CLASSIFICATION OF ROBOTS:

The following is a general list of classifications of devices that are considered robots:

• Fixed-sequence robot:

A device that performs the successive stages of a task according to a predetermined, unchanging method that is hard to modify.

• Playback robot:

A human operator performs a task manually by leading the robot, which records the motions for later playback. The robot repeats the same motions according to the recorded information.

• Numerical-control robot:

The operator supplies the robot with a movement program rather than teaching it the task manually.

• Intelligent robot:

A robot with the means to understand its environment and the ability to successfully complete a task despite changes in the surrounding conditions under which it is to be performed.

ADVANTAGES OF ROBOTS:

• Robotics and automation can, in many situations, increase productivity, safety, efficiency, quality, and consistency of products.

• Robots can work in hazardous environments (such as radiation, darkness, hot and cold, ocean bottoms, space, and so on) without the need for life support, comfort, or concern for safety. Robots need no environmental comfort like lighting, air conditioning, ventilation, and noise protection.

• Robots work continuously without tiring or fatigue or boredom. They do not get mad, do not have hangovers, and need no medical insurance or vacation.

• Robots have repeatable precision at all times unless something happens to them, or unless they

wear out.

• Robots can be much more accurate than humans. Typical linear accuracies are a few ten-thousandths of an inch. New wafer-handling robots have micro-inch accuracies.

• Robots and their accessories and sensors can have capabilities beyond those of humans.

• Robots can process multiple stimuli or tasks simultaneously. Humans can only process one active stimulus.

• Robots replace human workers, causing economic hardship, worker dissatisfaction and resentment, and the need for retraining the replaced workforce.

DISADVANTAGES OF ROBOTS:

Robots lack the capability to respond in emergencies, unless the situation is predicted and the

response is included in the system. Safety measures are needed to ensure that they do not injure

operators and other machines that are working with them. This includes:

– Inappropriate or wrong responses

– Lack of decision-making power

– Loss of power

– Damage to the robot and other devices

– Injuries to humans

• Robots, although superior in certain senses, have limited capabilities in:

– Cognition, creativity, decision making, and understanding

– Degrees of freedom and dexterity

– Sensors and vision systems

– Real-time response

• Robots are costly due to:

– Initial cost of equipment and installation

– Need for integration into the manufacturing processes

– Need for peripherals

– Need for training

– Need for programming