday.
- 2) Did you ever adjusted a programmable logic controller during your laboratory classes?
- 3) The system engineering team didn't finished the software integration process yet.
- 4) In 2018, our university has introduced a new specialization in industrial robotics.
- 5) I have seen the new technical drawing two minutes ago on the professor's desk.
- 6) The factory output has increased significantly when they installed robots last year.
- 7) We already verified the electrical circuits, so you can turn on the main power now.
- 8) Have you received the error log that the automated system sent it yesterday morning?
- 9) The technical assistant has opened the laboratory door, stepped inside, and turns on the computers.
- 10) I haven't never encountered such a strange bug in the microcontroller's firmware before.
- 11) The data monitoring software recorded three critical system crashes since last Monday.
- 12) Automation technology changed a lot over the last few years, making human life easier.
- 13) When have you downloaded this technical manual about computer-integrated manufacturing?
- 14) The automated machine has stopped working suddenly because someone pulled the wire out.
- 15) Our group already passed the final test on technical English vocabulary last week.

Task 5. Sentence Transformation & Synthesis

Rewrite or combine the sentences according to the instructions in brackets, paying attention to tense changes.

- 1) This is the first time I have programmed an industrial robotic arm. (Rewrite starting with *I have never...*)

- 2) The technician calibrated the sensor. Then he tested the control loop.
(Combine using *after* + *Past Perfect*)
- 3) The plant integrated its software systems in 2022. (Change into a question starting with *Since when* / *How long ago*)
- 4) We still haven't fixed the error in the main program. (Rewrite using *yet* at the end)
- 5) The engineers updated the hardware. The factory performance improved immediately. (Combine using *As soon as*)
- 6) I began studying computer-integrated technologies three years ago. (Rewrite using *Present Perfect with for*)
- 7) They installed the automated line. Then they checked its productivity. (Combine using *Before* + *-ing*)
- 8) This machine was completely manual. Now it is fully automated. (Combine using *Present Perfect to show change*)
- 9) The operator pressed the button. The conveyor belt started moving. (Combine using *when*)
- 10) I have not calibrated an electronic device like this for many years. (Rewrite using *It's been years since...*)
- 11) The software crashed. We lost all the simulated telemetry data. (Combine using *because*)
- 12) The laboratory purchased new computers. They have already arrived. (Combine into one concise sentence)
- 13) They digitized the archives. They saved a lot of office space. (Combine using *by* + *-ing*)
- 14) The student finished his presentation. The professor asked him a difficult question. (Combine using *Once*)
- 15) He worked as an operator for five years. He doesn't work there anymore. (Ensure the use of correct past tense)

TEMA 4. Automation in Industry

Grammar Focus: Articles: a/an, the, no Article.

Professional Vocabulary: assembly line, conveyor, efficiency, industry, human labor, plant, mass production, quality control, manufacturing, sensor, raw material, reduction, maintenance.

Task 1. Vocabulary & Context Clues

Fill in the blanks with the correct professional terms from the list: assembly, conveyor, reduction, efficiency, sensors, human, maintenance, plant, quality, manufacturing, materials, mass, automated, engineers, tools.

- 1) Modern factories use a continuous _____ belt to move products from one station to another.
- 2) The primary goal of industrial automation is to increase total production _____.
- 3) Automated _____ control systems check every product for defects using digital cameras.
- 4) Heavy industrial robots can lift raw _____ and components without any human assistance.
- 5) High-precision _____ detect any changes in the speed of the automated production line.
- 6) The transition to fully automated systems causes a significant _____ in operational costs.
- 7) Regular technical _____ is necessary to prevent sudden breakdowns of complex machinery.
- 8) A modern automotive _____ can produce hundreds of electric vehicles every single day.
- 9) Before automation, factories relied heavily on dangerous and repetitive _____ labor.
- 10) The invention of the _____ line completely changed the face of world manufacturing.
- 11) Computer-controlled machines can cut metal and plastic components with incredible _____.
- 12) Smart technologies allow modern manufacturers to implement flexible _____ processes.
- 13) Specialized software helps design efficient layouts for an automated industrial _____.
- 14) Cheap and fast _____ production became possible thanks to early mechanical automation.
- 15) Young engineering students learn how to program automated CNC _____ in our laboratory.

Task 2. Grammar Focus: Articles (a/an, the, zero article)

Insert a, an, the, or Ø (no article) into the blanks to complete the technical sentences.

- 1) Modern industry heavily relies on _____ automation to maximize financial profits.
- 2) We have installed _____ new programmable logic controller on the main assembly line.
- 3) _____ sensor that we calibrated yesterday is working much better than the old one.

- 4) It takes _____ hour for the robotic system to complete a full diagnostic cycle.
- 5) Engineers often use _____ aluminum because it is a lightweight and durable metal.
- 6) Look at _____ monitor over there; it shows a dangerous drop in hydraulic pressure.
- 7) Fully automated plants can operate twenty-four hours _____ day without any problems.
- 8) _____ computer-integrated technologies combine software, hardware, and networks.
- 9) Our university has built _____ advanced laboratory for studying industrial robotics.
- 10) _____ efficiency of this specific electric motor depends on the input voltage.
- 11) To start the manufacturing process, press _____ red button on the control panel.
- 12) Every specialist needs _____ deep understanding of modern digital technologies.
- 13) _____ safety at work is the main priority for any industrial enterprise today.
- 14) They are currently testing _____ autonomous vehicle inside the main warehouse.
- 15) _____ internet allows engineers to monitor industrial processes from home.

Task 3. Technical Translation

Translate the following sentences into English, paying special attention to the correct use of articles and technical terms.

- 1) Автоматизація промисловості зменшує кількість помилок, які робить людина.
- 2) Ми встановили новий датчик тиску на головний конвеєр три години тому.
- 3) Роботизована лінія збирання працює двадцять чотири години на добу.
- 4) Професор увімкнув комп'ютер, щоб показати нам схему нової мікросхеми.
- 5) Нам потрібна година, щоб оновити програмне забезпечення цього контролера.
- 6) Якість продукції на заводі контролюється спеціальними цифровими камерами.

- 7) Інженери часто використовують мідь для виготовлення електричних кабелів.
- 8) Комп'ютерно-інтегровані технології роблять масове виробництво набагато дешевшим.
- 9) Подивіться на екран: температура всередині двигуна швидко зростає.
- 10) Цей робот може переносити важкі матеріали без допомоги людини.
- 11) Регулярне технічне обслуговування запобігає серйозним аваріям на виробництві.
- 12) Наш університет має велику лабораторію для тестування промислових систем.
- 13) Сучасні заводи використовують штучний інтелект для оптимізації логістики.
- 14) Натисніть зелену кнопку, щоб запустити автоматичний процес сортування.
- 15) Безпека праці є найважливішим правилом для кожного молодого інженера.

Task 4. Correct the mistakes

Identify and correct one error regarding articles or technical terminology in each sentence.

- 1) A automated assembly line can produce thousands of standard microchips per hour.
- 2) The efficiency of a industrial processes increases when you reduce manual human labor.
- 3) We checked an sensors yesterday, and they are all transmitting accurate digital data.
- 4) It is important to perform the regular maintenance to avoid sudden machine breakdowns.
- 5) The automation engineer needs a deep knowledge of the computer programming.
- 6) Look at a control panel on the wall; the emergency light is blinking red!
- 7) An uniform distribution of electrical power protects fragile electronic circuits from damage.
- 8) Factories use the robots to perform dangerous and highly repetitive manual tasks.
- 9) Our laboratory bought the new digital oscilloscope last week from a German supplier.
- 10) Air is a poor conductor of electricity, which is important for high-voltage systems.

- 11) The student wrote a code for the microcontroller, but code has three logical errors.
- 12) Computer-integrated technology makes a mass production faster and more reliable.
- 13) We are going to replace a old conveyor belt with a brand-new automated one.
- 14) The information technologies are developing rapidly all over the modern world.
- 15) She wants to become an automation engineer after graduating from the university.

Task 5. Sentence Transformation & Synthesis

Combine or modify the sentences according to the instructions in brackets, ensuring correct article usage.

- 1) The factory installed a robot. The robot packs components into plastic boxes. (Combine using *which*)
- 2) Automation cuts production costs. Automation improves product quality. (Combine using *not only... but also*)
- 3) Technicians must check the sensors every morning. This is an important rule. (Rewrite starting with *Checking the sensors...*)
- 4) The conveyor belt stopped. The motor was completely overheated. (Combine using *because*)
- 5) We study technical English. We want to read international engineering manuals. (Combine using *in order to*)
- 6) The machine requires maintenance. The maintenance must be done immediately. (Combine into a concise sentence)
- 7) A digital camera scans the barcodes. It sends the data to a central server. (Combine using *and then*)
- 8) Human labor is expensive. Automated manufacturing is cheap. (Combine using *while*)
- 9) The automated system found a defect. The defect was inside the aluminum plate. (Combine using *located*)
- 10) They use a programmable controller. It manages the entire chemical process. (Combine using *to manage*)
- 11) The assembly line is fully digitalized. This makes the plant highly flexible. (Combine using *which*)
- 12) I bought an electronic component. The component is lying on my laboratory desk. (Combine into one sentence)
- 13) Engineers calibrated the optical sensors. They did it during the afternoon shift. (Rewrite in the passive voice)

14) Smart machines save energy. They also reduce raw material waste.

(Combine using *besides*)

15) The system generates a daily report. The report contains fifteen tables.

(Combine using *consisting of*)

TEMA 5. Robotics: Past, Present, and Future

Grammar Focus: Can, Could, be Able to; Reflexive Pronouns (myself, itself, themselves, etc.).

Professional Vocabulary: history, mechanical, autonomous, drone, humanoid, evolution, limitation, manipulation, upgrade, industry, sensor, software, vision system.

Task 1. Vocabulary & Context Clues

Fill in the blanks with the correct professional terms from the list:

autonomous, history, humanoid, drones, limitations, evolution, mechanics, manipulate, future, vision, soft, programmed, software, sensors, device.

1) The _____ of robotics began centuries ago with simple mechanical automatons.

2) Early industrial robots could not move freely because of their technological _____.

3) Modern _____ robots have legs and arms, making them look similar to humans.

4) Quadcopter _____ are now widely used for aerial photography and cargo delivery.

5) In the near future, completely _____ cars will navigate heavy city traffic easily.

6) Advanced robotic arms can _____ tiny electronic components with sub-millimeter precision.

7) The rapid _____ of microprocessors allowed engineers to build smaller and smarter robots.

8) Advanced artificial _____ systems help autonomous vehicles recognize traffic lights and obstacles.

9) Early mechanical devices were controlled by gear systems, but today we use digital _____.

- 10) High-tech robots are equipped with multiple _____ to measure distance, temperature, and pressure.
- 11) Some futuristic robots are made of flexible materials, which is known as _____ robotics.
- 12) A basic robotic arm can protect _____ from mechanical damage if it has proximity sensors.
- 13) Engineers have _____ the machine to stop automatically during an unexpected electric overload.
- 14) Studying the _____ of science helps us understand how modern automation was invented.
- 15) This smart device is able to calibrate _____ without any human intervention.

Task 2. Grammar Focus: Modals of Ability & Reflexive Pronouns

*Complete the sentences with appropriate forms of **can, could, or be able to** and the correct **reflexive pronoun** (himself, itself, themselves, etc.).*

- 1) Early mechanical robots _____ not analyze data because they lacked microchips.
- 2) Today, a modern robotic arm _____ calibrate _____ using advanced software algorithms.
- 3) After next month's hardware upgrade, the drone _____ (will / be able to) fly by _____.
- 4) We _____ easily fix this simple coding mistake in the microchip firmware _____.
- 5) The automated machine protected _____ from overheating because it _____ detect the temperature rise.
- 6) Industrial robots nowadays _____ perform heavy lifting operations all by _____.
- 7) Fifty years ago, engineers _____ not create complex computer-vision systems for machines.
- 8) If the system is fully autonomous, it must _____ (be able to) repair _____ during a failure.
- 9) The student built a small walking robot all by _____ for his final university project.
- 10) Due to a dead battery, the robotic vehicle _____ not return to the charging station yesterday.
- 11) Modern automated systems _____ optimize _____ over time thanks to machine learning.
- 12) With this new tool, you _____ (will / be able to) program the controller by _____ next week.

- 13) The heavy industrial manipulators _____ move huge metal sheets across the workshop floor.
- 14) The software update was so simple that it installed _____ without any human help.
- 15) The young inventor _____ explain the complex mechanics of his humanoid robot very well.

Task 3. Technical Translation

Translate the following sentences into English, using modals of ability and reflexive pronouns.

- 1) П'ятдесят років тому роботи не могли самостійно приймати рішення.
- 2) Сучасна автоматизована система може самостійно виправляти дрібні помилки в коді.
- 3) Після модернізації цей безпілотник зможе літати повністю автономно.
- 4) Ми можемо самостійно зібрати цю просту електричну схему в лабораторії.
- 5) Цей промисловий робот захистив себе від перевантаження завдяки новому датчику.
- 6) Майбутні гуманоїдні роботи зможуть допомагати людям по господарству.
- 7) Студенти змогли запрограмувати контролер самостійно без допомоги викладача.
- 8) Через зламаний кабель маніпулятор не зміг завершити процес зварювання вчора.
- 9) Розумні машини здатні адаптуватися до нових умов на заводі самостійно.
- 10) Раніше інженери не могли створювати такі маленькі та точні мікросхеми.
- 11) Ви зможете налаштувати цю роботизовану систему самостійно наступного тижня.
- 12) Цей автономний автомобіль може самостійно паркуватися у вузьких місцях.
- 13) Минулого року наша команда не змогла виграти конкурс з робототехніки.
- 14) Програма оновилася сама після того, як комп'ютер підключився до мережі Інтернет.
- 15) Чи зможуть роботи повністю замінити людей на заводах у найближчому майбутньому?

Task 4. Correct the mistakes

Identify and correct one error regarding modals of ability, reflexive pronouns, or technical vocabulary.

- 1) Modern industrial robots can to perform highly precise surgical tasks under human control.
- 2) The automated system turned off myself when the pressure exceeded the critical limit.
- 3) Yesterday, the lab technicians will be able to calibrate all fifteen digital sensors.
- 4) Early engineers could not built autonomous drones because computers did not exist yet.
- 5) A smart machine should be able to analyze data and optimize themselves continuously.
- 6) We configured the entire local area network for the robots all by ourselves.
- 7) I am sure that robots are able to replacing human delivery drivers in five years.
- 8) The robotic arm injured the technician because it could not stopping in time.
- 9) The students designed the electronic circuits by hiself during the practical class.
- 10) This software can updates itself every time a new version is uploaded to the server.
- 11) Five years ago, our university group isn't able to construct a walking humanoid robot.
- 12) The automated machine tool cut the metal plate perfectly all by itself.
- 13) To work in space, a robotic device must can withstand extreme temperature changes.
- 14) The operators could solved the system configuration error within twenty minutes.
- 15) The drone stabilized itself in the strong wind because it had an advanced gyroscope.

Task 5. Sentence Transformation & Synthesis

Rewrite or combine the sentences according to the instructions in brackets, maintaining correct technical context.

- 1) The robot is capable of adjusting its own speed. (Rewrite using *can* and a reflexive pronoun)
- 2) We fixed the hardware problem. No one helped us. (Combine into one sentence using a reflexive pronoun)

- 3) In the past, machines lacked sensors. They were unable to see obstacles. (Combine using *could not*)
- 4) Future robots will have advanced AI. They will solve complex algorithmic problems. (Combine using *will be able to*)
- 5) The system reboots. It does this automatically when an error occurs. (Rewrite using *itself*)
- 6) He built a drone. He didn't ask for any assistance from his classmates. (Combine using *by himself*)
- 7) The robotic arm can lift 50 kilograms. This is its maximum weight limit. (Combine into one concise sentence)
- 8) Technicians updated the code. Now the machine can process data twice as fast. (Combine using *so that*)
- 9) The battery died. As a result, the autonomous vehicle was unable to move. (Combine using *because*)
- 10) You want to program a microcontroller. You need a dedicated USB cable. (Combine using *To program...*)
- 11) The software detects bugs. It isolates them without human intervention. (Combine using *and then itself*)
- 12) Long ago, people dreamed of artificial servants. They couldn't build them. (Combine using *but could not*)
- 13) The robot arm moves smoothly. It uses pneumatic actuators to achieve this. (Combine using *by using*)
- 14) This smart machine checks its own internal temperature every ten seconds. (Rewrite using *itself*)
- 15) Computer vision is developing fast. Robots can recognize objects more accurately now. (Combine using *allowing robots to*)

TEMA 6. Types of Robots and Their Applications

Grammar Focus: Modals of Obligation: Must, Have to, Should.

Professional Vocabulary: industrial robot, mobile robot, medical, military, agricultural, underwater, application, hazardous environment, sorting, assembly, safety regulation, instruction.

Task 1. Vocabulary & Context Clues

Fill in the blanks with the correct professional terms from the list: industrial, medical, hazardous, agricultural, applications, mobile, underwater, sorting, environment, safety, instructions, military, operators, robots, maintenance.

- 1) Fully automated _____ robots are widely used in car manufacturing plants for welding.

- 2) Advanced _____ robots help surgeons perform complex operations with minimal incisions.
- 3) Autonomous _____ vehicles can navigate across rough fields to harvest crops automatically.
- 4) Unmanned _____ robots can explore the deep ocean floor where pressure is too high for humans.
- 5) Robots are perfect for working in a _____ environment, such as a nuclear power plant.
- 6) Automated _____ machines use sensors to separate plastic bottles from glass ones.
- 7) Mobile warehouse robots are responsible for _____ and moving heavy pallets of goods.
- 8) Modern drone technologies have many dangerous _____ in reconnaissance and defense.
- 9) To avoid accidents, machine _____ must strictly follow all technical safety regulations.
- 10) The technical manual provides clear _____ on how to install the robotic control unit.
- 11) Unlike fixed manipulators, _____ robots can move around the factory floor using wheels.
- 12) Exploring a volcanic _____ is much safer when you use remote-controlled rovers.
- 13) Regular software updates are essential for the safe operation of modern industrial _____.
- 14) Technicians must wear protective gear when performing _____ on high-voltage machines.
- 15) Automated technology finds new and exciting _____ in everyday human life every year.

