**Практическая работа № 26**

**Тема**: Системы автоматизации производства и проектирования: САМ и CAD. Страдательный залог.

**Прочитайте текст и выполните задания после него.**

**COMPUTER SCIENCE IN ENGINEERING**

Computer science is a part of an applied mathematics. Specialists in computer science say that this field of knowledge is very interesting because it deals with computer-aided-design (CAD) and computer-aided-manufacturing (CAM).

Computers are intended to improve the productivity of labour of scientists, designers, engineers, managers, and other specialists, because computers offer quick and optimal solutions. One of the main goals of using CAD/CAM is to shorten the time between designing and manufacturing.

Computer aided design (CAD) is the process of creating a design, known as drafting, using computer technology. Computer aided manufacturing (CAM) is the use of computers and computer software to guide machines to manufacture something, usually a part that is mass-produced. There is always a strict relation between CAD and CAM and they are often used together.

CAD creates the design and CAM builds it. CAM is usually dependent on CAD. The use of CAD created designs offers an easy way of inputting information into a CAM software system. CAM and CAD are both referred to as part of an overall process known collectively as computer aided engineering (CAE). They can render things in either two dimensions (2D) or three dimensions (3D).

Many CAM machines have CAD software built-in, although not all designs require the use of a CAD created design. A CAD user will typically be an engineer with training in CAD software, whereas a CAM user will usually be a specially trained machinist. These types of machinists are highly skilled.

**Задание 1. Ответьте на вопросы, используя текст.**

1. What do the abbreviations CAM and CAD mean?
2. What is one of the main goals of using CAM and CAD?
3. What is CAD?
4. What is CAM
5. Are they used together? How?
6. What is CAE?
7. What can you say about a CAD and CAM users?

**Задание 2. Переведите на русский язык в письменной форме абзацы 2, 3, и 5.**

**Задание 3. Заполните пропуски в предложениях и запишите пропущенные слова в тетрадь.**

1. The use of CAD created \_\_\_\_\_\_\_\_\_\_\_\_\_ offers an easy way of \_\_\_\_\_\_\_\_\_\_\_\_\_ information into a CAM software system.
2. CAM is the use of computers and computer software to \_\_\_\_\_\_\_\_\_\_\_\_\_ machines to manufacture something, usually a \_\_\_\_\_\_\_\_\_\_\_\_\_ that is mass-produced.
3. A lot of CAM \_\_\_\_\_\_\_\_\_\_\_\_\_ have CAD software ..., although not all designs \_\_\_\_\_\_\_\_\_\_\_\_\_ the use of a CAD created design.
4. Computers are \_\_\_\_\_\_\_\_\_\_\_\_\_ to improve the productivity of labour of scientists, designers, engineers, managers, and other specialists, because computers \_\_\_\_\_\_\_\_\_\_\_\_\_ quick and optimal …**.**

**Практическая работа № 27**

**Тема**: Роботы в промышленности.

**Прочитайте текст и выполните задания после него**

**ROBOTS IN MANUFACTURING**

Today most robots are used in manufacturing operations. The applications of robots can be divided into three categories:

1. material handling

2. processing operations

3. assembly and inspection.

Material-handling is the transfer of material and loading and unloading of machines. Material-transfer applications require the robot to move materials or work parts from one to another. Many of these tasks are relatively simple: robots pick up parts from one conveyor and place them on another. Other transfer operations are more complex, such as placing parts in an arrangement that can be calculated by the robot. Machine loading and unloading operations utilize a robot to load and unload parts. This requires the robot to be equipped with a gripper

that can grasp parts. Usually the gripper must be designed specifically for the particular part geometry.

In robotic processing operations, the robot manipulates a tool to perform a process on the work part. Examples of such applications include spot welding, continuous arc welding and spray painting. Spot welding of automobile bodies is one of the most common applications of industrial robots. The robot positions a spot welder against the automobile panels and frames to join them. Arc welding is a continuous process in which robot moves the welding rod along the welding seam. Spray painting is the manipulation of a spray-painting gun over the surface of the object to be coated. Other operations in this category include grinding and polishing in which a rotating spindle serves as the robot's tool.

The third application area of industrial robots is assembly and inspection. The use of robots in assembly is expected to increase because of the high cost of manual labour. But the design of the product is an important aspect of robotic assembly. Assembly methods that are satisfactory for humans are not always suitable for robots. Screws and nuts are widely used for fastening in manual assembly, but the same operations are extremely difficult for a one-armed robot.

Inspection is another area of factory operation in which the utilization of robots is growing. In a typical inspection job, the robot positions a sensor with respect to the work part and determines whether the part answers the quality specifications. In nearly all industrial robotic applications, the robot provides a substitute for human labour. There are certain characteristics of industrial jobs performed by humans that can be done by robots:

1. the operation is repetitive, involving the same basic work motions every cycle,

2. the operation is hazardous or uncomfortable for the human worker (for example: spray painting, spot welding, arc welding, and certain machine loading and unloading tasks),

3. the workpiece or tool is too heavy and difficult to handle,

4. the operation allows the robot to be used on two or three shifts.

