Практическое занятие № 11

**Тема**: Роботы в промышленности
**Цель:** активизировать лексику по теме в разных видах деятельности: чтение, аудирование, говорение.

**Ход занятия:**

**1. Изучите лексику для обязательного усвоения** (Glancing at Vocabulary):

transfer – передача
location - местонахождение
pick up – брать, подбирать
arrangement - расположение
to utilize – находить применение
gripper – захват
to grasp – схватывать
labour – труд
shift – смена
spot welding – точечная сварка
continuous - непрерывный
spray painting – окраска распылением
spray-painting gun – распылитель краски
grinding - шлифование
polishing - полирование
manual - ручной
frame - рама
hazardous - опасный

**2. Выполните задания:**

Задание 1. Переведите предложения:

1. Material-handling is the transfer of material and loading and unloading of machines.
2. Robots pick up parts from one conveyor and place them on another.
3. Robots must be equipped with a gripper that can grasp parts.
4. Spot welding of automobiles bodies is one of the most common applications of industrial robots.
5. The third application area of industrial robots is assembly and inspection.
6. Robots are used when the operation is hazardous or uncomfortable for the human worker.
7. The operations allow to use robots on two or three shifts.

Задание 2. Соотнесите слова:

1. assembly — a. применение
2. inspection — b. поверхность
3. material-handling — c. определять
4. grasp — d. сборка
5. surface — e. проверка
6. determine — f. цикл
7. cycle — g. смена
8. shift — h. схватывать
9. application — i. обработка материала

Задание 3. Переведите словосочетания:

1. manufacturing operations
2. can be divided
3. processing operations
4. loading and unloading

5. placing parts
6. to grasp parts
7. manual assembly
8. inspection job
9. require the robot to move
10. to join panels and frames

Задание 3. Прочитайте и переведите текст « ROBOTS IN INDUSTRY»

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 processing operations 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 labor. 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 operations 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 labor. 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 welding, arc welding, and certain machine loading and unloading tasks),

3) The workpiece or tool are too heavy and difficult to handle,

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

Задание 4. Ответьте письменно на вопросы:

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?

3. **Контрольные вопросы:**

1. What categories can the application of robots be divided into? (На какие категории может подразделяться применение роботов?)

2. What work can be done by robots instead of people? (Какую работу могут выполнять роботы вместо людей?)