Task 2. Grammar Focus: Modals of Obligation (Must, Have to, Should)

*Fill in the blanks with **must**, **have to** (or its forms), or **should** based on the level of obligation required.*

- 1) All employees _____ wear safety glasses when entering the automated welding zone. (Strict rule)
- 2) Students _____ study the basic principles of mechanics before they start building robots. (Advice)
- 3) The technician was sick yesterday, so another worker _____ calibrate the sensors. (Past obligation)
- 4) You _____ never touch exposed electrical wires while the power supply is turned on. (Prohibition)

- 5) To become a professional automation engineer, you _____ pass several difficult exams. (Necessity)
- 6) I think you _____ update your operating system; it will make your programming software run faster. (Recommendation)
- 7) According to factory rules, operators _____ log out of the system at the end of their shift. (Company rule)
- 8) We don't _____ write the entire code today; the deadline is not until next Friday. (Lack of obligation)
- 9) Young engineers _____ listen to the advice of experienced laboratory assistants. (Strong recommendation)
- 10) To prevent a short circuit, the main control unit _____ be completely waterproof. (Essential requirement)
- 11) Yesterday, the engineering team _____ modify the robotic algorithm due to a system bug. (Past necessity)
- 12) You _____ use a digital multimeter if you want to measure electrical resistance accurately. (Advice)
- 13) Automated vehicles _____ stop immediately if a human step into their driving path. (Absolute rule)
- 14) Students _____ clean their laboratory workspace after finishing an electronics experiment. (Rule)
- 15) I think the company _____ invest more money in eco-friendly agricultural drones. (Opinion/Advice)

Task 3. Technical Translation

Translate the following sentences into English, using appropriate modals of obligation.

- 1) Усі робітники повинні носити захисні шоломи на території автоматизованого заводу.
- 2) Вам слід оновити антивірусну програму на цьому керуючому комп'ютері.
- 3) Вчора інженерам довелося замінити три датчики через раптове перевантаження.
- 4) Студенти не зобов'язані завершувати лабораторну роботу сьогодні, дедлайн наступного тижня.
- 5) Ніколи не можна змінювати налаштування контролера без дозволу головного інженера.
- 6) Для створення надійного робота ви маєте глибоко розуміти закони фізики.
- 7) Я вважаю, що керівництву слід придбати нових медичних роботів для лікарні.

- 8) Згідно з інструкцією, цей кабель має бути підключений до заземлення.
- 9) Операторам конвеєра довелося зупинити виробництво вчора через технічну помилку.
- 10) Роботи для небезпечних середовищ повинні витримувати високий рівень радіації.
- 11) Тобі слід перевірити схему ще раз перед тим, як вмикати живлення.
- 12) Студенти мають прибирати свої робочі місця після закінчення занять з робототехніки.
- 13) Автономні транспортні засоби повинні негайно зупинятися перед будь-якою перешкодою.
- 14) Нам не довелося довго чекати, поки комп'ютер завершить аналіз даних.
- 15) Майбутні інженери мають вивчати технічну англійську для роботи за кордоном.

Task 4. Correct the mistakes

Identify and correct one error regarding modals of obligation, verb forms, or technical vocabulary.

- 1) All technicians must to turn off the main power source before repairing the machine.
- 2) The company had to replaced five mobile warehouse robots after the fire last year.
- 3) You shouldn't never modify the safety settings of an industrial robotic manipulator.
- 4) To operate a medical robot, a surgeon has to undergoing intensive practical training.
- 5) Students don't must pay for using the university engineering software in the lab.
- 6) I think we should to install additional proximity sensors on this automated vehicle.
- 7) The operator must wears a static-dissipative wrist strap when handling microchips.
- 8) Yesterday, the maintenance team must fix a major breakdown on the assembly line.
- 9) Underwater robots should be completely sealed so that water cannot enter inside.
- 10) You don't have to touch that burning component because you will hurt your hand.

- 11) Engineering students ought follow the official instructions when assembling circuits.
- 12) Agricultural drones has to process heavy imaging data to map fields accurately.
- 13) The control software should automatically shuts down the system during an emergency.
- 14) Operators had to waiting for two hours until the system finished its reboot cycle.
- 15) You must always verify the calibration data before starting a precise sorting robot.

Task 5. Sentence Transformation & Synthesis

Rewrite or combine the sentences according to the instructions in brackets, maintaining correct modal meaning.

- 1) It is a strict rule to turn off the laser after use. (Rewrite using *must*)
- 2) I advise you to read the technical manual carefully. (Rewrite using *should*)
- 3) It was necessary for the team to rewrite the code yesterday. (Rewrite using *had to*)
- 4) It is not necessary for students to buy their own multimeters. (Rewrite using *don't have to*)
- 5) Do not open the control unit under any circumstances. (Rewrite using *must not*)
- 6) It is a good idea for the factory to implement smart sorting robots. (Rewrite using *should*)
- 7) The company is forced to follow strict European safety standards. (Rewrite using *has to*)
- 8) The operator failed to wear safety glasses, which was a bad idea. (Rewrite using *should have / should*)
- 9) To avoid accidents, calibration is an absolute necessity. (Rewrite using *must be calibrated*)
- 10) The machine broke down. Therefore, we were forced to call an engineer. (Combine using *so we had to*)
- 11) Read the instructions. This is my strong recommendation to you. (Rewrite using *should*)
- 12) The laboratory assistant cleaned the equipment because it was his duty. (Rewrite using *had to*)
- 13) It is prohibited to enter the robotic zone during operation. (Rewrite using *must not*)
- 14) The system is stable, so a manual reboot is not required. (Rewrite using *need not / don't have to*)

15) Autonomous drones require a stable GPS signal to function properly.
(Rewrite using *must have*)

TEMA 7. Smart Machines and Artificial Intelligence

Grammar Focus: Past Tenses: Simple, Continuous, Perfect.

Professional Vocabulary: artificial intelligence, machine learning, neural network, algorithm, data processing, automation, smart device, pattern recognition, implementation, dataset.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list:
intelligence, networks, learning, algorithms, processing, data, recognition, datasets, automation, implementation, devices, systems, patterns, optimized, prediction.*

- 1) Artificial _____ allows modern manufacturing systems to adapt to changing factory environments.
- 2) The team trained the neural _____ using thousands of images of defective machine parts.
- 3) Machine _____ models help autonomous rovers navigate unknown terrains without crashing.
- 4) Fast data _____ is essential for systems that control robotic movements in real time.
- 5) Smart _____ like intelligent thermostats can predict energy consumption patterns.
- 6) The successful _____ of AI algorithms reduced product defects by twenty percent last year.
- 7) Advanced computer vision relies heavily on complex image _____ technologies.
- 8) Genetic _____ mimic natural evolution to solve difficult engineering optimization tasks.
- 9) To train a neural network effectively, engineers must collect massive and accurate _____.
- 10) Intelligent automation _____ can detect system anomalies before a complete breakdown occurs.
- 11) The program analyzes big _____ to discover hidden correlations in machine performance.
- 12) Smart machines use voice _____ software to receive spoken commands from operators.
- 13) Predictive maintenance software uses historical data to make an accurate _____ of failures.

- 14) The industrial process was fully _____ after we introduced a deep learning model.
- 15) Modern digital _____ help automate repetitive mental tasks previously done by humans.

Task 2. Grammar Focus: Past Tenses (Simple, Continuous, Perfect)

Put the verbs in brackets into the Past Simple, Past Continuous, or Past Perfect tense.

- 1) The automation system _____ (crash) because the technician _____ (not/install) the security patch.
- 2) While the robotic arm _____ (assemble) the microchip, the power supply suddenly _____ (drop).
- 3) By the time the supervisor _____ (arrive) at the lab, the smart machine _____ (finish) its calibration.
- 4) Engineers _____ (test) the neural network all night before they finally _____ (achieve) the desired accuracy.
- 5) Yesterday at 3 PM, the intelligent sorting robot _____ (process) a huge dataset of raw materials.
- 6) We _____ (realize) that the autonomous drone _____ (lose) its GPS connection a few minutes earlier.
- 7) While the computer _____ (analyze) the sensor telemetry, the operator _____ (notice) a dangerous temperature rise.
- 8) The industrial plant _____ (use) old automated systems before management _____ (decide) to implement AI.
- 9) After the software developer _____ (write) the machine learning script, he _____ (run) a simulation.
- 10) The digital monitor _____ (blink) red while the pressure inside the boiler _____ (increase) rapidly.
- 11) They _____ (already/digitize) all technical drawings before the main engineering project _____ (begin).
- 12) What _____ you _____ (do) when the fully automated conveyor belt _____ (stop) working yesterday?
- 13) The student _____ (not/know) how to configure the smart device because he _____ (miss) the previous lecture.
- 14) The system _____ (send) an automatic warning log after it _____ (detect) a network anomaly.
- 15) The robotic vehicle _____ (move) slowly across the workshop floor when it _____ (hit) an unexpected obstacle.

Task 3. Technical Translation

Translate the following sentences into English using appropriate past tenses and professional terminology.

- 1) Розумна машина раптово зупинилася, тому що вона виявила дефект у металевій деталі.
- 2) Коли інженер зайшов до лабораторії, нейронна мережа все ще аналізувала великий набір даних.
- 3) До кінця минулого року компанія повністю впровадила технології штучного інтелекту на заводі.
- 4) Поки робот сортував компоненти, комп'ютер записував інформацію про його швидкість.
- 5) Ми зрозуміли, що програма припустилася помилки, оскільки алгоритм не пройшов належного тестування.
- 6) Наш викладач працював над проектом з машинного навчання до того, як приєднався до університету.
- 7) Що саме ви робили, коли автоматизована система надіслала це аварійне повідомлення?
- 8) Коли оператор натиснув кнопку аварійної зупинки, конвеєр уже припинив рух.
- 9) Розумний датчик зафіксував різке падіння напруги, поки ми проводили технічний експеримент.
- 10) Студенти успішно завершили лабораторну роботу після того, як виправели всі помилки в коді.
- 11) Минулого тижня ми протестували новий алгоритм розпізнавання образів для камер безпеки.
- 12) Цифровий контролер перегрівся, тому що охолоджувальна система забилася пилом.
- 13) Поки безпілотник летів над полем, його сенсори збирали дані про стан ґрунту.
- 14) До того як заводи стали комп'ютерно-інтегрованими, люди виконували всю роботу вручну.
- 15) Програма автоматично видалила файл, оскільки вона виявила небезпечний вірус.

Task 4. Correct the mistakes

Identify and correct one grammatical or lexical error in each of the following sentences.

- 1) While the AI system was calculated the efficiency parameters, the server ran out of memory.
- 2) The team had successfully integrated the neural network before they start the live production test.

- 3) Yesterday at noon, the automated machinery was undergo a complete technical inspection.
- 4) The smart machine stopped because it has encountered an unknown algorithmic error.
- 5) We were knowing that artificial intelligence required powerful graphic processors to work well.
- 6) The drone crashed while it flew over the automated manufacturing facility last Tuesday.
- 7) By the time the technician turned on the backup generator, the central database already crashed.
- 8) The pattern recognition software detected a flaw after the robot already finished the welding.
- 9) Why did the controller sending error logs while you were updating the core software?
- 10) In 2024, our department has established a research group for smart automation systems.
- 11) The laboratory assistant adjusted the sensor while the robotic arm moved across the zone.
- 12) The industrial machine learning algorithm worked perfectly until the network cable broke.
- 13) Students didn't brought their laptop computers, so they couldn't run the Python script.
- 14) The data processing software had processed half of the dataset when the computer frozen.
- 15) The expert was explaining how neural networks operate while the students took notes.

Task 5. Sentence Transformation & Synthesis

Rewrite or combine the sentences according to the instructions in brackets, focusing on past events.

- 1) The robot completed the scanning process. Then the operator checked the final report. (Combine using *after* + *Past Perfect*)
- 2) The network crashed. At that exact time, the software was downloading an update. (Combine using *while*)
- 3) Engineers developed a new AI model. They presented it at an international conference. (Combine using *and then*)
- 4) The system was completely down. Someone had pulled out the main power plug. (Combine using *because*)
- 5) The machine was calibrated. This happened before the morning shift started. (Combine using *by the time*)

- 6) I read the technical guide on deep learning. Then I started writing the script. (Combine using *once*)
- 7) The smart device monitored the temperature. It did this for three consecutive hours yesterday. (Rewrite using *Past Continuous*)
- 8) We fixed the software bug. The machine immediately began to operate smoothly. (Combine using *As soon as*)
- 9) The camera recognized the facial features. It sent a signal to open the automated door. (Combine using *and instantly*)
- 10) The laboratory lacked the necessary equipment. Therefore, they cancelled the experiment. (Combine using *due to*)
- 11) He was an automation consultant for ten years. Then he retired last winter. (Combine into one sentence using *before*)
- 12) The data processing cycle was long. It required a massive amount of electric energy. (Combine using *which*)
- 13) The technician modified the algorithmic parameters. This solved the system stabilization issue. (Combine using *by + -ing*)
- 14) The system detected an emergency. It shut down all the manufacturing lines. (Combine using *having + Past Participle*)
- 15) The students were studying machine learning. The alarm bell rang suddenly. (Combine using *when*)

TEMA 8. Technical Professions and Career Opportunities

Grammar Focus: Prepositions of Time (in, on, at, during, for, since); Present Simple vs. Present Continuous.

Professional Vocabulary: automation engineer, systems integrator, job market, career path, employment, skills, qualification, responsibility, manufacturing plant, interview.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **engineer, integrator, career, employment, qualifications, responsibilities, market, interview, plant, skills, profession, developers, industry, trainees, positions.***

- 1) An experienced automation _____ can earn a high salary in modern industrial sectors.
- 2) Choosing a stable _____ path in robotics requires continuous learning and hard work.
- 3) The modern job _____ offers excellent opportunities for graduates who know technical English.

- 4) A systems _____ is responsible for connecting different hardware components into a single network.
- 5) To get a good job, you must present a professional resume highlighting your technical _____.
- 6) High-level professional _____ include certificates in PLC programming and industrial safety.
- 7) One of the main _____ of a maintenance technician is inspecting automated assembly lines.
- 8) He is preparing for a technical job _____ at an international robotics corporation tomorrow.
- 9) This modern automotive _____ employs hundreds of specialists in computer-integrated technologies.
- 10) The rapid growth of automation technologies creates a high demand for software _____.
- 11) Young engineering graduates often start their careers as junior _____ in large plants.
- 12) The robotics _____ is developing so fast that universities must constantly update curricula.
- 13) There are many open engineering _____ for specialists who understand smart manufacturing.
- 14) Learning how to manage projects is an important skill for achieving long-term _____ success.
- 15) Being an engineer is a highly respected _____ that combines science, logic, and creativity.

Task 2. Grammar Focus: Present Tenses & Prepositions of Time

Complete the sentences with the correct present tense form of the verbs in brackets and insert appropriate prepositions of time (in, on, at, during, for, since).

- 1) Our chief systems integrator usually _____ (arrive) at the facility _____ 8:30 _____ the morning.
- 2) Currently, the company _____ (look) for a new automation engineer _____ the first time _____ two years.
- 3) Students _____ (not/attend) university lectures _____ Sundays, but they often study _____ the evening.
- 4) I _____ (prepare) for my upcoming technical job interview _____ this very moment.
- 5) Industrial plants _____ (operate) continuously _____ twenty-four hours a day _____ the week.
- 6) Mr. Smith _____ (work) as a senior robotics consultant _____ our department _____ 2022.

- 7) Look! The HR manager _____ (interview) a young applicant for the position of junior engineer _____ room 4.
- 8) Modern technical professions _____ (require) constant skill upgrading _____ the course of a career.
- 9) Our team _____ (test) the software parameters _____ present, so please don't turn off the PC.
- 10) The engineering department always _____ (organize) a safety training session _____ October every year.
- 11) Why _____ you _____ (study) the technical manual for the programmable controller _____ the weekend?
- 12) Thousands of high-tech job opportunities _____ (appear) _____ the job market _____ the digital age.
- 13) She _____ (teach) advanced computer-integrated systems _____ the university _____ five semesters.
- 14) The factory manager _____ (examine) the monthly productivity report _____ the moment.
- 15) We _____ (believe) that automation specialists _____ (get) better employment opportunities _____ Fridays.

Task 3. Technical Translation

Translate the following sentences into English, paying attention to prepositions of time and present tenses.

- 1) Мій брат працює інженером з автоматизації на великому хімічному заводі вже три роки.
- 2) Наразі ми шукаємо кваліфікованого системного інтегратора для нашого нового проекту.
- 3) Зазвичай технічні співбесіди починаються о дев'ятій годині ранку по понеділках.
- 4) Ринок праці в галузі робототехніки швидко змінюється у двадцять першому столітті.
- 5) Студенти проходять практичне навчання на підприємстві протягом літніх канікул.
- 6) Чому ти зараз читаєш про професійні обов'язки інженера з обслуговування?
- 7) Наша кафедра організовує велику наукову конференцію у травні кожного року.
- 8) Я готуюся до тесту з професійної англійської мови вже більше двох годин.
- 9) Подивіться! Директор заводу зараз розмовляє з молодими стажерами в лабораторії.

- 10) Інженери з автоматизації мають постійно оновлювати свої знання під час своєї кар'єри.
- 11) Ця міжнародна компанія пропонує чудові можливості працевлаштування для випускників АКТР.
- 12) Мій колега не працює вечорами, але він іноді перевіряє код контролера вночі.
- 13) Зараз ми розробляємо нові критерії оцінювання для майбутніх фахівців з робототехніки.
- 14) Професія інженера вимагає глибокого розуміння комп'ютерно-інтегрованих систем.
- 15) Він успішно працює керівником технічних проєктів з минулого вівторка.

Task 4. Correct the mistakes

Identify and correct one error regarding prepositions of time, tense usage, or professional vocabulary in each sentence.

- 1) The senior automation engineer is working at this manufacturing plant since ten years.
- 2) We are usually having a short technical meeting in 9 o'clock every Monday morning.
- 3) Currently, the human resources department interview three applicants for the job.
- 4) I am believing that a career path in industrial automation is very promising nowadays.
- 5) The students are practical training at a modern robotics enterprise during two weeks.
- 6) Professional qualifications in programming are highly demanded at the 21st century.
- 7) Look! The junior trainee modifies the parameters of the control loop right now.
- 8) Automation engineers always are checking safety regulations before starting an experiment.
- 9) He is study technical English vocabulary on the moment to pass his university exam.
- 10) The factory opens its new fully automated assembly sector on next September.
- 11) Systems integrators requires excellent communication skills to work effectively in a team.
- 12) Why do you looking for open engineering positions on the internet at this very moment?

