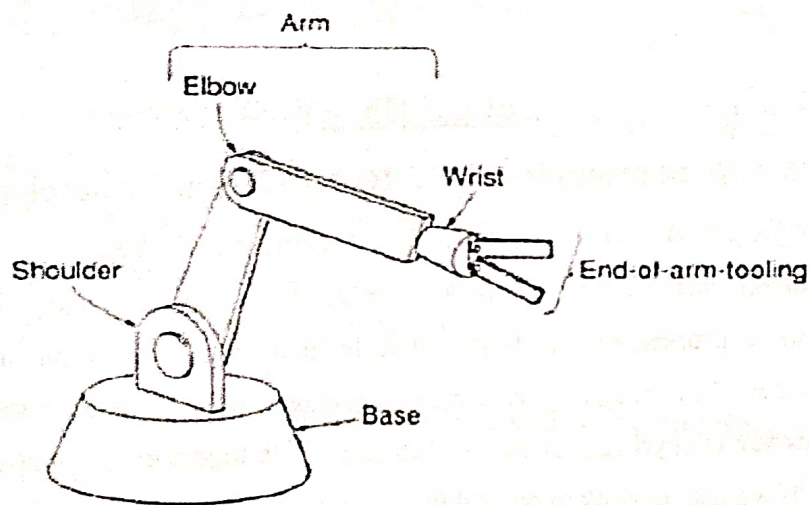


8. (b) The Robot can be used for standard pick and place applications where objects are picked up and moved to other locations in a single plane. Discuss the various parts and functions of a Robot to perform the above task. *10 Marks*



Basic parts of Robot System

Robot structure is concerned with the physical construction & characteristics, Body, Arm, Wrist which are parts of the Robot.

- **Body** – Robot are mounted on a Base. The body is attached to the base.
- **Arm** – The arm is assembled to the body
- **Wrist** – At the end of the arm is wrist which holds the gripper or end effector that performs the work.

Arm and Body motion: Arm and Body motion include 3 motions like

- Vertical motion – This motion includes up and down movements of the arm.
- Radial motion – Radial motion includes in & out moments i.e. front and back.
- Rotational motion – This includes rotation of the arm.

Wrist Motion:

- Wrist rotation movement – It is the rotation of the wrist perpendicular to the end of the arm.
- Wrist bend – It is the movement of the wrist in up and down direction.

Degrees Of Freedom (DOF):

A typical robot arm will have 6 DOF. Only 3 DOF are necessary to get it anywhere in space, but 6 gives it more versatility.

To put it in simpler terms, each of the following is one degree of freedom:

1. Moving up and down (heaving)
2. Moving left and right (swaying)
3. Moving forward and back (surging)
4. Tilting up and down (pitching)
5. Turning left and right (yawing)
6. Tilting side to side (rolling)