**Задание 1. Ответьте на вопросы к тексту:**

1. How are robots used in manufacturing?

2. What is «material handling»?

3. What does a robot need to be equipped with to do loading and unloading operations?

4. What does robot manipulate in robotic processing operation?

5. What is the most common application of robots in automobile manufacturing?

6. What operations could be done by robot in car manufacturing industry?

7. What are the main reasons to use robots in production?

8. How can robots inspect the quality of production?

9. What operations could be done by robots in hazardous or uncomfortable for the human workers conditions?

**Задание 2. Переведите на английский язык предложения из текста:**

1. Существует несколько различных сфер использования автоматизации в производстве.

2. Для использования жесткой автоматизации необходимы большие инвестиции.

3. Жесткая автоматизация широко используется в химической промышленности.

4. Станки с числовым программным управлением — хороший пример программируемой

автоматизации.

5. Гибкая автоматизация делает возможным перепрограммирование оборудования.

6. Время простоя оборудования оборачивается большими убытками.

7. Использование гибкой автоматизации делает возможным производство разнообразной продукции.

**Практическая работа № 28**

**Тема**: Техника безопасности в мастерской. Трудности перевода: Сложное подлежащее

**Цель**:

***Прочитайте текст и выполните задания после него.***

**SAFETY ENGINEERING**

Accidents to people in industrial enterprises are called industrial injury. They occur when workers have not acquired the requisite for skill and lack the necessary experience in handling tools and equipment. Accidents are also caused through neglect of safety rules and regulations in the factories and training workshops.

The purpose of safety engineering is to prevent accidents and to create such conditions of work in industry which will ensure maximum productivity of labour.

When taking up new duties or when first going to work at any industrial enterprise each worker is obliged to acquaint him thoroughly with, and to master the safety instructions.

**Задание 1. Ответьте на вопросы к тексту**

1. How are the accidents to people in industrial enterprises called?
2. When do the accidents to people occur?
3. What must one do to prevent accidents?
4. What is the purpose of safety engineering?
5. What is a worker obliged to do when taking up new duties?

**Задание 2. Прочитайте текст и переведите письменно 1 и 2 абзацы.**

**Задание 3. Найдите соответствия английских и русских предложений**

|  |  |
| --- | --- |
| **a)**   1. Wear safety boots! 2. Don’t enter! 3. Don’t use a mobile phone here. 4. Emergency exit this way! 5. Be careful. Dangerous liquid! 6. Don’t touch! 7. Wear safety goggles in the area! 8. Don’t park here! 9. Be careful! Explosive material! 10. Don’t switch on! 11. Danger of an electric shock! 12. Don’t smoke here! 13. Wear a hard hat! 14. Watch out! Danger! | **b)**  a) Руками не трогать!  b) Парковка запрещена!  c) Осторожно! Взрывоопасные вещества.  d) Не курить!  e) Не включать!  f) Осторожно! Высокое напряжение!  g) Надеть обувь!  h) Запасной выход!  i) Осторожно! Опасно!  j) Отключить мобильные телефоны!  k) Не входить!  l) Для безопасности оденьте очки!  m) Осторожно! Опасные растворы!  n) Надеть каску! |

**Задание 4. Заполните пропуски словами, данными справа**

|  |  |
| --- | --- |
| 1) These ear protectors must be carried everywhere in the 1\_\_\_\_\_\_\_ hangar. 2) These 2\_\_\_\_\_\_\_ must be lubricated every day. 3) Drivers are required to check the 3\_\_\_\_\_\_\_, lights, tyres, and water before a long car journey. 4) Apprentices must always wear 4\_\_\_\_\_\_\_ in the workshop. | a) overalls  b) gears  c) brakes  d) aircrafts |

**Задание 5. Переведите предложения, обращая внимание на перевод «Сложного подлежащего» (См. таблицу ниже).**

1. Light is proved to travel in straight lines.
2. Popov is known to be the inventor of radio in Russia.
3. Faraday is believed to be a great English physicist.
4. He is believed to be a very talented person.
5. Forging processes are expected to be performed at various temperatures.
6. This device is sure to have changed the world.

**Сложное подлежащее**

В состав Сложного подлежащего входит имя существительное (в общем падеже) или местоимение (в именительном падеже) и инфинитив. Все предложение имеет следующую структуру:

The value is said to change. – Говорят, что это значение меняется.

Не is expected to come. - Ожидают, что он придет.

т. е. между существительным и инфинитивом стоит сказуемое предложения, выражающее мнение, суждение или предположение.

Мнение, суждение, предположение в таком предложении может быть выражено следующими глаголами:

1) в страдательном залоге:

|  |  |  |  |
| --- | --- | --- | --- |
| This value | is expected  is assumed  is reported  is considered  is proved  is found  etc. | to change  (to be changing)  (to have changed) | Известно, …  Предполагают,  Ожидают, …  Допускают,…  Сообщают,…  Считают, …  Доказано, …  Найдено, …  и т. д. |

2) в действительном залоге:

|  |  |  |  |
| --- | --- | --- | --- |
| This value | seems  appears  turns out  proves  is likely  is unlikely  is sure  is certain | to change  (to be changing)  (to have changed) | По-видимому …  Оказывается…  ““  “”  Вероятно …  Маловероятно …  Безусловно …  Непременно… |

Перевод английского предложения следует начинать со сказуемого предложения и переводить его неопределенно-личным предложением «Известно …», «Находят …», «Считают …» и т. д., за

которым следует придаточное предложение с союзом **что**.

This device appears to be of some interest. - По-видимому, этот прибор представляет интерес.

It is supposed to be used in our experiment. - Предполагается, что он будет использован в нашем эксперименте.