- 13) The company doesn't offer any employment opportunities for students during weekends.
- 14) Our professor is knowing exactly what qualifications are necessary for a robotics engineer.
- 15) I am working on my final presentation for the technical job interview since three days.

Task 5. Sentence Transformation & Synthesis

Combine or modify the sentences according to the instructions in brackets, ensuring correct grammar and prepositions.

- 1) He works as a robotics technician. He started doing this in 2021.
(Combine using *Present Perfect Continuous with since*)
- 2) The team checks the hardware stability. They do this every morning at eight. (Rewrite starting with *Every morning at eight...*)
- 3) The manager is reviewing resumes. She is doing this right now.
(Change into a negative sentence)
- 4) English skills are useful. They help engineers pass job interviews.
(Combine using *in order to*)
- 5) The job market is expanding. It offers many positions for systems integrators. (Combine using *which*)
- 6) I study industrial automation. I want to build advanced automated plants in the future. (Combine using *because*)
- 7) The trainee works in the laboratory. He is there for the duration of the summer. (Rewrite using *during*)
- 8) Automation engineers manage complex projects. This is their primary responsibility. (Combine into one sentence)
- 9) The shift ends at 6 PM. Operators must clean the equipment before that time. (Combine using *by*)
- 10) The factory installed a new production line. This happened in winter. (Rewrite using the preposition *in*)
- 11) She is applying for a job. The job is at an international automation company. (Combine into a concise sentence)
- 12) The interview was long. It lasted for two hours without a break.
(Combine using *which lasted*)
- 13) Young specialists need practical experience. They can get it through university internships. (Combine using *obtainable*)
- 14) Technical manuals are written in English. Engineers must read them often. (Combine using *therefore*)
- 15) The supervisor is evaluating our progress. He does this every Friday afternoon. (Rewrite using *Present Continuous for a temporary situation*)

TEMA 9. Parts of Machines and Mechanisms

Grammar Focus: Noun Plurals (Regular and Irregular);
Compound Nouns (e.g., control panel, conveyor belt).

Professional Vocabulary: gear, shaft, bearing, valve, actuator, linkage, mechanism, piston, cylinder, component, assembly, engine, friction, wear and tear, transmission.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms or compound nouns from the list: **gears, shaft, bearings, valves, actuators, linkage, mechanisms, pistons, cylinders, components, friction, wear, transmission, belt, panel.***

- 1) High-precision _____ transfer rotational force from the electric motor to the conveyor system.
- 2) The steel rotating _____ must be perfectly balanced to prevent heavy vibrations in the machine.
- 3) Special ball _____ reduce dangerous friction between moving mechanical parts.
- 4) Hydraulic _____ control the flow of fluid inside high-pressure automated automation systems.
- 5) Electric _____ convert electrical energy into precise mechanical motion in robotic joints.
- 6) A mechanical _____ connects different parts of the robot to transmit complex movements.
- 7) Automated industrial machines consist of thousands of individual mechanical _____.
- 8) Internal combustion engines rely on the precise movement of heavy metal _____ inside deep cavities.
- 9) Pneumatic _____ use compressed air to move heavy pistons back and forth rapidly.
- 10) Regular lubrication is essential to protect heavy machinery from dangerous _____ and tear.
- 11) The main power _____ system transfers mechanical energy from the engine to the wheels.
- 12) Excessive _____ generates a massive amount of heat, which can damage fragile machine parts.
- 13) The technician checked the tension of the rubber conveyor _____ yesterday morning.
- 14) The operator monitors all machine operations using the main digital control _____.

15) Understanding how complex mechanical _____ operate is a core skill for robotics engineers.

Task 2. Grammar Focus: Noun Plurals & Compound Nouns

Form the correct plural forms of the nouns in brackets (pay attention to irregular technical plurals like phenomenon \rightarrow phenomena, criterion \rightarrow criteria, axis \rightarrow axes, foot \rightarrow feet) and correctly identify the compound noun structures.

- 1) Industrial automation lines use various types of digital control _____ (system) and proximity _____ (sensor).
- 2) The heavy robot arm moves along three independent structural _____ (axis) to reach components.
- 3) Technicians replaced all the worn-out rubber conveyor _____ (belt) and ball _____ (bearing) yesterday.
- 4) Modern automated machines use advanced pneumatic _____ (actuator) to move metal _____ (plate).
- 5) We need to analyze the specific design _____ (criterion) for these new mechanical _____ (linkage).
- 6) High-pressure hydraulic _____ (pump) push fluid through thick metal _____ (pipe) to move pistons.
- 7) The engineering students studied different dangerous mechanical _____ (phenomenon) during the lab.
- 8) Industrial _____ (gear) must be lubricated regularly to prevent severe structural _____ (damage).
- 9) Specialized microdevices use microscopic silicon _____ (mechanism) to measure precise physical fields.
- 10) The laboratory assistant bought five new digital control _____ (panel) for the student _____ (bench).
- 11) Automated automotive assembly lines handle heavy metal _____ (chassis) using magnetic _____ (gripper).
- 12) We measured the total electrical resistance using different advanced technical _____ (device).
- 13) The mechanical power transmission system contains several rotating _____ (shaft) and metal _____ (coupling).
- 14) Engineers must inspect the mechanical components to eliminate any hidden structural _____ (flaw).
- 15) Our laboratory has ten advanced computer _____ (workstation) for designing 3D machine _____ (part).

Task 3. Technical Translation

Translate the following sentences into English, paying attention to the correct plural forms of nouns, compound nouns, and technical terms.

- 1) Цей промисловий робот використовує три різні осі для точного переміщення деталей конвеєра.
- 2) Техніки замінили всі старі кулькові підшипники на головному валу двигуна минулого вівторка.
- 3) Сучасні пневматичні актуатори працюють за допомогою стисненого повітря всередині металевих циліндрів.
- 4) Нам потрібно ретельно проаналізувати всі інженерні критерії для цієї трансмісійної системи.
- 5) Головна панель керування відображає інформацію про швидкість обертання шестерень.
- 6) Машини зношуються через надмірне тертя між рухомими механічними компонентами.
- 7) Лаборант приніс нові гумові конвеєрні стрічки для нашої навчальної лабораторії.
- 8) Гідравлічні клапани регулюють напрямок руху рідини в автоматизованій системі.
- 9) Студенти вивчають складні механічні явища під час практичних занять з машинобудування.
- 10) Роботизовані маніпулятори мають спеціальні захвати для перенесення важких металевих пластин.
- 11) Інженери використовують спеціалізоване програмне забезпечення для проектування складних механізмів.
- 12) Регулярне змащування захищає деталі машин від передчасного зносу та поломок.
- 13) Цей двигун складається з чотирьох поршнів, які рухаються з надзвичайно високою швидкістю.
- 14) Скільки незалежних осей обертання має цей новий гуманоїдний робот?
- 15) Перевірте надійність усіх механічних з'єднань перед тим, як запускати конвеєр.

Task 4. Correct the mistakes

Identify and correct one error regarding noun plurals, compound nouns, or technical terminology in each sentence.

- 1) The robotic device moves smoothly along its three independent rotational axes.
- 2) We replaced the worn-out conveyor belts system during the regular maintenance cycle.

- 3) Modern automated plants use advanced microchips to control industrial robots arms.
- 4) The technician analyzed the unique engineering phenomenons that caused the machine failure.
- 5) All industrial gears must be made of high-strength alloy steel to withstand heavy loads.
- 6) The operator checked the control panels settings to adjust the speed of the motor shaft.
- 7) Students must follow strict safety rule when handling hot soldering irons in the lab.
- 8) The engine efficiency dropped because two metal pistons was completely damaged.
- 9) Hydraulic systems require special oil to reduce severe frictions between moving parts.
- 10) We need to implement new design criterias to improve the stability of the robot.
- 11) The maintenance team replaced five ball bearinges on the main transmission shaft.
- 12) Electric actuators converts digital commands into precise mechanical movements.
- 13) Look at those machine component lying on the workbench; they need to be assembled.
- 14) Pneumatic cylinders uses compressed gas to generate high mechanical forces easily.
- 15) The engineering student designed a complex gear transmission systems for his project.

Task 5. Sentence Transformation & Synthesis

Rewrite or combine the sentences according to the instructions in brackets, focusing on mechanical components and plural structures.

- 1) The gear rotates. It transfers mechanical energy to the next shaft. (Combine using *which*)
- 2) The technician inspected the bearing. The bearing was completely worn out. (Combine into one concise sentence)
- 3) Microscopic mechanisms are highly complex. They require special microchips to control. (Combine using *because*)
- 4) We need to check the safety standard. We do this before starting the assembly process. (Combine using *Prior to + -ing*)
- 5) The machine has a control panel. The control panel is located on the left side. (Combine using a compound noun structure)

- 6) The mechanical linkage broke down. This happened because the friction was too high. (Combine using *due to*)
- 7) Industrial robots have mechanical arms. These arms can perform heavy welding operations. (Combine using *equipped with*)
- 8) The valve opens automatically. It releases excess pressure from the hydraulic cylinder. (Combine using *to infinitive*)
- 9) The piston moves up and down. This movement compresses the air inside the chamber. (Combine using *which compresses*)
- 10) Engineers calibrate sensors. They do this to ensure precise quality control. (Rewrite starting with *Sensors are calibrated...*)
- 11) The transmission system consists of shafts. It also includes gears and couplings. (Combine using *not only... but also*)
- 12) The wear and tear was severe. As a result, the factory stopped the assembly line. (Combine using *so severe that*)
- 13) Lubrication is essential. It minimizes friction between moving metal components. (Combine using *in order to*)
- 14) The students built several robotic prototypes. They used 3D-printed parts. (Combine using *made of*)
- 15) The axis must be perfectly aligned. Otherwise, the machine will vibrate violently. (Combine using *to prevent*)

TEMA 10. Sensors and Control Systems

Grammar Focus: Relative Clauses (who, which, that, where, whose).

Professional Vocabulary: proximity sensor, feedback loop, transducer, thermocouple, actuator, accuracy, calibration, input/output (I/O), programmable logic controller (PLC), signal processing.

Task 1. Vocabulary & Context Clues

Fill in the blanks with the correct professional terms from the list: sensors, feedback, accuracy, calibration, PLC, signal, inputs, thermocouple, transducer, proximity, control, outputs, system, processing, measure.

- 1) A specialized _____ loop continuously compares the actual machine output with the desired reference value.
- 2) Industrial _____ detect physical changes like temperature, light, or pressure and convert them into electrical signals.
- 3) The high-precision _____ measures extreme temperatures inside the industrial melting furnace.

- 4) An automated system uses a digital _____ to change physical energy from one form to another.
- 5) Our new programmable logic _____ acts as the primary brain of the entire automated manufacturing line.
- 6) High-tech _____ sensors can detect nearby metal objects without any physical contact.
- 7) Regular system _____ guarantees that all digital instruments provide precise and error-free measurements.
- 8) The total _____ of a robotic arm depends heavily on the quality of its feedback encoders.
- 9) An industrial controller receives digital data through its complex system of input/output (I/O) _____.
- 10) Effective _____ processing eliminates external noise from raw telemetry data coming from the factory floor.
- 11) Advanced intelligent machines require real-time data _____ to prevent sudden system failures.
- 12) The main distributed _____ system coordinates thousands of independent smart devices simultaneously.
- 13) Smart proximity devices send electronic signals directly to the input modules of a digital _____.
- 14) This acoustic sensor is able to _____ the exact distance to the nearest moving obstacle.
- 15) If the system detects a dangerous temperature rise, it instantly modifies its control _____.

Task 2. Grammar Focus: Relative Clauses

*Complete the sentences using appropriate relative pronouns (**who, which, that, where, whose**). Indicate cases where the pronoun can be omitted.*

- 1) The programmable logic controller _____ we installed yesterday manages fifteen conveyor belts.
- 2) This is the state-of-the-art laboratory _____ engineering students learn to calibrate digital sensors.
- 3) We need to hire an experienced systems integrator _____ knows how to design feedback loops.
- 4) The industrial thermocouple _____ measures the boiler temperature needs immediate maintenance.
- 5) The automation company _____ software we use has updated its cybersecurity protocols.
- 6) The high-precision proximity device _____ is blinking red has a broken internal circuit.

- 7) Is this the exact factory sector _____ autonomous mobile robots sort heavy raw materials?
- 8) The maintenance technician _____ repaired the main control panel has already finished his shift.
- 9) We are looking for an optical transducer _____ maximum accuracy matches our strict design criteria.
- 10) The telemetry data _____ the sensors collect in real time is sent directly to a cloud server.
- 11) This is the advanced electronic microcontroller _____ pins are connected to the pneumatic actuators.
- 12) The expert _____ delivered the presentation on signal processing works at a large robotics plant.
- 13) The heavy industrial machine _____ control system failed two hours ago is completely repaired now.
- 14) Automated production lines _____ utilize smart sensors run thirty percent faster than manual ones.
- 15) This is the high-voltage control room _____ operators monitor the entire manufacturing facility.

Task 3. Technical Translation

Translate the following sentences into English using appropriate relative pronouns and technical terms.

- 1) Датчик наближення, який ми протестували вчора, може виявляти металеві деталі на відстані двох сантиметрів.
- 2) Це та сучасна лабораторія, де першокурсники вивчають основи промислової автоматизації.
- 3) Інженер, який запрограмував цей логічний контролер (ПЛК), зараз працює на великому заводі.
- 4) Ми шукаємо новий термопарний датчик, точність якого відповідає міжнародним стандартам.
- 5) Програма зчитує цифрові дані, які сенсори надсилають на центральний сервер кожну секунду.
- 6) Завод, на якому впроваджено сучасні системи керування, працює без зупинок і аварій.
- 7) Студент, чий науковий проект присвячений обробці сигналів, отримав спеціальну нагороду.
- 8) Це та сама червона кнопка, яка запускає автоматичний цикл калібрування всього обладнання.
- 9) Сигнали, які цей перетворювач (трансдюсер) надсилає до контролера, потребують додаткової фільтрації.

- 10) Будь ласка, покличете техніка, який відповідає за обслуговування цих оптичних датчиків тиску.
- 11) Зворотний зв'язок — це важливий процес, який дозволяє машині самостійно виправляти помилки руху.
- 12) Це комп'ютерна кімната, де оператори стежать за роботою всіх конвеєрних ліній.
- 13) Нове програмне забезпечення, яке ми завантажили минулого тижня, покращило точність роботи.
- 14) Промислова система керування, чия база даних була пошкоджена, повністю відновила роботу.
- 15) Деталі, які роботизований маніпулятор переміщує на конвеєр, мають бути ідеально чистими.

Task 4. Correct the mistakes

Identify and correct one error regarding relative pronouns or technical terminology in each sentence.

- 1) The proximity sensor who we replaced yesterday is transmitting very accurate digital signals.
- 2) This is the automated warehouse which autonomous vehicles move heavy pallets around.
- 3) The lead automation engineer which designed the feedback loop is leading a new research group.
- 4) We bought a modern digital transducer where maximum operating voltage is twelve volts.
- 5) The digital signal processing software what you downloaded yesterday has several logical bugs.
- 6) The laboratory assistant whose repaired the broken thermocouple is updating the calibration log.
- 7) Look at the programmable logic controller whom handles all the inputs and outputs over there.
- 8) This is the industrial chemical plant where we visited during our technical summer internship.
- 9) The automated machinery that it failed two hours ago caused a temporary production delay.
- 10) We need to find a specialist who skills include programming advanced industrial SCADA systems.
- 11) The optical encoders which they measure the exact shaft rotation speed are working fine.
- 12) That is the control panel room whose the emergency alarm started ringing five minutes ago.

- 13) The students designed an algorithmic script which it optimizes energy distribution in circuits.
- 14) The technician whom calibrated the pressure sensors has forgot to sign the technical report.
- 15) This is the high-precision machine tool which its pneumatic actuators require urgent repair.

Task 5. Sentence Transformation & Synthesis

Combine or rewrite the sentences using relative clauses as indicated in the brackets.

- 1) The sensor measures hydraulic pressure. It is located near the main pump. (Combine using *which*)
- 2) We met an automation technician. His primary responsibility is repairing industrial PLCs. (Combine using *whose*)
- 3) This is the high-tech cleanroom. Engineers assemble fragile microscopic microchips here. (Combine using *where*)
- 4) The calibration process was long. It successfully eliminated all systematic data errors. (Combine using *that*)
- 5) A programmer wrote this machine learning script. He has already left the university lab. (Combine using *who*)
- 6) The feedback system is very reliable. Its main purpose is to maintain stable motor speed. (Combine using *whose*)
- 7) I am reading a technical manual. The professor recommended it to our group last Tuesday. (Combine using *which*)
- 8) This is the electronic control cabinet. We keep all the spare proximity switches inside it. (Combine using *where*)
- 9) The automated line restarted suddenly. It was stopped due to an electrical overload. (Combine using *which*)
- 10) We called an expert. He explained the basic principles of digital signal processing to us. (Combine using *who*)
- 11) The data dataset was massive. The neural network analyzed it within ten minutes. (Combine using *that*)
- 12) This is a pneumatic actuator. Its piston moves heavy components across the workbench. (Combine using *whose*)
- 13) The company offers great jobs. It manufactures advanced medical robotic platforms. (Combine using *which*)
- 14) Students passed the final test. They studied technical English terms every single week. (Combine using *who*)
- 15) The digital monitor displays telemetry data. The monitor is fixed to the control wall. (Combine using *that*)

TEMA 11. Programming for Automation and Robotics

Grammar Focus: Conditionals: Zero, First, and Second Conditionals.

Professional Vocabulary: firmware, compiler, script, debugging, variable, loop, syntax, library, conditional statement, microchip, function, executable, optimization, language.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **firmware, debugging, compiler, variables, loop, script, syntax, libraries, microchip, function, languages, executable, optimization, programming, code.***

- 1) In industrial robotics, a standard Python _____ can automate the process of data collection.
- 2) The specialized software _____ translates our human-readable code into raw machine instructions.
- 3) If your code has a _____ error, the compiler will refuse to generate an executable file.
- 4) Experienced software engineers spend hours _____ their scripts to find hidden memory leaks.
- 5) A basic conditional statement allows an automated machine to make decisions based on inputs.
- 6) To save time, robotic programmers import pre-written code modules from external digital _____.
- 7) The basic microdevice controller executes a fast infinite _____ to scan inputs continuously.
- 8) We need to update the device _____ to make the programmable hardware compatible with new sensors.
- 9) In this script, we declare several dynamic _____ to store real-time temperature data numbers.
- 10) Modern automation specialists use different high-level _____ like C++, Python, and Structured Text.
- 11) The main algorithmic _____ calculates the precise angle of rotation for every robotic joint.
- 12) Code _____ is highly important when you write scripts for microchips with limited memory.
- 13) After a successful compilation process, the software system outputs a binary _____ file.
- 14) If you upload a faulty code to the central _____, the robotic arm will stop moving immediately.

15) Learning the basics of microcontroller _____ is a necessary requirement for robotics students.

Task 2. Grammar Focus: Conditionals (Zero, First, Second)

Put the verbs in brackets into the correct tense according to the conditional type specified.

- 1) If you _____ (press) the emergency button, the fully automated conveyor belt stops immediately. (Zero Conditional)
- 2) If the programmer _____ (not/fix) the syntax error now, the compiler won't generate the file. (First Conditional)
- 3) If our laboratory _____ (have) a more powerful computer, we would run complex 3D physics simulations. (Second Conditional)
- 4) When the internal machine temperature _____ (exceed) eighty degrees, the safety valve opens. (Zero Conditional)
- 5) If the engineering team _____ (update) the firmware tomorrow, the robot will move much faster. (First Conditional)
- 6) If I _____ (be) a senior automation engineer, I would design completely autonomous drone systems. (Second Conditional)
- 7) If a microcontroller code _____ (contain) an infinite loop, the system freezes completely. (Zero Conditional)
- 8) Provided that the internet connection _____ (remain) stable, the telemetry data will upload to the server. (First Conditional)
- 9) If you _____ (not/lubricate) the industrial gears regularly, severe friction damages the machine. (Zero Conditional)
- 10) If the factory _____ (automate) its entire sorting process, its financial profits would increase drastically. (Second Conditional)
- 11) Unless you _____ (import) the dedicated robotics library, your Python script will not recognize the sensors. (First Conditional)
- 12) If the laboratory assistant _____ (be) here right now, he would show us how to debug this C++ code. (Second Conditional)
- 13) If a smart proximity sensor _____ (detect) an obstacle, it sends a digital signal to the PLC. (Zero Conditional)
- 14) As soon as the simulation _____ (finish) its data analysis, the software will output a detailed table. (First Conditional)
- 15) If the microchip _____ (not/cost) so much money, our department would purchase fifty units for students. (Second Conditional)

Task 3. Technical Translation

Translate the following sentences into English using appropriate conditional structures (Zero, First, or Second).

- 1) Якщо ви натискаєте зелену кнопку, автоматизована система запускає процес сортування деталей.
- 2) Якщо інженер не виправить логічну помилку в коді сьогодні, робот завтра не працюватиме.
- 3) Якби наша лабораторія мала новий 3D-принтер, ми б самі друкували пластикові деталі для роботів.
- 4) Коли напруга в електричній мережі падає, цифровий контролер автоматично перезавантажується.
- 5) Роботизована лінія зупиниться негайно, якщо датчик наближення виявить людину в небезпечній зоні.
- 6) Якби я знав мову програмування C++ краще, я б самостійно написав прошивку для цього мікрочипа.
- 7) Якщо ви не імпортуєте потрібну математичну бібліотеку, ваш алгоритм не зможе обчислити кути.
- 8) Якщо промисловий комп'ютер перегріється, вбудована система безпеки вимкне все живлення.
- 9) Якщо компанія оновить програмне забезпечення наступного місяця, ефективність виробництва зросте.
- 10) Якби заводи не використовували автоматизацію, масове виробництво товарів було б дуже дорогим.
- 11) Якщо студент завантажить правильний двійковий файл, мікроконтролер почне виконувати алгоритм.
- 12) Коли датчик фіксує рух, система безпеки автоматично вмикає цифрові камери.
- 13) Керівництво придбає нових промислових роботів, якщо ціна на них знизиться найближчим часом.
- 14) Якби цей робот мав штучний інтелект, він би адаптувався до змін на конвеєрі самостійно.
- 15) Якщо ви не збережете зміни у файлі конфігурації, програма працюватиме за старими налаштуваннями.

Task 4. Correct the mistakes

Identify and correct one error regarding conditionals, verb forms, or technical vocabulary in each sentence.

- 1) If you will update the firmware of the controller, it will support new types of sensors.
- 2) When the boiler pressure exceeds the maximum limit, the safety valve opened automatically.

- 3) If I am you, I would check the syntax of the script before compiling the code.
- 4) The industrial robotic arm won't start moving unless you don't send a start command from the PC.
- 5) If a microchip doesn't have enough flash memory, it couldn't store massive software libraries.
- 6) As soon as the compiler finishes its work, the software system outputs an executable file.
- 7) If we implement a deep learning model now, factory efficiency will increased by ten percent.
- 8) If the automated conveyor system has a mechanical jam, the main motor stops automatically.
- 9) If our university department had more money, it will buy advanced humanoid robot kits.
- 10) Unless the laboratory technician calibrates the sensor, the input readings won't be accurate.
- 11) When you delete this line of code, the infinite loop caused a total system crash.
- 12) If the programming script contains a logical bug, the system wouldn't perform the tasks correctly.
- 13) The automated machine tool will stop its operation if the raw material runs out.
- 14) If the software developer knows the password, he would log into the central engineering server.
- 15) Provided that the power supply is stable, the electronic microcontroller operates without errors.

Task 5. Sentence Transformation & Synthesis

Rewrite or combine the sentences using conditional clauses according to the instructions in brackets.

- 1) Press the start button to activate the automated welding machine. (Rewrite as a Zero Conditional sentence)
- 2) The technician might not update the script today. In that case, we won't run the live test tomorrow. (Combine using *If... not*)
- 3) Our lab lacks an industrial simulator. That's why we can't test our PLC code on a virtual conveyor. (Combine using *If* — Second Conditional)
- 4) High-voltage electricity passes through a poor conductor. It generates a massive amount of heat. (Rewrite as a Zero Conditional sentence)
- 5) Install the latest version of the IDE. Your software compilation process will run much faster. (Combine using *If* — First Conditional)

- 6) I am not a professional systems developer. I am unable to write complex firmware all by myself. (Combine using *If* — Second Conditional)
- 7) Proximity sensors detect a broken component. They instantly trigger an emergency sound alarm. (Rewrite as a Zero Conditional sentence using *When*)
- 8) Maybe the network cable will break. If so, the autonomous drone will lose its connection immediately. (Combine using *Unless*)
- 9) The manufacturing plant is not fully computerized. It still requires a large amount of human labor. (Combine using *If* — Second Conditional)
- 10) The algorithm requires a specific library. You must import it first to avoid critical compilation errors. (Combine using *Provided that*)
- 11) Turn off the main power supply during an emergency. This is the absolute safety rule. (Rewrite as a Zero Conditional sentence)
- 12) The student doesn't have a personal multimeter. He cannot measure circuit resistance at home. (Combine using *If* — Second Conditional)
- 13) The factory needs to reduce waste. Implementing precision sorting robots is the best way to do it. (Combine using *If* — First Conditional)
- 14) A code has bad optimization. It runs very slowly on basic 8-bit digital microchips. (Rewrite as a Zero Conditional sentence)
- 15) The expert is busy today. He won't inspect our automated robotics laboratory this afternoon. (Combine using *If* — Second Conditional)

TEMA 12. Computer Hardware and Software

Grammar Focus: Passive Voice (Present Simple Passive and Past Simple Passive).

Professional Vocabulary: microprocessor, motherboard, operating system, firmware, peripheral device, graphics processing unit (GPU), random-access memory (RAM), installation, user interface, software application.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **microprocessor, motherboard, operating, firmware, peripheral, GPU, RAM, installation, interface, applications, hardware, software, memory, units, configuration.***

- 1) The central _____ executes instructions and manages data flow inside the industrial computer.
- 2) All core electronic components like the CPU and RAM are physically attached to the main _____.
- 3) An industrial _____ system coordinates the execution of different high-level engineering programs.
- 4) The specialized engineering software requires sixteen gigabytes of temporary _____ to run smoothly.
- 5) High-performance computer platforms use a dedicated _____ to accelerate heavy 3D physics simulations.
- 6) A graphical user _____ allows factory operators to monitor complex automated systems visually.
- 7) Printers, scanners, and digital oscilloscopes are typical examples of industrial _____ devices.
- 8) The regular _____ of software patches is required to protect our automation system from viruses.
- 9) Advanced computer-integrated plants run dedicated software _____ to analyze real-time telemetry data.
- 10) The low-level control _____ is stored directly inside the non-volatile memory of the microchip.
- 11) Industrial automation relies on both durable physical _____ and reliable digital programming code.
- 12) Special memory _____ store massive amounts of diagnostic logs generated by automated machines.
- 13) The main technical specialist completed the software _____ process within thirty minutes yesterday.
- 14) If the computer lacks enough random-access _____, the data processing script runs very slowly.
- 15) Operators can easily modify system parameters using a well-designed digital human-machine _____.

Task 2. Grammar Focus: Passive Voice (Present and Past Simple Passive)

Put the verbs in brackets into the Present Simple Passive or Past Simple Passive tense.

- 1) Yesterday, the old industrial computer motherboard _____ (replace) by the maintenance team.
- 2) Thousands of high-precision electronic microchips _____ (manufacture) by this automated factory every day.
- 3) In 2025, a new supervisory control and data acquisition system _____ (implement) at our plant.

- 4) The diagnostic telemetry data _____ (collect) automatically by smart sensors every five seconds.
- 5) All broken peripheral devices _____ (remove) from the engineering laboratory two hours ago.
- 6) Complex robotic simulation scripts usually _____ (write) in high-level programming languages like Python.
- 7) The critical firmware update _____ (download) successfully by the system computer last night.
- 8) The rotation speed of the conveyor electric motor _____ (control) by a programmable logic controller.
- 9) In the past, all mechanical manufacturing operations _____ (perform) by manual human labor.
- 10) The engineering student benchmarks _____ (analyze) by the central processing unit in real time.
- 11) The main industrial server database _____ (back up) automatically at midnight every single day.
- 12) Yesterday, the new graphical user interface _____ (test) by three experienced factory operators.
- 13) High-voltage electronic circuits always _____ (protect) by special automatic fuse switches.
- 14) The technical report on computer hardware optimization _____ (finish) by our group last Friday.
- 15) Professional engineering software applications _____ (use) to design complex autonomous systems.

Task 3. Technical Translation

Translate the following sentences into English using the Passive Voice (Present Simple Passive or Past Simple Passive).

- 1) Вчора нове програмне забезпечення для робота було успішно інстальовано на головний комп'ютер.
- 2) Тисячі терабайт інженерних даних аналізуються потужними графічними процесорами щодня.
- 3) Усі зламані датчики тиску були замінені лаборантом дві години тому.
- 4) Цей промисловий конвеєр керується за допомогою центральної операційної системи.
- 5) Звіти про системні помилки надсилаються автоматично на електронну пошту головного інженера.
- 6) Минулого тижня наш університет отримав нове комп'ютерне обладнання для занять з АКТР.

- 7) Параметри роботи електричного двигуна перевіряються техніками під час кожної зміни.
- 8) Перша цифрова плата була спроектована інженерами компанії багато років тому.
- 9) Складні тривимірні моделі механізмів створюються за допомогою спеціалізованих інженерних програм.
- 10) Код прошивки був повністю змінений для покращення точності роботизованого маніпулятора.
- 11) Оперативна пам'ять (RAM) комп'ютера захищається від збоїв спеціальними алгоритмами.
- 12) Кнопка аварійної зупинки була натиснута оператором відразу після виникнення короткого замикання.
- 13) Уся технічна документація зберігається в цифровому форматі на захищеному сервері заводу.
- 14) Минулого вівторка студентам було продемонстровано роботу нового логічного контролера.
- 15) Логічні змінні автоматично скидаються до нуля після кожного перезавантаження системи.

Task 4. Correct the mistakes

Identify and correct one error regarding passive voice structures or hardware/software terminology in each sentence.

- 1) The digital system database was updates automatically by the core software last night.
- 2) High-performance graphics processing units are use to accelerate deep learning algorithms.
- 3) The motherboard was replace two hours ago because its main electrical circuit burnt out.
- 4) Professional software applications is downloaded by engineering students during practical classes.
- 5) All peripheral devices checked carefully by the laboratory assistant before every experiment.
- 6) The firmware code of the modern microprocessor was wrote by an international team of developers.
- 7) The factory conveyor line is control automatically by a programmable logic controller.
- 8) In 1980, the first automated manufacturing operating system was introduced into the plant.
- 9) Error logs are sent automatic to the system administrator when a network failure occurs.

- 10) The temperature parameters was measured by a high-precision digital thermocouple yesterday.
- 11) Fragile electronic microchips are handles with care by workers wearing anti-static gloves.
- 12) The configuration file was deleted accidentally by a first-year student during the lab.
- 13) New security patches are install on the central server every month to prevent cyberattacks.
- 14) The robotic device was damage during the testing phase because the safety limits were wrong.
- 15) Advanced graphical user interfaces are designed by specialized software engineering teams.

Task 5. Sentence Transformation & Synthesis

Convert the sentences from Active to Passive voice, or combine them as specified, maintaining a technical focus.

- 1) The technician replaced the burnt-out graphics card yesterday afternoon. (Convert into the Passive voice)
- 2) Microprocessors process all the digital input signals in real time. (Convert into the Passive voice)
- 3) The student accidentally corrupted the system configuration file during the test. (Convert into the Passive voice)
- 4) A programmable logic controller automatically regulates the conveyor speed. (Convert into the Passive voice)
- 5) Engineers designed the initial technical layout of the motherboard in 2023. (Convert into the Passive voice)
- 6) The software application generates a complete error report every hour. (Convert into the Passive voice)
- 7) The laboratory purchased new random-access memory modules last week. (Convert into the Passive voice)
- 8) High-voltage surges can damage fragile computer hardware parts. (Convert into the Passive voice using *can be*)
- 9) The operating system monitors all peripheral device connections continuously. (Convert into the Passive voice)
- 10) The developer successfully updated the microcontroller firmware last night. (Convert into the Passive voice)
- 11) They calibrate the sensors every morning. This ensures high data accuracy. (Combine using Passive voice: *The sensors are calibrated... to ensure...*)

12) Someone pressed the emergency stop button. The conveyor belt stopped immediately. (Combine using Passive voice: *The emergency stop button was pressed, which...*)

13) The computer processes massive datasets. It uses an AI algorithm to do this. (Combine using Passive voice)

14) The factory team implemented a new SCADA system last year. It improved monitoring efficiency. (Combine using Passive voice)

15) Operators check the temperature meters every hour to prevent the engine from overheating. (Convert into the Passive voice)

Модуль II. Professional English for Automation and Robotics.

TEMA 13. Internet of Things (IoT) in Industry (IIoT)

Grammar Focus: Expressing Purpose (to, in order to, so as to, so that).

Professional Vocabulary: cloud computing, edge computing, gateway, latency, predictive maintenance, sensor node, smart asset, telemetry, bandwidth, interoperability.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **cloud, edge, gateway, latency, maintenance, node, assets, telemetry, bandwidth, interoperability, IIoT, networks, data, connection, bandwidth.***

1) Companies implement industrial IoT (_____) architectures to achieve total visibility over their manufacturing lines.

2) An intelligent hardware _____ acts as a bridge between local sensor networks and the global cloud infrastructure.

3) We deploy _____ computing local devices right on the factory floor to process data immediately without transmission delays.

4) If a network has high _____, the critical control signals will arrive too late to prevent a mechanical collision.

5) The engineering team uses real-time _____ to monitor the precise operational temperature of offshore oil rigs.

6) A single wireless sensor _____ can monitor vibration, acoustic noise, and humidity simultaneously around the motor.

7) By analyzing machine vibration patterns, factories can perform predictive _____ before an actual breakdown happens.

8) Low network _____ restricts the volume of high-definition video data we can transmit from autonomous factory drones.

9) Achieving true _____ among devices from different manufacturers is the biggest challenge in modern automation.

- 10) Large manufacturing groups prefer _____ computing platforms for long-term storage and heavy big data analytics.
- 11) Connecting legacy machinery to digital networks turns old mechanical hardware into connected smart _____.
- 12) Raw sensor _____ must be filtered at the local controller level to optimize internal network traffic.
- 13) A stable wireless _____ is essential for transmitting continuous diagnostic packets to the remote server.
- 14) If you increase the system _____, more diagnostic nodes will be able to stream data at the same time.
- 15) Smart industrial _____ help managers track the exact geographic location of shipments in real time.

Task 2. Grammar Focus: Expressing Purpose

Complete the sentences using appropriate linkers of purpose (to, in order to, so as to, so that). Do not use the same linker more than three times.

- 1) Engineers installed twenty edge controllers _____ reduce data latency during automated assembly.
- 2) The software sends immediate telemetry warnings _____ the operations team can respond to anomalies.
- 3) We calibrated the wireless sensor nodes _____ avoid receiving incorrect temperature measurements.
- 4) Technicians implement predictive maintenance algorithms _____ prevent sudden tool breakage on the production line.
- 5) The network infrastructure was upgraded _____ allow hundreds of smart assets to connect simultaneously.
- 6) Please configure the industrial gateway _____ it handles encrypted cryptographic data protocols safely.
- 7) Operators analyze vibration diagnostic logs _____ identify internal bearing wear before a failure occurs.
- 8) The factory deployed a local server _____ process critical telemetry data without utilizing internet channels.
- 9) They modified the communication script _____ not to overload the low-bandwidth wireless channel.
- 10) The system compresses all diagnostic datasets _____ they can be uploaded to the cloud repository faster.
- 11) Advanced filters were added to the transducer circuit _____ eliminate high-frequency electromagnetic noise.
- 12) Software engineers write clean modular scripts _____ optimize the limited flash memory of industrial microchips.

- 13) The automated platform monitors fluid pressure continuously _____ alert technicians if a leak develops.
- 14) Security patches are applied to the IoT gateway regularly _____ block unauthorized network connections.
- 15) The student joined the university robotics laboratory _____ gain practical experience with industrial IIoT hardware.

Task 3. Technical Translation

Translate the following sentences into English using appropriate structures for expressing purpose and professional IIoT vocabulary.

- 1) Інженери встановили шлюзи (gateways), щоб підключити старі верстати до хмарної платформи.
- 2) Ми використовуємо периферійні обчислення (edge computing), щоб зменшити затримку (latency) під час обробки даних.
- 3) Завод впровадив прогностичне обслуговування, щоб запобігти раптовим зупинкам конвеєра.
- 4) Дані телеметрії надсилаються кожну хвилину, щоб оператори могли відстежувати стан двигунів.
- 5) Компанія оновила бездротову мережу, щоб забезпечити сумісність (interoperability) між усіма пристроями.
- 6) Будь ласка, перевірте цей сенсорний вузол, щоб переконатися, що він правильно передає сигнал.
- 7) Вони оптимізували код прошивки, щоб не витратити обмежену пропускну здатність (bandwidth) мережі.
- 8) Розумні активи (smart assets) збирають вібраційні логи, щоб інженери могли виявити дефекти на ранній стадії.
- 9) Дані фільтруються на локальному рівні, щоб великі файли не перевантажували хмарне сховище.
- 10) Студенти використовують протокол MQTT, щоб налаштувати обмін даними між ПЛК та датчиками.
- 11) Захисний кожух був встановлений навколо сенсора, щоб захистити його від пилу та вологи.
- 12) Програма автоматично архівує старі звіти, щоб звільнити місце на жорсткому диску сервера.
- 13) Техніки змінили конфігурацію шлюзу, щоб він міг підтримувати більше тридцяти пристроїв одночасно.
- 14) Цей алгоритм був розроблений для того, щоб мінімізувати споживання енергії бездротовими вузлами.
- 15) Конвеєр обладнали оптичними датчиками, щоб система могла автоматично підраховувати готову продукцію.

Task 4. Correct the mistakes

Identify and correct one error regarding purpose structures or technical vocabulary in each sentence.

- 1) The factory uses edge computing platforms so that to minimize the latency of high-speed robot reactions.
- 2) Technicians checked the sensor node in order that replace its depleted internal lithium battery.
- 3) Telemetry data is compressed before transmission for to save expensive satellite network bandwidth.
- 4) We integrated an industrial gateway so as we could monitor smart assets from our home office.
- 5) The software application updates its internal database every hour to preventing data mismatch.
- 6) The engineering team added a predictive maintenance script so that avoid total mechanical destruction.
- 7) Industrial routers are shielded with metal casings to protecting them from high electromagnetic interference.
- 8) The student adjusted the calibration profile in order not introduce systematic errors into the telemetry log.
- 9) Cloud computing architectures are implemented by companies to analyzing global manufacturing trends.
- 10) The security protocol was modified so that the gateway can block unauthorized IP addresses automatically.
- 11) Smart sensors are deployed around the high-voltage transformer so to detect dangerous thermal expansion.
- 12) The data filter script was rewritten for improve the total processing speed of the local microchip.
- 13) Operators monitor fluid telemetry variables constantly so as to they can identify pipe leaks early.
- 14) The technical university opened a new IIoT laboratory to teaching students advanced automation skills.
- 15) Encoders are attached to the motor shaft in order to measuring the exact angular rotation velocity.

Task 5. Sentence Transformation & Synthesis

Combine or rewrite the sentences using linkers of purpose as indicated in the brackets.

- 1) The system isolates the broken node. This prevents the entire network from crashing. (Combine using *so that*)

- 2) Operators install vibration sensors. They want to detect internal bearing defects. (Combine using *in order to*)
- 3) We store telemetry data on local edge devices. We don't want to use expensive cloud storage. (Combine using *so as not to*)
- 4) The programmer updated the gateway software. He wanted to make it compatible with new wireless protocols. (Combine using *to*)
- 5) Digital filters process the raw signals. As a result, the PLC receives clear, noise-free metrics. (Combine using *so that*)
- 6) Apply thermal grease to the microprocessor surface. You need to maximize heat dissipation. (Combine using *in order to*)
- 7) The company purchased modern industrial routers. They wanted to build a secure local network. (Combine using *so as to*)
- 8) We run a continuous diagnostic script. This script helps us catch unexpected software errors early. (Combine using *to*)
- 9) Packets are transmitted over a private VPN. This ensures third-party hackers cannot intercept them. (Combine using *so that*)
- 10) The laboratory assistant lowered the sampling rate. He didn't want to drain the sensor's battery. (Combine using *so as not to*)
- 11) Students use specialized simulation environments. They want to test their IIoT setups safely. (Combine using *in order to*)
- 12) The industrial network requires high bandwidth. It needs to handle video streams from automated inspection cameras. (Combine using *to*)
- 13) The automated platform calculates motor wear. This allows the factory to order spare parts in advance. (Combine using *so that*)
- 14) Implement standardized communication protocols. This is necessary to achieve seamless device interoperability. (Combine using *in order to*)
- 15) Technicians shield all telemetry copper cables. They want to prevent high-frequency noise interference. (Combine using *so as to*)

TEMA 14. Cybersecurity in Automation Systems

Grammar Focus: Modal Verbs for Obligation, Prohibition, and Permission (must, mustn't, should, shouldn't, can, can't, have to, don't have to).

Professional Vocabulary: firewall, encryption, vulnerability, malware, access control, cyberattack, authentication, breach, firmware update, intrusion detection system (IDS).

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **firewall, encryption, vulnerability, malware, access, cyberattack,***

authentication, breach, updates, IDS, networks, security, passwords, protocol, system.

- 1) A powerful network _____ inspects all incoming data packets and blocks unauthorized traffic from the internet.
- 2) If hackers find a critical zero-day _____ in the PLC code, they can take full control of the factory.
- 3) Data _____ transforms clear technical text into unreadable code to prevent industrial espionage.
- 4) The IT department installed an active intrusion detection _____ (IDS) to catch network anomalies early.
- 5) A severe security _____ occurred last night when a corporate password was leaked onto the public web.
- 6) Strict _____ control policies guarantee that only certified senior engineers can change machine settings.
- 7) The automated assembly line was shut down for three hours due to a destructive ransomware _____.
- 8) You must use multi-factor _____ before connecting your personal laptop to the main engineering server.
- 9) Corrupted USB drives can easily spread dangerous _____ across isolated operational technology networks.
- 10) Regular firmware _____ close known software security holes and keep industrial hardware running safely.
- 11) An automated network scan helps specialists identify any hidden _____ in the communication system.
- 12) If you don't use cryptographic _____, hackers can easily intercept and modify telemetry signals.
- 13) The main network administrator configures user _____ permissions according to their technical rank.
- 14) A sudden industrial data _____ can cost a manufacturing enterprise millions of dollars in legal fees.
- 15) Never run an unknown software application on a computer that is connected to the primary _____ network.

Task 2. Grammar Focus: Modal Verbs

*Choose or insert the correct modal verb (**must, mustn't, should, shouldn't, can, can't, have to, don't have to**) based on the context of industrial cybersecurity rules.*

- 1) Operators _____ insert personal flash drives into control PCs; it is strictly prohibited by factory rules.

- 2) To modify the core PLC configuration parameters, you _____ enter a valid administrator password.
- 3) Engineering students _____ read the cybersecurity manual before they start working with industrial networks.
- 4) You _____ connect a machine to the internet without a firewall; it will be infected by malware within minutes.
- 5) Since the system updates itself automatically at midnight, the night technician _____ run the update manually.
- 6) Regular users _____ access the master server room; only authorized personnel hold the electronic keycards.
- 7) Security teams _____ perform weekly network scans to detect hidden vulnerabilities before hackers find them.
- 8) If the intrusion detection system blinks red, you _____ ignore it; call the security team immediately.
- 9) With our new access control privileges, junior laboratory assistants _____ view telemetry logs but they cannot edit them.
- 10) You _____ use simple, predictable passwords like "12345" if you want to protect your smart assets from cyberattacks.
- 11) The network administrator _____ reset all system passwords yesterday because of a suspected data breach.
- 12) If a computer is completely air-gapped from the outer world, we _____ worry about external internet cyberattacks.
- 13) Students _____ download unknown software executable files onto laboratory laptops without explicit permission.
- 14) Every connected device _____ support modern encryption standards to ensure safe end-to-end communication.
- 15) Since the secondary backup server is already active, we _____ turn off the main server for physical maintenance.

Task 3. Technical Translation

Translate the following sentences into English using appropriate modal verbs and industrial cybersecurity terminology.

- 1) Оператори не повинні використовувати прості паролі для захисту промислових логічних контролерів.
- 2) Ви обов'язково повинні увімкнути шифрування даних перед відправкою телеметрії у хмару.
- 3) Студентам дозволено (can) переглядати конфігурацію брандмауера, але їм заборонено змінювати її.
- 4) Ви не повинні ігнорувати попередження системи виявлення вторгнень (IDS); це може бути кібератака.

- 5) Техніку не довелося оновлювати прошивку вручну, тому що система зробила це автоматично.
- 6) Нам потрібно (should) провести повний аудит безпеки мережі, щоб знайти приховані вразливості.
- 7) Стороннім особам суворо заборонено заходити в головну диспетчерську кімнату без супроводу.
- 8) Якщо стався витік даних (data breach), адміністратор повинен негайно заблокувати всі облікові записи.
- 9) Які антивірусні програми нам слід встановити, щоб захистити робочі станції від шкідливого ПЗ (malware)?
- 10) Ви можете підключити цей пристрій до мережі, оскільки він уже пройшов процедуру автентифікації.
- 11) Інженери не мають права відключати брандмауер під час роботи автоматизованої конвеєрної лінії.
- 12) Щоб запобігти кібератакам, промислові комп'ютери мають бути повністю ізольовані від публічного інтернету.
- 13) Вам не обов'язково міняти пароль кожен день, але ви повинні робити це хоча б раз на місяць.
- 14) Нова шкідлива програма може пошкодити прошивку мікрочипа, тому ми повинні бути дуже обережними.
- 15) Студент не зміг завантажити конфігураційний файл, тому що у нього немає прав доступу (access control).

Task 4. Correct the mistakes

Identify and correct one error regarding modal verbs or technical terminology in each sentence.

- 1) You mustn't to write your master engineering passwords on sticky notes attached to the computer monitor.
- 2) The technician don't have to bypass the firewall rules, as it violates the main industrial security protocol.
- 3) Every connected smart asset should supports advanced data encryption standards to prevent data breaches.
- 4) Users shouldn't to click on suspicious hyperlinks when operating the central SCADA terminal.
- 5) The laboratory assistant must to reset the network routing switches after yesterday's critical failure.
- 6) You can't accessing the engineering database unless you have high-level access control privileges.
- 7) Industrial automation systems must handled with extra care during live network cyberattacks.

- 8) Students don't must use the laboratory Wi-Fi network for downloading massive personal media files.
- 9) The intrusion detection system should detected the malware installation, but its database was outdated.
- 10) You haven't to pay the hackers any money if your corporate computers are infected by ransomware.
- 11) To prevent authorization bugs, a programmer must checks the authentication code logic very carefully.
- 12) Operational technology networks shouldn't being connected directly to corporate office networks.
- 13) The company had to replacing three infected microprocessors because their firmware was corrupted by a virus.
- 14) We can modifying the encryption parameters only when the industrial machine tool is fully stopped.
- 15) Technicians shouldn't neglected regular software updates if they want to avoid severe system vulnerabilities.

Task 5. Sentence Transformation & Synthesis

Rewrite the sentences using appropriate modal verbs according to the conditions described in the brackets.

- 1) It is strictly forbidden for students to bring food into the computer control room. (Rewrite using *mustnot*)
- 2) My recommendation is that you update your antivirus software databases every morning. (Rewrite using *should*)
- 3) There is no necessity for the night shift operator to run manual data backups. (Rewrite using *don'thaveto*)
- 4) Senior engineers have official permission to modify the firewall routing rules. (Rewrite using *can*)
- 5) It is absolutely necessary for the enterprise to implement multi-factor authentication this month. (Rewrite using *must*)
- 6) Connecting an unverified USB flash drive to the PLC terminal is against corporate laws. (Rewrite using *mustnot*)
- 7) It is a good idea for the IT team to scan the industrial network for hidden vulnerabilities. (Rewrite using *should*)
- 8) Due to a network lockout, the developer is unable to connect to the remote cloud server. (Rewrite using *cannot*)
- 9) The automated system automatically handles encryption, so manual configuration is not required. (Rewrite using *neednot*)
- 10) Yesterday, the sudden cyberattack forced us to isolate all industrial subnets immediately. (Rewrite using *hadto*)

- 11) It is dangerous and bad practice to leave the control cabinet doors unlocked. (Rewrite using *shouldnot*)
- 12) Is it permissible for first-year students to enter the high-voltage laboratory? (Rewrite as a question using *can*)
- 13) The security team didn't manage to locate the source of the data breach during their shift. (Rewrite using *couldnot*)
- 14) It is mandatory that every data packet passing through the gateway undergoes strict authentication. (Rewrite using *must*)
- 15) It is not necessary to replace the router if you can simply update its legacy firmware. (Rewrite using *don'thaveto*)

TEMA 15. Industry 4.0 and Smart Factories

Grammar Focus: Expressing Cause and Effect (because, because of, due to, as a result, therefore, consequently).

Professional Vocabulary: digital twin, cyber-physical system, big data, additive manufacturing, cloud manufacturing, automation pyramid, artificial intelligence (AI), machine-to-machine (M2M), scalability, predictive analytics.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **twin, systems, data, manufacturing, pyramid, intelligence, M2M, scalability, analytics, automated, digital, internet, factory, production, cloud.***

- 1) Industry 4.0 relies heavily on a _____ twin, which is a real-time virtual replica of a physical machine.
- 2) Modern smart factories utilize advanced cyber-physical _____ to synchronize physical processes with digital algorithms.
- 3) Processing massive amounts of industrial big _____ requires powerful distributed server architectures.
- 4) Industrial 3D printing, also known as additive _____, allows companies to create complex metal components rapidly.
- 5) The classic automation _____ defines the hierarchy of factory systems, from field level devices up to enterprise software.
- 6) Integrating artificial _____ (AI) into production lines allows machines to optimize their own energy consumption.

- 7) Machine-to-machine (_____) communication enables autonomous vehicles to coordinate their movements on the shop floor.
- 8) The high _____ of cloud-based industrial software means you can easily add hundreds of new sensors to the platform.
- 9) By applying predictive _____, factory managers can accurately forecast production bottlenecks before they occur.
- 10) Distributed _____ manufacturing enables different production facilities to share data and balance manufacturing loads.
- 11) A smart industrial _____ operates with minimal human intervention due to total digital connectivity.
- 12) Engineers use deep neural networks to extract valuable insights from unstructured industrial _____ dumps.
- 13) Autonomous robotic units can communicate directly with each other thanks to standardized _____ protocols.
- 14) Implementing modern digital technologies increases the flexibility and cost-efficiency of custom mass _____.
- 15) The virtual _____ mirrors every single mechanical movement of the physical robotic arm on the assembly line.

Task 2. Grammar Focus: Expressing Cause and Effect

*Fill in the blanks with appropriate cause-and-effect linkers (**because, because of, due to, as a result, therefore, consequently**). Ensure a balanced use of the options.*

- 1) The factory implemented a digital twin; _____, engineers can now test complex code updates without stopping the physical machines.
- 2) Production speed increased by forty percent _____ the installation of high-speed machine-to-machine communication links.
- 3) The manufacturing plant was shut down for two days _____ a severe corporate network database corruption.
- 4) _____ additive manufacturing allows for rapid prototyping, our engineering team created the new engine casing in under twelve hours.
- 5) Smart sensors collect massive amounts of telemetry variables; _____, big data analytics tools are required to process them.
- 6) The old robotic arms lacked wireless connectivity; _____, they could not be integrated into the new cloud manufacturing network.
- 7) The production line achieved maximum efficiency _____ the predictive analytics software calculated the optimal distribution of materials.
- 8) High-voltage energy consumption decreased significantly _____ the integration of an artificial intelligence control script.

- 9) The company chose a cloud-based SCADA platform _____ its excellent scalability and low maintenance costs.
- 10) The main server crashed during the calibration sequence; _____, all temporary telemetry data logs were lost.
- 11) Many old factories struggle to adopt Industry 4.0 standards _____ their outdated legacy hardware components.
- 12) _____ a major breakdown in the primary cyber-physical system, all automated conveyor operations were paused.
- 13) The automated machine tool can adjust its own drilling speed _____ it receives real-time tool wear metrics from proximity sensors.
- 14) The system architecture lacks modularity; _____, expanding the automated network requires a total rebuild of the codebase.
- 15) Total factory throughput improved dramatically _____ the implementation of the new five-layer automation pyramid model.

Task 3. Technical Translation

Translate the following sentences into English using appropriate cause-and-effect connectors and Industry 4.0 vocabulary.

- 1) Завод зміг збільшити обсяги виробництва завдяки (due to) впровадженню концепції Індустрії 4.0.
- 2) Цифровий двійник (digital twin) працює синхронно з реальним верстатом, тому інженери можуть бачити всі помилки негайно.
- 3) Оскільки адитивне виробництво (3D-друк) економить матеріали, компанія знизила собівартість деталей.
- 4) Головний сервер перевантажений через те, що тисячі датчиків одночасно надсилають великі дані (big data).
- 5) Система використовує штучний інтелект; як результат, верстати можуть самостійно підлаштовувати швидкість роботи.
- 6) Зв'язок між машинами (M2M) був налаштований неправильно, і внаслідок цього два автоматизовані візки зіткнулися.
- 7) Ця хмарна платформа є дуже популярною через свою високу масштабованість (scalability) та надійність.
- 8) Прогностична аналітика виявила знос підшипника, тому техніки замінили його під час планової перерви.
- 9) Традиційна піраміда автоматизації змінюється, оскільки периферійні пристрої тепер можуть надсилати дані прямо у хмару.
- 10) Роботизована лінія зупинилася через раптове падіння тиску в пневматичній системі.

- 11) Ми обрали локальну архітектуру кіберфізичних систем через високі вимоги до кібербезпеки.
- 12) Програма не змогла побудувати точну модель, оскільки вхідні інженерні дані містили багато помилок.
- 13) Компанія інвестувала в хмарне виробництво, і як наслідок, ефективність координації між філіями зросла.
- 14) Нова неймережа працює дуже швидко, тому обробка великих даних займає всього кілька секунд.
- 15) Через застаріле обладнання завод не може впровадити сучасні технології машинного навчання.

Task 4. Correct the mistakes

Identify and correct one error regarding cause-and-effect linkers or Industry 4.0 terminology in each sentence.

- 1) Because of the digital twin simulates everything perfectly, we don't need to build physical prototypes.
- 2) The factory throughput increased by twenty percent due to we implemented an automated M2M script.
- 3) Big data storage is highly expensive; because of, our department deletes old diagnostic logs every quarter.
- 4) Consequently a minor firmware bug in the cyber-physical system, the entire assembly line stopped working.
- 5) The automation pyramid model was rejected because its lack of flexibility in modern dynamic networks.
- 6) Therefore the integration of artificial intelligence, our sorting system can categorize components automatically.
- 7) Additive manufacturing requires specialized raw materials, as a result custom printing costs are still high.
- 8) The cloud manufacturing platform failed last night due to a hacker executed a distributed cyberattack.
- 9) The engineering team added new server nodes because of they needed to improve the scalability of the network.
- 10) The machine tool broke down yesterday, because, the predictive analytics algorithm was configured incorrectly.
- 11) Due to the internet connection was lost, the local gateway could not upload telemetry data to the cloud.
- 12) The digital twin lost synchronization with the robot; as a result of, all simulated metrics became invalid.
- 13) Industrial big data assets are processed on dedicated remote clusters consequently their massive size.

- 14) The system requires constant recalibration therefore the high thermal expansion of the mechanical components.
- 15) Because the factory was completely computerized, therefore the transition to Industry 4.0 was smooth and fast.

Task 5. Sentence Transformation & Synthesis

Combine or rewrite the sentences using the cause-and-effect connectors specified in brackets, keeping the tone strictly academic.

- 1) We integrated machine-to-machine communication protocols. Autonomous factory robots now coordinate seamlessly. (Combine using *consequently*)
- 2) The network lacked proper scalability. The engineering team was forced to replace the central cloud router. (Combine using *due to*)
- 3) 3D printing creates parts layer-by-layer. It drastically reduces raw material waste in aerospace manufacturing. (Combine using *because*)
- 4) A high-voltage surge damaged the main cyber-physical controller. The production plant stopped for four hours. (Combine using *as a result*)
- 5) Predictive analytics software accurately forecasts mechanical wear. The factory saves thousands of dollars on spare parts. (Combine using *therefore*)
- 6) The corporate database suffered a severe ransomware attack. All cloud manufacturing operations were frozen. (Combine using *because of*)
- 7) Industrial big data arrays are massive. Technicians use dedicated data lakes to store them. (Combine using *since*)
- 8) The enterprise updated its classic automation pyramid model. Data now flows directly from field sensors to ERP systems. (Combine using *consequently*)
- 9) The physical sensor was incorrectly calibrated. The digital twin displayed faulty operational metrics. (Combine using *due to*)
- 10) Artificial intelligence algorithms analyze thermal imagery in real time. Defective components are detected instantly. (Combine using *as a result*)
- 11) The manufacturing group expanded its facilities. They required a system with excellent horizontal scalability. (Combine using *because*)
- 12) The local network experienced extreme high data latency. Autonomous transport vehicles slowed down automatically. (Combine using *because of*)
- 13) Additive manufacturing technology has advanced rapidly. We can now print complex titanium alloy joints. (Combine using *therefore*)
- 14) The factory floor is completely air-gapped from the external web. It is immune to remote internet cyberattacks. (Combine using *since*)

15) A critical logic error was found in the M2M communication script. The engineering team rolled back the firmware update. (Combine using *due to*)

TEMA 16. Robotic Applications and AI

Grammar Focus: Modals of Possibility and Probability (may, might, could, must, can't + Present/Perfect Infinitive).

Professional Vocabulary: machine vision, neural network, degree of freedom (DoF), end-effector, kinematics, path planning, payload, autonomous navigation, deep learning, computer vision.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **vision, network, freedom, effector, kinematics, planning, payload, navigation, learning, computer, robot, algorithm, training, dataset, coordinates.***

- 1) A high-resolution machine _____ system allows the robot to sort defective components on a fast-moving conveyor.
- 2) The mechanical robotic arm has six degrees of _____, allowing it to reach any point within its workspace.
- 3) An advanced deep _____ model helps autonomous mobile delivery robots recognize pedestrian traffic signs.
- 4) The welding torch or vacuum gripper attached to the end of a robotic wrist is called an end-_____.
- 5) Inverse _____ equations calculate the exact joint angles required to move the robot's gripper to a specific point.
- 6) The drone's path _____ algorithm recalculates the flight route in real time to avoid sudden wind obstacles.
- 7) This heavy-duty industrial manipulator has a maximum _____ of two hundred kilograms.
- 8) Autonomous _____ algorithms rely on simultaneous localization and mapping (SLAM) to navigate empty warehouses.
- 9) A convolutional neural _____ is excellent for processing real-time imagery from factory safety cameras.
- 10) Industrial _____ vision eliminates human error during high-speed microscopic electronic circuit inspections.
- 11) If you modify the end-_____, you must reconfigure the tool center point coordinates in the controller.
- 12) The mathematical study of motion without considering forces is known as robot _____.

- 13) To train an AI model for quality control, programmers require a massive _____ of labeled images.
- 14) If a robot exceeds its maximum _____ capacity, the internal structural joints can suffer permanent damage.
- 15) The robotic forklift uses lidar data for safe _____ inside the narrow aisles of the smart facility.

Task 2. Grammar Focus: Modals of Possibility and Probability

*Complete the sentences using appropriate modal verbs of possibility or probability (**may, might, could, must, can't**) combined with the correct form of the verb in brackets.*

- 1) The robot is completely frozen; its main control script _____ (contain) a fatal logic loop. (High probability/Certainty)
- 2) Be careful with those configuration settings; you _____ (damage) the sensitive machine vision camera. (Weak possibility)
- 3) The robotic arm _____ (move) so fast yesterday because its speed limit parameters were bypassed. (Past possibility)
- 4) This _____ (be) the correct neural network model; it is categorizing components with zero percent accuracy. (Impossibility)
- 5) The automation team _____ (finish) the path planning script last night, but I am not completely sure. (Uncertain past possibility)
- 6) Look at the telemetry log; the joint motor _____ (overheat) during the heavy load stress test. (High past probability)
- 7) If we upgrade the processor, the deep learning algorithm _____ (execute) commands much faster. (Future possibility)
- 8) The autonomous drone _____ (crash) into the warehouse wall; its proximity sensors are working perfectly. (Impossibility)
- 9) The technical assistant _____ (leave) his digital multimeter in the robotics lab; go check the workbench. (Past possibility)
- 10) This heavy payload manipulator _____ (cost) a fortune; it features advanced carbon-fiber structural elements. (High probability)
- 11) The warehouse robot _____ (lose) its wireless connection because the main router restarted five minutes ago. (Past possibility)
- 12) You _____ (see) a humanoid robot working on this old production line; the plant uses only basic CNC machines. (Past impossibility)
- 13) The inverse kinematics calculation _____ (be) wrong; the robotic gripper is moving to the completely opposite side. (High probability)
- 14) Our university department _____ (purchase) a new computer vision kit next month if the grant budget is approved. (Weak possibility)

15) The programmers _____ (train) the neural network for a whole week; its feature recognition is absolutely flawless. (High past probability)

Task 3. Technical Translation

Translate the following sentences into English using modals of possibility/probability and professional AI/robotics vocabulary.

- 1) Роботизований маніпулятор, мабуть, перевищив своє максимальне корисне навантаження (payload), тому що двигун зупинився.
- 2) Не доторкайтеся до робота; він може (might) почати виконувати алгоритм планування шляху (path planning) у будь-який момент.
- 3) Цей алгоритм комп'ютерного зору не може бути правильним, оскільки він зовсім не розпізнає дефекти деталей.
- 4) Можливо (could), неймережа була навчена на застарілому наборі даних, тому вона робить так багато помилок.
- 5) Інженери, мабуть (must have), завершили розрахунок кінематики вчора, адже траєкторія руху робота тепер ідеальна.
- 6) Бездротовий сенсорний вузол міг (might have) втратити живлення через розряджений акумулятор.
- 7) Штучний інтелект може (may) повністю замінити ручне сортування на цьому заводі вже наступного року.
- 8) Робот не міг (can't have) впасти; його система автономної навігації оснащена трьома захисними лідачами.
- 9) Мабуть, цей кінцевий ефектор (end-effector) використовує вакуумний присосок для фіксації крихких скляних листів.
- 10) Налаштування камери машинного зору могли бути змінені під час нічної зміни.
- 11) Цей мініатюрний дрон не може мати шість ступенів свободи (degrees of freedom); його конструкція занадто проста.
- 12) Студент, можливо (might), забув імпортувати бібліотеку глибокого навчання (deep learning) перед запуском скрипту.
- 13) Код керування, мабуть, містить помилку синтаксису, тому що компілятор відмовляється створювати файл.
- 14) Траєкторія руху мобільного робота може (could) змінитися, якщо лазерний сканер виявить нову перешкоду.
- 15) Ця сучасна нейронна мережа, мабуть (must), потребує потужного графічного процесора (GPU) для обробки відео.

Task 4. Correct the mistakes

Identify and correct one error regarding modal verbs of possibility/probability or robotics terminology in each sentence.

- 1) The robotic arm must containing an error in its inverse kinematics script because it moves erratically.
- 2) The computer vision model can't trained yesterday because the laboratory server was completely offline.
- 3) This machine vision camera might costs thousands of dollars due to its extreme resolution capabilities.
- 4) The autonomous vehicle can't have hit the barrier because its navigation algorithms are highly advanced.
- 5) The neural network may processed the telemetry dataset last night, but we need to check the logs.
- 6) The end-effector must been broken during the payload stress test because it cannot grip components now.
- 7) The drone path planning script could crashes the controller if the processor running out of memory.
- 8) A robot with only three degrees of freedom must easily performing complex six-axis industrial welding operations.
- 9) The laboratory technician might left the security keys inside the central microprocessor control cabinet.
- 10) The deep learning application can't be requiring sixteen gigabytes of RAM; it is a very simple script.
- 11) The manufacturing robot must have execute the shutdown sequence because its display screen is dark.
- 12) The proximity sensors might detected the obstacle, but the control loop failed to trigger the brakes.
- 13) This neural network model shouldn't be wrong; it was validated by senior AI automation experts.
- 14) The technician can't has modified the kinematics profile without explicit administrative permission privileges.
- 15) The mobile robotic platform may loses its trajectory tracking parameters if the wheels slip on grease.

Task 5. Sentence Transformation & Synthesis

Rewrite the sentences using modal verbs of possibility or probability according to the instructions in brackets.

- 1) I am absolutely certain that the programmer updated the computer vision libraries yesterday. (Rewrite using *musthave*)
- 2) It is possible that the autonomous forklift will lose its signal inside the steel coldroom. (Rewrite using *might*)
- 3) It is completely impossible that a rookie student designed this flawless deep learning architecture. (Rewrite using *can'thave*)

- 4) Perhaps the robotic manipulator failed due to a sudden pneumatic line drop. (Rewrite using *couldhave*)
- 5) I am sure that the end-effector has a built-in force torque sensor because its touch is very delicate. (Rewrite using *must*)
- 6) It is possible that the kinematics equations do not have a valid mathematical solution. (Rewrite using *may*)
- 7) It is impossible that the network administrator leaked the master cryptographic access keys. (Rewrite using *can'thave*)
- 8) I am certain the machine vision filter eliminated the high-frequency image noise. (Rewrite using *musthave*)
- 9) Perhaps the company will deploy autonomous mobile robots to reduce human transit times. (Rewrite using *might*)
- 10) There is a strong probability that the path planning algorithm is running a recalculation loop now. (Rewrite using *must*)
- 11) It is possible that the robot did not receive the stop command from the central PLC terminal. (Rewrite using *couldnot_have*)
- 12) I am sure that this industrial manipulator can't handle a three-hundred-kilogram payload. (Rewrite using *can't*)
- 13) Perhaps the laboratory assistant forgot to back up the raw neural network training weights. (Rewrite using *mayhave*)
- 14) It is certain that the cyber-physical system reacted immediately to the emergency telemetry signal. (Rewrite using *musthave*)
- 15) It is possible that the degree of freedom limitations prevent the tool from reaching the lower corner. (Rewrite using *might*)

TEMA 17. Maintenance and Troubleshooting

Grammar Focus: Expressing Condition and Regret in the Past: Third Conditional.

Professional Vocabulary: troubleshooting, preventive maintenance, calibration, malfunction, diagnostic code, breakdown, wear and tear, multimeter, spare part, downtime.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **troubleshooting, maintenance, calibration, malfunction, codes, breakdown, wear, multimeter, parts, downtime, inspect, log, tools, probe, components.***

- 1) Regular preventive _____ reduces the probability of unexpected equipment failure on the factory floor.

- 2) The experienced technician used a digital _____ to measure the voltage drops across the circuit board.
- 3) If an industrial machine experiences a serious mechanical _____, it instantly stops the assembly line.
- 4) The central PLC screen displays specific diagnostic _____ to help engineers locate the source of an error.
- 5) Natural mechanical _____ and tear causes conveyor belts to stretch and loosen over months of operation.
- 6) Unexpected system _____ costs the manufacturing enterprise thousands of dollars for every idle hour.
- 7) During the systematic _____ process, we discovered that a single communication wire was disconnected.
- 8) The laboratory maintains an emergency stock of critical spare _____ to complete repairs within minutes.
- 9) Instrument _____ must be performed annually to ensure that temperature sensors display precise metrics.
- 10) A sudden mechanical _____ occurs when operators ignore minor vibrations inside high-speed motor bearings.
- 11) Technicians use a sharp voltmeter _____ to test structural electrical continuity inside the control panel.
- 12) Every maintenance operation must be carefully documented in the central engineering diagnostic _____.
- 13) If you do not replace worn-out electronic _____, the entire control loop can experience a massive failure.
- 14) The team had to _____ every proximity sensor because the machine kept reporting false positioning data.
- 15) Advanced automated diagnostics help systems developers minimize total maintenance _____.

Task 2. Grammar Focus: Third Conditional

Put the verbs in brackets into the correct form to construct Third Conditional sentences.

- 1) If the technician _____ (calibrate) the pressure sensor last week, the system malfunction _____ (not/occur).
- 2) The factory _____ (not/lose) millions of dollars if the maintenance team _____ (perform) preventive inspections.
- 3) If the operator _____ (not/ignore) the diagnostic error code, the machine tool _____ (not/break down).
- 4) If you _____ (use) a digital multimeter, you _____ (detect) the broken circuit board trace immediately.

- 5) If the company _____ (keep) spare parts in the warehouse, the system downtime _____ (be) much shorter.
- 6) The automated conveyor belt _____ (not/stop) if the mechanical gears _____ (be) lubricated properly.
- 7) If the software developer _____ (optimize) the PLC script, the microcontroller _____ (not/freeze) during the test.
- 8) If the laboratory assistant _____ (wear) anti-static gloves, he _____ (not/damage) the microprocessor microchip.
- 9) What _____ (you/do) if the main industrial server database _____ (crash) during your night shift?
- 10) If the intrusion detection system _____ (be) active, the cyberattack _____ (not/corrupt) the firmware code.
- 11) If the engineering team _____ (implement) a digital twin, they _____ (predict) the structural breakdown.
- 12) The automated robotic arm _____ (not/collide) with the barrier if its path planning algorithm _____ (work) correctly.
- 13) If the network administrator _____ (change) the default master passwords, the malware _____ (not/penetrate) the subnet.
- 14) If the students _____ (read) the technical maintenance log book, they _____ (know) how to troubleshoot the transducer.
- 15) The high-voltage fuse _____ (not/blow) if the electrical current _____ (not/exceed) thirty amperes.

Task 3. Technical Translation

Translate the following sentences into English using Third Conditional structures and professional troubleshooting vocabulary.

- 1) Якби технік перевірів датчик наближення вчора, затримки у виробництві не відбулося б.
- 2) Робот не зламався б минулого тижня, якби оператори вчасно замінили зношені деталі.
- 3) Якби ми використовували цифровий мультиметр (multimeter), ми б виявили коротке замикання набагато швидше.
- 4) Завод не зазнав би великих збитків через час простою (downtime), якби на складі були запасні частини.
- 5) Якби лаборант помітив діагностичний код помилки, він би негайно перезавантажив систему керування.
- 6) Прошивка контролера не була б пошкоджена вірусом, якби брандмауер (firewall) був увімкнений.
- 7) Якби інженери провели калібрування (calibration) термомпари, температурні показники були б точними.

- 8) Що б ви зробили, якби автоматизований конвеєр повністю зупинився під час вашої зміни?
- 9) Якби робототехнічна лінія пройшла планове обслуговування, механічна поломка (malfunction) не сталася б.
- 10) Логічний контролер не видав би помилку, якби програміст вчора виправив синтаксис скрипту.
- 11) Якби оператор натиснув кнопку аварійної зупинки, роботизований маніпулятор не пошкодив би деталь.
- 12) Цифровий шлюз (gateway) не втратив би зв'язок із хмарою, якби мережевий кабель був закріплений.
- 13) Якби ми завантажили новий файл конфігурації минулого вівторка, точність верстата б покращилася.
- 14) Система виявлення вторгнень (IDS) заблокувала б хакера, якби її бази даних були оновлені.
- 15) Якби природний знос (wear and tear) деталей ковзання був виявлений раніше, аварії б не сталося.

Task 4. Correct the mistakes

Identify and correct one error regarding Third Conditional structures or technical troubleshooting terms in each sentence.

- 1) If the technician would have checked the diagnostic codes, he would have fixed the malfunction much faster.
- 2) The factory had not suffered severe downtime if the maintenance specialists had performed weekly inspections.
- 3) If you used a professional digital multimeter yesterday, you would have located the short circuit instantly.
- 4) The automated machinery wouldn't broken down if the sliding joints had been regularly lubricated with oil.
- 5) If the warehouse kept critical spare parts, the mechanical repair would had been completed within an hour.
- 6) The system administrator would have noticed the data breach if he checked the server security log last night.
- 7) If the thermocouple calibration process had been successful, the displayed metrics were accurate yesterday.
- 8) The robotic arm wouldn't have collided with the workbench if its proximity sensors hadn't fail.
- 9) If the student has read the troubleshooting guide, he would have known how to reset the microprocessor.

- 10) The industrial software application wouldn't have crashed if the code optimization process had finished.
- 11) If the gateway firmware was updated last month, it would have supported the new wireless data protocols.
- 12) The electric motor wouldn't have overheated if the automated cooling system had start automatically.
- 13) If the operator didn't ignore the alarm vibration, the internal bearing wouldn't have shattered into pieces.
- 14) What would the engineering team had done if the central PLC terminal had lost power during the process?
- 15) If the cyber-physical system had detected the network anomaly, it would has isolated the infected node.

Task 5. Sentence Transformation & Synthesis

Rewrite the situations as Third Conditional sentences, shifting from factual past actions to hypothetical conditions.

- 1) The technician failed to calibrate the flow meter. As a result, the automated mixing tank overflowed.
- 2) The operator ignored the loud bearing noise. Consequently, the high-speed electric motor burned out.
- 3) We did not possess a backup power generator. Therefore, the sudden electricity blackout erased our telemetry logs.
- 4) The programmer forgot to close an infinite loop in the script. That's why the central PLC froze during the live test.
- 5) The laboratory assistant didn't check the fuse status. Because of this, the entire control room lost its connection.
- 6) The factory ran out of spare proximity switches. As a result, the automated sorting conveyor stood idle for three days.
- 7) Hackers discovered a massive vulnerability in the legacy firmware. They encrypted the entire SCADA database.
- 8) The maintenance team did not inspect the pneumatic pipes. A high-pressure leak occurred during the morning shift.
- 9) The engineering student forgot to input the tool offset. The CNC machine tool drilled a hole in the wrong spot.
- 10) The network router lacked a powerful firewall. Malware penetrated our operational technology subnet within minutes.
- 11) The team implemented predictive analytics too late. They missed the critical signs of structural mechanical wear.
- 12) The security system did not require multi-factor authentication. An unauthorized person modified the machine code.

- 13) The digital twin was completely offline. Engineers failed to run virtual tests on the new control script.
- 14) The technician reversed the polarity of the copper wires. The sensitive digital transducer short-circuited instantly.
- 15) The factory omitted annual instrument calibration. The quality control sensors produced false telemetry data.

TEMA 18. Safety Standards and Regulations in Automation

Grammar Focus: Complex Object (Structures with verbs of causing, wishing, and perceiving: make/let/have someone do, want/expect/force someone to do, see/hear something doing/done).

Professional Vocabulary: emergency stop (e-stop), safety interlocking, hazard, risk assessment, compliance, protective enclosure, lock-out/tag-out (LOTO), regulation, personal protective equipment (PPE), occupational safety.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **stop, interlocking, hazard, assessment, compliance, enclosure, regulations, equipment, safety, locked, guard, shield, light, procedure, zones.***

- 1) Pushing the prominent red emergency _____ button cuts off all electrical power to the moving robotic joints.
- 2) Mechanical safety _____ prevents the protective doors from opening while the high-speed machine tool is rotating.
- 3) Before installing a robotic cell, safety compliance officers must perform a comprehensive risk _____.
- 4) Every worker entering the heavy automated assembly zone must wear standard personal protective _____ (PPE).
- 5) The lock-out/tag-out (LOTO) _____ guarantees that machinery cannot be restarted while maintenance work is underway.
- 6) Industrial robots are enclosed in a durable protective _____ to separate moving parts from human operators.
- 7) Strict occupational safety _____ mandate that all high-voltage control cabinets must be securely grounded.
- 8) A high-tech optical light curtain detects an airborne _____ and stops the conveyor if a human hand crosses the beam.

- 9) Achieving total international regulatory _____ is necessary for selling automation hardware in European markets.
- 10) A loose electrical cable laying across the laboratory floor represents a severe slipping and tripping _____.
- 11) The yellow laser scanner defines specific safety _____ around the dangerous working perimeter of the machine.
- 12) Technicians must ensure that the heavy protective glass _____ is down before activating the laser cutter.
- 13) If a factory violates state safety _____, it can face massive financial penalties and total operational closure.
- 14) The safety interlocking circuit uses redundant electronic relays to make sure that the system is fully _____.
- 15) Conducting a rigorous risk _____ helps industrial engineers eliminate mechanical design hazards early.

Task 2. Grammar Focus: Complex Object

Complete the sentences by putting the verbs in brackets into the correct form (bare infinitive, to-infinitive, or participle) following Complex Object rules.

- 1) The senior automation engineer made the apprentice student _____ (rewrite) the entire safety protocol log.
- 2) We expect all factory maintenance operators _____ (wear) personal protective equipment at all times.
- 3) The safety officer observed the robotic arm _____ (swing) dangerously close to the protective enclosure.
- 4) The strict lock-out/tag-out regulations force technicians _____ (isolate) all power sources before repairs.
- 5) Did you hear the emergency stop alarm _____ (ring) when the pneumatic valve blew out?
- 6) The factory management had the engineering team _____ (install) a modern optical light curtain.
- 7) Our laboratory professor does not let anyone _____ (operate) the CNC machine tool without supervision.
- 8) We watched the high-precision laser cutter _____ (slice) through a thick sheet of titanium alloy.
- 9) The international safety standard requires companies _____ (perform) a thorough risk assessment annually.
- 10) I noticed the proximity sensor _____ (blink) yellow, indicating a positional alignment error.
- 11) The safety interlocking system caused the moving conveyor belt _____ (stop) instantly when the gate opened.

- 12) Have the laboratory assistant _____ (check) the grounding of all high-voltage control panels immediately.
- 13) The compliance inspector wants the outdated protective enclosures _____ (replace) as soon as possible.
- 14) We heard the safety relay _____ (click) open when the operator pushed the red emergency stop button.
- 15) Do not let uncertified junior personnel _____ (modify) the core parameters of the SCADA firewall.

Task 3. Technical Translation

Translate the following sentences into English using Complex Object structures and professional automation safety vocabulary.

- 1) Керівник з безпеки змусив (made) студентів одягнути каски та захисні окуляри (PPE) перед входом на завод.
- 2) Ми очікуємо, що нова система захисного блокування (safety interlocking) зупинить робота у разі небезпеки.
- 3) Технік бачив, як захисні двері автоматично зачинилися (saw something close/closing) після запуску конвеєра.
- 4) Нові правила охорони праці змушують (force) компанії проводити оцінку ризиків (risk assessment) щороку.
- 5) Ви чули, як увімкнулася (heard something start) сирена аварійної зупинки (e-stop) дві хвилини тому?
- 6) Професор не дозволяє (let) першокурсникам працювати з промисловими шлюзами без нагляду.
- 7) Ми спостерігали, як інженер з охорони праці перевіряв процедуру ЛОТО (lock-out/tag-out) на верстаті.
- 8) Керівництво заводу наказало (had) технічній команді встановити світлові завіси (light curtains) навколо робота.
- 9) Державні інспектори хочуть, щоб усі захисні кожухи (protective enclosures) були виготовлені зі сталі.
- 10) Я помітив, що датчик безпеки спрацював (noticed something trigger), коли оператор перетнув лазерний промінь.
- 11) Стандарти безпеки вимагають від розробників дублювати всі критичні кола керування.
- 12) Не дозволяйте стороннім особам заходити у зону роботи промислових маніпуляторів.
- 13) Ми бачили, як зношений кабель замінили (saw something replaced) під час планового технічного обслуговування.
- 14) Змусьте систему безпеки перезавантажитися (make something reset) після перевірки всіх цифрових реле.

- 15) Інспектор хоче, щоб звіт про оцінку ризиків був підписаний головним інженером сьогодні.

Task 4. Correct the mistakes

Identify and correct one error regarding Complex Object structures or safety terminology in each sentence.

- 1) The chief inspector made the manufacturing company to halt its operations due to safety violations.
- 2) We expect the automated emergency stop button cuts off all electrical power to the joint motors.
- 3) The maintenance technician observed the pressure valve to leak hydraulic fluid during the stress test.
- 4) Rigid industrial safety regulations force companies maintaining zero tolerance for hazardous working environments.
- 5) Did you hear the safety interlocking relay to click open when the protective door was unlatched?
- 6) The university department let the students to program the industrial PLC without any supervisor presence.
- 7) We watched the automated forklift moving packages around the smart warehouse floor yesterday.
- 8) The safety officer had the technical assistant to update the lock-out/tag-out safety documentation files.
- 9) International automation standards want all hazard risk assessments be completed before hardware installation.
- 10) I noticed the optical light curtain system to trigger the brakes when an object crossed the beam.
- 11) Redundant security features cause the automated line stop if a network communication mismatch occurs.
- 12) Do not let uncertified workers to calibrate the high-voltage fuse circuits inside the control panel box.
- 13) The factory management wants the old steel protective enclosure replaced by modern transparent plexiglass.
- 14) We heard the emergency alarm siren rang loudly when the industrial boiler temperature exceeded limits.
- 15) The expert made the programming team adding a hardware verification loop to the safety script codebase.

Task 5. Sentence Transformation & Synthesis

Combine or rewrite the sentences using Complex Object structures (make, let, force, expect, see, hear, want) as indicated in the brackets.

- 1) The supervisor ordered the technician to test the e-stop button. (Rewrite using *make*)
- 2) Operators must wear personal protective equipment. This is our strict expectation. (Rewrite using *expect*)
- 3) The technician was repairing the PLC. The safety officer watched him. (Combine using *see*)
- 4) The rigid regulation requires companies to isolate energy using LOTO procedures. (Rewrite using *force*)
- 5) The alarm siren started ringing suddenly. We heard it. (Combine using *hear*)
- 6) Students are not allowed to enter the high-voltage area. The professor enforces this. (Rewrite using *not/let*)
- 7) The engineer monitored the laser scanner. It was mapping the geometric safety zones. (Combine using *notice*)
- 8) The factory owners hired a certified firm to complete a full risk assessment. (Rewrite using *have someone do*)
- 9) The government demands that the factory must install new protective enclosures immediately. (Rewrite using *want*)
- 10) The optical light curtain detected an intrusion and caused the machine to shut down. (Rewrite using *cause*)
- 11) The worker adjusted the mechanical guard rail. The safety compliance inspector watched the process. (Combine using *watch*)
- 12) The laboratory assistant verified the grounding wire calibration parameters. The professor made him do it. (Rewrite using *make*)
- 13) Do not permit unauthorized operators to modify the safety interlocking software logic. (Rewrite using *not/let*)
- 14) The safety relay clicked open during the electrical short circuit. We clearly heard that. (Combine using *hear*)
- 15) Management wishes that all technical reports are prepared using standardized templates. (Rewrite using *want*)

TEMA 19. Job Interviews and Professional Networking

Grammar Focus: Gerunds vs. Infinitives (e.g., *interested in pursuing, capable of managing, plan to apply, manage to secure*).

Professional Vocabulary: core competency, soft skills, career objectives, elevator pitch, professional network, interview panel, technical background, interpersonal skills, candidate, job description.

Task 1. Vocabulary & Context Clues

Fill in the blanks with the correct professional terms from the list: competencies, skills, objectives, pitch, network, panel, background, interpersonal, candidate, description, resume, interview, experience, career, profiles.

- 1) During the job interview, the selection _____ focused heavily on my practical experience with PLC programming.
- 2) An effective _____ pitch should summarize your technical expertise and career goals in less than sixty seconds.
- 3) Building a strong professional _____ on LinkedIn helps engineering graduates discover hidden job openings.
- 4) My core _____ include microcomputer hardware design, automated signal processing, and systems troubleshooting.
- 5) In the automation field, strong _____ skills are just as important as technical coding abilities.
- 6) The detailed job _____ states that the ideal candidate must know how to configure industrial SCADA systems.
- 7) Every applicant should align their short-term career _____ with the strategic goals of the engineering company.
- 8) Having a solid technical _____ in mathematics and electronics gives you an advantage during a tech interview.
- 9) The HR manager asked the _____ why they were interested in shifting from software development to industrial robotics.
- 10) Developing excellent communication and teamwork _____ will help you collaborate with senior developers on the factory floor.
- 11) To stand out from the crowd, ensure your executive _____ highlights your project management experience.
- 12) Preparing for a technical _____ requires practicing live coding scripts and reviewing hardware design principles.
- 13) His professional _____ includes a five-month engineering internship at a leading automotive manufacturing plant.
- 14) A successful candidate must possess the ability to describe complex digital control systems in plain English.
- 15) Expanding your industry _____ involves attending technical conferences and participating in open-source projects.

Task 2. Grammar Focus: Gerunds vs. Infinitives

Put the verbs in brackets into the correct form (Gerund or Infinitive).

- 1) The automation engineer is highly interested in _____ (pursue) a Master's degree in cyber-physical systems.

- 2) The interview panel expects all qualified candidates _____ (demonstrate) their PLC troubleshooting skills.
- 3) Before _____ (apply) for the robotics specialist position, make sure to read the job description carefully.
- 4) Our university department plans _____ (launch) a new professional networking program for engineering students.
- 5) He managed _____ (secure) a prestigious internship at the automated plant despite having no prior field experience.
- 6) Automation candidates should avoid _____ (mention) irrelevant hobbies during a strict technical interview.
- 7) Being capable of _____ (manage) large industrial big data arrays is a critical requirement for this job.
- 8) The project manager suggested _____ (update) our LinkedIn profiles to attract international recruiters.
- 9) I look forward to _____ (discuss) my hardware design background with the lead systems developer tomorrow.
- 10) The company refused _____ (hire) the applicant because he failed to display basic interpersonal skills.
- 11) Succeeding in a technical interview involves _____ (explain) your engineering decisions clearly and confidently.
- 12) The candidate chose _____ (highlight) his experience with additive manufacturing during his elevator pitch.
- 13) You cannot expect _____ (master) complex industrial automation protocols without practicing every single week.
- 14) The technical supervisor accused the candidate of _____ (exaggerate) his proficiency in C++ and Python.
- 15) We decided _____ (postpone) the final job interviews until the new laboratory equipment is fully installed.

Task 3. Technical Translation

Translate the following sentences into English using appropriate Gerund/Infinitive structures and professional career vocabulary.

- 1) Кандидат зацікавлений у отриманні (interested in pursuing) посади інженера з автоматизації на цьому розумному заводі.
- 2) Нам вдалося пройти (managed to pass) перший етап технічної співбесіди завдяки нашому досвіду роботи з ПЛК.
- 3) Перед тим як подавати заявку (Before applying) на роботу, вам слід оновити свій профіль у професійних мережах.
- 4) Комісія співбесіди (interview panel) очікує, що ви продемонструєте свої міжособистісні навички (interpersonal skills).

- 5) Бути здатним керувати (Being capable of managing) великими проектами — це важлива ключова компетенція (core competency).
- 6) Я з нетерпінням чекаю на обговорення (look forward to discussing) мого технічного досвіду з головним розробником.
- 7) Інженер планує відвідати (plans to attend) міжнародну виставку, щоб розширити свою мережу професійних контактів.
- 8) Кандидатам слід уникати використання (should avoid using) занадто простих слів під час своєї хвилинної презентації (elevator pitch).
- 9) Роботодавець запропонував провести (suggested holding) фінальну співбесіду через Zoom наступного вівторка.
- 10) Студент відмовився підписувати (refused to sign) контракт, оскільки опис вакансії (job description) не відповідав його кар'єрним цілям.
- 11) Влаштування на роботу в галузі робототехніки передбачає постійне вивчення (involves learning) нових мов програмування.
- 12) Ви не можете розраховувати отримати (expect to get) цю посаду без базових знань з комп'ютерного зору (computer vision).
- 13) Ми вирішили зосередитися на (decided to focus on) описі наших навичок вирішення проблем під час інтерв'ю.
- 14) HR-менеджер похвалив кандидата за чітке формулювання його короткострокових кар'єрних цілей (career objectives).
- 15) Проходження технічної співбесіди вимагає ретельного повторення (requires reviewing) основ теорії автоматичного керування.

Task 4. Correct the mistakes

Identify and correct one error regarding gerunds, infinitives, or career-oriented vocabulary in each sentence.

- 1) The candidate is interested in to pursue a career in industrial cybersecurity and automated systems.
- 2) We plan applying for the new hardware developer position as soon as we finish our university thesis.
- 3) The interview panel praised the candidate for being capable to troubleshoot complex PLC network crashes.
- 4) Before to deliver your elevator pitch, make sure to practice your speech in front of a mirror.
- 5) He managed securing a high-paying job at the smart factory after completing a intensive coding bootcamp.
- 6) Engineering applicants should avoid to talk about personal financial difficulties during the initial interview phase.

- 7) I look forward to meet the lead automation recruiter at the upcoming professional networking event.
- 8) The company refused hiring the applicant because his technical background did not match the job criteria.
- 9) Succeeding in a technical career involves to update your professional competencies every single year.
- 10) The selection panel suggested to conduct a secondary background check on the final candidate's references.
- 11) You cannot expect master deep learning algorithms without spending hundreds of hours on practical coding.
- 12) The candidate chose highlighting his experience with industrial gateways and cloud manufacturing frameworks.
- 13) The HR specialist accused the engineer of avoid to answer direct questions about his previous team conflicts.
- 14) We decided postponing the recruitment process because the corporate job description required urgent revisions.
- 15) Having excellent interpersonal competencies help you passing the behavioral part of the interview seamlessly.

Task 5. Sentence Transformation & Synthesis

Combine or rewrite the sentences using gerunds or infinitives as indicated in the brackets.

- 1) The developer wants to specialize in industrial robotics. This is his primary interest. (Rewrite using *interested in pursuing*)
- 2) The technician must calibrate twenty sensors every morning. This is his mandatory duty. (Rewrite using *responsible for calibrating*)
- 3) He wrote a perfect application letter. As a result, he obtained a personal interview invitation. (Combine using *managed to secure*)
- 4) Review the detailed job description first. Then, update your technical resume. (Combine using *Before updating... should...*)
- 5) The applicant can handle extreme workplace stress. She proved this during the selection process. (Rewrite using *capable of handling*)
- 6) Do not include outdated technical certification credentials in your CV. This is a common rule. (Rewrite using *should avoid including*)
- 7) I want to meet the members of the senior engineering panel next week. (Rewrite using *look forward to meeting*)
- 8) The manager said that the company will not sponsor international working visas. (Rewrite using *refused to sponsor*)
- 9) If you want to become a successful networks administrator, you must study cybersecurity protocols. (Rewrite using *involves studying*)

- 10) We decided that we will change our main long-term career objectives this quarter. (Rewrite using *decided to change*)
- 11) The expert recommended that students should create clean professional profiles on LinkedIn. (Rewrite using *suggested creating*)
- 12) The candidate did not explain his project management background. He failed to do this. (Rewrite using *failed to explain*)
- 13) Practice your sixty-second elevator pitch every day. It will help you improve your confidence. (Combine using *Practicing... helps to improve...*)
- 14) The student dreams of winning the national university robotics competition this autumn. (Rewrite using *aspires to win*)
- 15) The team completed the hardware simulation on time. It was a difficult task. (Rewrite using *managed to complete*)

TEMA 20. Writing Professional CVs and Resumes

Grammar Focus: Expressing Professional Experience using Action Verbs in the Past Simple vs. Present Perfect vs. Gerunds (e.g., *designed, implemented, responsible for maintaining*).

Professional Vocabulary: employment history, academic credentials, key achievements, professional summary, proficient in, troubleshooting skills, certification, soft skills, publications, references.

Task 1. Vocabulary & Context Clues

*Fill in the blanks with the correct professional terms from the list: **history, credentials, achievements, summary, proficient, troubleshooting, certifications, skills, publications, references, experience, profile, resume, formatting, fields.***

- 1) Your professional _____ should contain a concise three-sentence overview of your engineering expertise and career goals.
- 2) In the CV section labeled employment _____, list your previous job titles starting from the most recent one.
- 3) The hiring manager was highly impressed by the candidate's academic _____ from the technical university.
- 4) Bullet points in the _____ section must highlight measurable results, such as "reduced machine downtime by 15%."
- 5) A modern automation engineer must be _____ in high-level programming languages like Python and C++.

- 6) Highlighting your advanced hardware _____ skills proves that you can handle real-world industrial failures.
- 7) Industrial _____ like Cisco CCNA or Siemens PLC Automation add massive value to an engineering CV.
- 8) Do not forget to include teamwork, leadership, and communication under the section dedicated to soft _____.
- 9) If you have written any academic articles, create a separate section for professional peer-reviewed _____.
- 10) Candidates usually state that professional _____ are available upon request from their previous supervisors.
- 11) A well-organized technical _____ should never exceed two pages in length to guarantee scannability.
- 12) Before submitting your application, verify that the document _____ is consistent and easy to read.
- 13) Senior researchers often list their scientific conference _____ at the very end of their extensive curriculum vitae.
- 14) To work in international automation companies, you must demonstrate proficiency in various specialized _____.
- 15) Her impressive engineering _____ includes managing multi-million dollar cyber-physical facility installations.

Task 2. Grammar Focus: Expressing Experience (Past Simple, Present Perfect, Gerunds)

Complete the CV bullet points by putting the verbs in brackets into the correct form (Past Simple, Present Perfect, or Gerund).

- 1) _____ (Design) and implemented a fully automated five-axis robotic welding cell for an automotive client in 2024.
- 2) Currently responsible for _____ (monitor) and optimizing real-time big data telemetry streams from 200+ sensor nodes.
- 3) Since 2025, I _____ (develop) three standalone software applications for industrial microcontroller firmware configuration.
- 4) _____ (Lead) a team of four junior laboratory assistants during a major upgrade of the university SCADA infrastructure.
- 5) Expert at _____ (troubleshoot) high-voltage electronic circuit boards and repairing industrial proximity devices.
- 6) Successfully _____ (reduce) total manufacturing line downtime by twenty percent through predictive analytics integration.
- 7) I _____ (maintain) an active professional engineering certification from the international society of automation since 2023.
- 8) _____ (Collaborate) with cross-functional software teams to integrate machine vision models into automated conveyor lines.

- 9) Highly skilled in _____ (program) programmable logic controllers using Structured Text and Ladder Logic diagrams.
- 10) _____ (Co-author) two scientific publications on the scalability of cyber-physical systems in smart manufacturing.
- 11) For the past two years, I _____ (serve) as the lead technical consultant for a regional cloud manufacturing project.
- 12) _____ (Calibrate) and configured high-precision digital transducers and industrial thermocouples on a daily basis.
- 13) Responsible for _____ (train) factory operators on how to handle emergency stop sequences and LOTO safety protocols.
- 14) _____ (Optimize) the central path planning algorithm script, which accelerated drone navigation speed by fifteen percent.
- 15) I _____ (receive) the "Best Young Automation Engineer" national award during my undergraduate studies in 2025.

Task 3. Technical Translation

Translate the following sentences into English using appropriate verbal forms and professional CV vocabulary.

- 1) Розробив (Designed) та впровадив алгоритм глибокого навчання для систем машинного зору у 2025 році.
- 2) Зараз відповідаю за обслуговування (Responsible for maintaining) та калібрування промислових датчиків тиску.
- 3) З 2024 року я спроектував (have designed) п'ять цифрових плат для систем автоматизації.
- 4) Керував (Managed) командою з трьох техніків під час модернізації центрального сервера шлюзу.
- 5) Маю досвід у пошуку несправностей (Experienced in troubleshooting) висококальтних електричних кіл.
- 6) Успішно зменшив (Successfully reduced) час простою обладнання на 15% завдяки прогностичному обслуговуванню.
- 7) Я володію (am proficient in) мовами програмування C++ та Python, а також середовищем розробки MATLAB.
- 8) Співавтор двох наукових публікацій (Co-author of two publications) у галузі промислового інтернету речей (IIoT).
- 9) Протягом останніх двох років я працюю (have been working) над розробкою цифрових двійників для розумних заводів.
- 10) Пройшов сертифікацію (Obtained certification) з кібербезпеки промислових систем керування у 2026 році.
- 11) До моїх обов'язків входило навчання (My duties included training) першокурників основам програмування мікроконтролерів.

- 12) Оптимізував (Optimized) пропускну здатність мережі для підвищення швидкості передачі даних телеметрії.
- 13) Моє резюме (resume) містить детальний опис моєї трудової діяльності (employment history) та академічних досягнень.
- 14) Рекомендації (References) можуть бути надані за запитом від мого наукового керівника з університету.
- 15) Нагороду за найкращий інженерний проект було отримано (was received) під час літнього стажування.

Task 4. Correct the mistakes

Identify and correct one error regarding tense usage, gerunds, or CV formatting vocabulary in each sentence.

- 1) Since 2024, I designed three complex neural network models for high-speed industrial object recognition.
- 2) Responsible for maintain and updating the configuration logs of the primary industrial SCADA server.
- 3) I have graduated from the national technical university with a Master's degree in automation in June 2025.
- 4) Proficient into configuring programmable logic controllers and implementing Modbus communication networks.
- 5) Expert at troubleshoot mechanical defects inside high-performance robotic manipulator joints.
- 6) Successfully reduce factory energy consumption by twelve percent during my six-month corporate internship.
- 7) Currently study advanced cyber-physical system architectures and cloud manufacturing integration protocols.
- 8) I am maintaining a valid Siemens automation certification since I passed the practical exam two years ago.
- 9) Co-authored an academic publication on machine-to-machine communication protocols in 2025 autumn.
- 10) My duties including inspecting all incoming raw materials using automated optical inspection equipment.
- 11) The selection panel noted that the employment summaries section was completely missing from my CV.
- 12) I have completed a intensive course on industrial network cybersecurity rules last Thursday afternoon.
- 13) Highly skilled in design high-precision electronic printed circuit boards using professional EDA software.
- 14) Attended three international conferences on Industry 4.0 trends during my academic credential history.

15) References are available upon requesting from the human resources department of my previous company.

Task 5. Sentence Transformation & Synthesis

Convert the professional statements into concise, scannable CV bullet points using the indicated grammatical form.

1) In my previous job, I supervised a team of five automation technicians during assembly. (Rewrite as a CV bullet point starting with an action verb in the *Past Simple*)

2) My daily job consists of analyzing big data telemetry datasets coming from factory devices. (Rewrite as a CV bullet point starting with *Responsible for + Gerund*)

3) I started working on a modular firmware update in 2024 and I am still working on it now. (Rewrite as a CV bullet point using the *Present Perfect*)

4) I achieved a ten percent reduction in circuit power consumption by modifying code logic. (Rewrite as a CV bullet point starting with *Successfully optimized... to achieve...*)

5) I have great skills when it comes to programming microchips using Assembly and C. (Rewrite as a CV bullet point starting with *Proficient in + Gerund*)

6) I wrote three separate research papers during my university career. (Rewrite as a CV bullet point starting with an action verb in the *Past Simple*)

7) I hold a professional project management certificate that I received two years ago and still keep active. (Rewrite as a CV bullet point using the *Present Perfect*)

8) My main task was to train new staff members on how to use the CNC laser cutting tools safely. (Rewrite as a CV bullet point starting with *Tasked with + Gerund*)

9) I modified the mechanical layout of the motherboard to make heat dissipation better. (Rewrite as a CV bullet point starting with *Redesigned... to enhance...*)

10) I am very good at identifying hidden software bugs inside python algorithmic scripts. (Rewrite as a CV bullet point starting with *Expert at + Gerund*)

11) We implemented an intrusion detection system at the facility in the year 2025. (Rewrite as a CV bullet point starting with an action verb in the *Past Simple*)

12) I built a working relationship with three global automation hardware vendors. (Rewrite as a CV bullet point starting with *Established... with...*)

13) I monitor the industrial network infrastructure continuously to catch cyber threats early. (Rewrite as a CV bullet point starting with *Engaged in + Gerund*)

14) I began managing the factory migration to cloud manufacturing architecture in January and I am still doing it. (Rewrite as a CV bullet point using the *Present Perfect*)

15) I finished a full risk assessment protocol for ten automated robotic production cells. (Rewrite as a CV bullet point starting with an action verb in the *Past Simple*)

TEMA 21. Technical Presentations and Reports

Grammar Focus: Linking Words for Structuring Information (e.g., *firstly, map out, move on to, turn our attention to, wrap up, in conclusion*).

Professional Vocabulary: executive summary, methodology, data analysis, visual aids, conclusion, technical specification, recommendation, diagram, chart, overview.

Task 1. Vocabulary & Context Clues

Fill in the blanks with the correct professional terms from the list: summary, methodology, analysis, aids, conclusion, specifications, recommendations, diagrams, charts, overview, reporting, presentation, figures, data, section.

- 1) The introductory executive _____ provides busy corporate managers with a brief one-page overview of the entire report.
- 2) Our research _____ section describes the precise engineering steps and mathematical models used in the experiment.
- 3) Comprehensive big data _____ involves filtering raw telemetry metrics and running statistical software scripts.
- 4) Utilizing clear visual _____ like charts and diagrams helps the audience follow complex technical presentations.
- 5) In the final _____ of the presentation, the speaker summarized the main points and answered audience questions.
- 6) The blueprint document outlines the exact technical _____ of the new programmable logic controller.
- 7) Based on our diagnostic results, we formulated several concrete _____ for upgrading the network firewall.
- 8) Flowcharts and schematic _____ illustrate the structural connection between sensors and the central gateway.

- 9) Pie charts and bar _____ are highly effective for displaying comparative energy consumption patterns.
- 10) Before describing the neural network architecture, let us take a brief look at the general project _____.
- 11) Technical _____ requires absolute accuracy, objective language, and a consistent scannable layout.
- 12) Preparing a successful slideshow _____ involves organizing slide contents chronologically and avoiding text walls.
- 13) All data tables and structural _____ must be numbered sequentially and referenced correctly in the body text.
- 14) The engineering team collected raw performance _____ during the entire execution phase of the system.
- 15) Please review the safety compliance _____ before drafting the final operational manual for the robot cell.

Task 2. Grammar Focus: Linking Words for Structuring Information

Fill in the blanks with appropriate transitional phrases and linking words (firstly, map out, move on to, turn our attention to, wrap up, in conclusion, furthermore, however, therefore).

- 1) _____, I would like to outline the main structural components of our cyber-physical system architecture.
- 2) Now that we have covered the hardware setup, let us _____ the software algorithm configuration.
- 3) The initial simulation showed excellent results; _____, the live factory test revealed several hidden network bugs.
- 4) Before we begin the practical coding session, let us _____ the primary goals of today's laboratory class.
- 5) Having discussed the telemetry variables, I want to _____ the critical issue of industrial network security.
- 6) Let us _____ today's technical presentation by highlighting the financial benefits of automated sorting lines.
- 7) The microchip has limited flash memory; _____, we must optimize every single line of our firmware script.
- 8) _____, implementing a digital twin reduces testing costs; it also minimizes the risk of physical tool damage.
- 9) _____, I want to emphasize that regular sensor calibration is mandatory for maintaining high data accuracy.
- 10) Let us now _____ the data analysis section to inspect the efficiency charts of the robotic manipulator.

- 11) The system failed its first compliance audit; _____, the engineering team had to redesign the protective enclosure.
- 12) Firstly, we declare the global variables; secondly, we create the control loop; _____, we test the code.
- 13) To _____ the first part of my talk, I will show a brief video demonstration of the autonomous forklift.
- 14) We must analyze the hardware options carefully _____ we can choose the most cost-effective microprocessor unit.
- 15) The network bandwidth is insufficient; _____, we cannot stream high-definition video from the security cameras.

Task 3. Technical Translation

Translate the following sentences into English using appropriate linking words and technical reporting vocabulary.

- 1) По-перше (Firstly), я б хотів надати короткий огляд (overview) нашого проекту автоматизації.
- 2) Тепер давайте перейдемо до (move on to) аналізу даних телеметрії, отриманих минулого тижня.
- 3) На завершення (In conclusion), впровадження штучного інтелекту зменшило витрати енергії на 12%.
- 4) Перед початком тестування нам потрібно окреслити (map out) основні етапи нашої методології (methodology).
- 5) Далі давайте звернемо нашу увагу на (turn our attention to) технічні характеристики (technical specifications) контролера.
- 6) Давайте підіб'ємо підсумки (wrap up) сьогоднішньої презентації, переглянувши основні рекомендації (recommendations).
- 7) Дані були пошкоджені, і тому (therefore) фінальний графік (chart) містить деякі неточності.
- 8) Крім того (Furthermore), цей промисловий шлюз підтримує розширені протоколи шифрування даних.
- 9) Початкові результати були хорошими, однак (however) верстат перегрівся під час стрес-тесту.
- 10) Будь ласка, подивіться на цю схему (diagram), яка ілюструє структуру нашої локальної мережі.
- 11) Коротке резюме (Executive summary) містить опис усіх ключових досягнень нашої інженерної команди.
- 12) По-перше, ми збираємо логи помилок; по-друге, ми використовуємо мультиметр для перевірки напруги.
- 13) Цей звіт містить детальні технічні специфікації всіх периферійних пристроїв у лабораторії.

- 14) Використання наочних засобів (visual aids) допомагає аудиторії краще зрозуміти складні алгоритми.
- 15) Зв'язок між машинами (M2M) був перерваний, і внаслідок цього (consequently) система зупинилася.

Task 4. Correct the mistakes

Identify and correct one error regarding linking words, transitions, or technical presentation vocabulary in each sentence.

- 1) Firstly of all, let us examine the executive summary of the automated manufacturing report.
- 2) Now that we finished the hardware layout, let us moving on to discuss the firmware compilation.
- 3) In a conclusion, the integration of predictive analytics successfully minimized system downtime.
- 4) Before we begin, let us mapping out the exact safety zones around the robotic manipulator cell.
- 5) Let us turn our attention for the next slide, which displays the comparative energy efficiency chart.
- 6) To wrap off today's technical talk, I would like to thank our university laboratory assistants.
- 7) The microcontroller is cheap, however, our department purchased fifty units for practical classes.
- 8) Furthermore than reducing material waste, additive manufacturing enables rapid custom prototyping.
- 9) The telemetry data log was lost, therefore, the engineering team cannot completing the analysis.
- 10) Please look at this flowchart diagram who explains the logic of the safety interlocking circuit.
- 11) The research methodologies section needs to be expanded with detailed algorithmic formulas.
- 12) Firstly, we calibrate the transducer; second, we log the metrics into the central database table.
- 13) Visual aids like charts and figures is necessary for delivering a scannable and professional presentation.
- 14) The technical specification document were updated by the systems integrator last Friday morning.
- 15) The network crashed during the update, consequently, all simulated twin metrics became totally invalid.

Task 5. Sentence Transformation & Synthesis

Combine or restructure the presentation statements using the professional linking words specified in the brackets.

- 1) I will start my talk by showing you the project overview. Then I will describe the hardware. (Combine using *Firstly... move on to...*)
- 2) The team completed the data analysis. After that, they formulated the final recommendations. (Combine using *Having completed... turned their attention to...*)
- 3) We need to end this presentation now. Let us look at the summary slide. (Combine using *To wrap up... let us...*)
- 4) The cloud platform offers excellent scalability. It also provides advanced cryptographic security. (Combine using *Furthermore*)
- 5) We ran fifty virtual simulations. The real-world machine tool behaved differently. (Combine using *However*)
- 6) Operators must understand the code logic. First, we need to draw a clear flowchart diagram. (Combine using *Therefore, before... we must...*)
- 7) I will summarize everything now. The project was a complete success. (Combine using *In conclusion*)
- 8) We discussed the microchip firmware. Now we will discuss the motherboard hardware layout. (Combine using *Moving on from... let us turn our attention to...*)
- 9) The student must follow the strict methodology guidelines. Otherwise, the research results will be rejected. (Combine using *Since... therefore...*)
- 10) The speaker explained the technical specifications. At the same time, she pointed at the visual aids on the wall. (Combine using *While explaining... utilized...*)
- 11) We need to plan the structure of our technical report before we start writing the introduction. (Rewrite using *map out*)
- 12) The industrial router lacks a metal enclosure. High-frequency noise easily disrupts its signal. (Combine using *Consequently*)
- 13) First, we unpack the components. Second, we verify the delivery list. Third, we install the hardware. (Rewrite using *Firstly... secondly... finally...*)
- 14) The algorithm requires high computing power. We must deploy a high-performance GPU cluster. (Combine using *As a result*)
- 15) This bar chart demonstrates fuel consumption. This pie chart demonstrates total electricity waste. (Combine using *While this bar chart... this pie chart...*)

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1. **IEEE Spectrum – Automation & Robotics Section** URL: <https://spectrum.ieee.org/robotics-automation>
2. **Siemens Global – Industrial Automation & Industry 4.0 Portfolio** URL: <https://www.siemens.com/global/en/products/automation.html>
3. **MIT OpenCourseWare – Mechanical Engineering & Principles of Autonomy** URL: <https://ocw.mit.edu> Навчальні матеріали та технічні

звіти, які стали основою для моделювання синтаксичних конструкцій у завданнях на пасивний стан, умовні речення та герундіальні звороти.