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Ans to the Que No 1(A)

**Contact Type Keyboard Switch Mechanism:**

- Widely used switches.
- Pressing the key plunger causes the contacts to touch and to produce a voltage.
- Key bounce --- the contacts may bounce when the plunger is depressed giving the appearance of several rapid key depressions. This effect is known as key bounce. This must be eliminated by special circuitry which effectively ignores the key after its first depression for a very short period of time.

Figure 4.2 *Contact type keyboard switch*
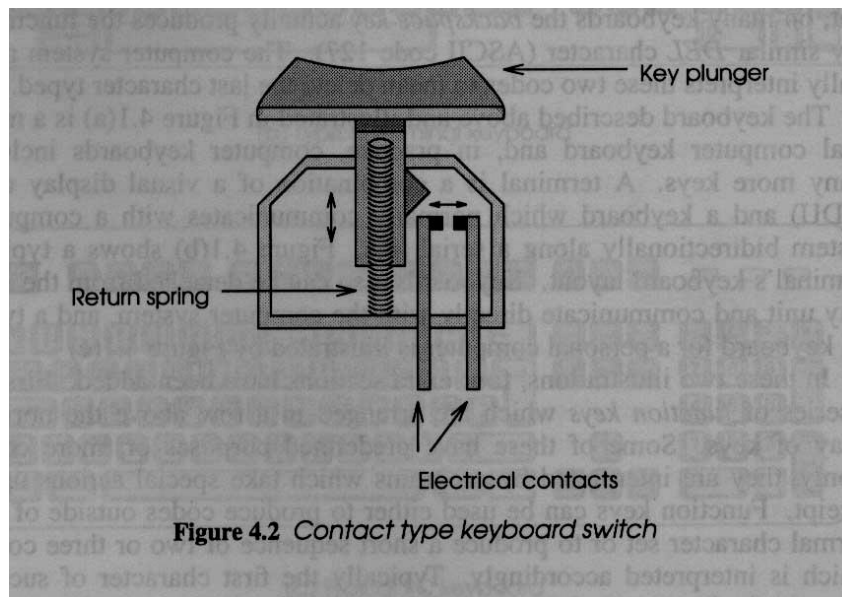
Ans to the Que No 1(B)

Analog Interfacing:

In order to control the machines in -- Electronics Factory, Medical Instruments, Automobiles etc., We need to determine the values of some variables like pressure, temperature, light, flow etc.
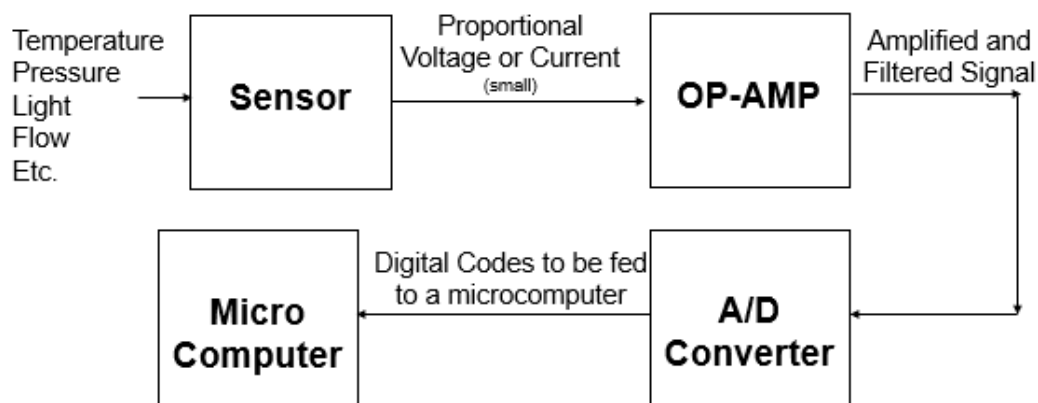
Ans to the Que No 2(A)

Sensors:

Sensors are input devices that record data about the physical environment around it. Sensors send data to a microprocessor (computer). They do not make judgements, decisions or control any output devices.

List of Sensors:
- Position Sensors
- Pressure Sensors
- Temperature Sensors
- Force Sensors
- Vibration Sensors
- Piezo Sensors
- Fluid Property Sensors
- Humidity Sensors
- Strain gauges
- Photo Optic Sensors
- Flow and Level Switches

List of Transducers:
- Current transducers
- Magnetic field transducers
- Pressure transducers
- A piezoelectric transducer
- Thermocouples
- An Electromechanical transducer
- Mutual induction transducers
- Strain gauges

Ans to the Que No 2(B)

Advantage and Disadvantage of Thermocouple Sensors:

Disadvantages of Thermocouple:
- The shape of the typical characteristic is shown in Fig. 1.2, from which we can see that the thermocouple is useful only over a limited range of temperature due to the non-linear shape of the characteristic.
- The output from a thermocouple is small, of the order of millivolts for a 10°C temperature difference. Because of the small voltage output, amplification is usually needed unless the thermocouple is used for temperature measurement along with a sensitive millivoltmeter.
- The main limitation is precision; system errors of less than 1 °C can be difficult to achieve.

Advantages of Thermocouple:
One particular advantage of thermocouples is that the sensing elements themselves are very small, allowing thermocouples to be inserted into very small spaces and to respond to rapidly changing temperatures.
Thermocouples are most suitable for measuring over a large temperature range, up to 1800 K. They are less suitable for applications where smaller temperature differences need to be measured with high accuracy, for example the range 0–100 °C with 0.1 °C accuracy. For such applications, thermistors and RTDs are more suitable.

Ans to the Que No 3(A)

Strain Gages:

A small resistor whose value changes when its length is changed. It may made of thin wire, thin foil or semiconductor material.

(a)
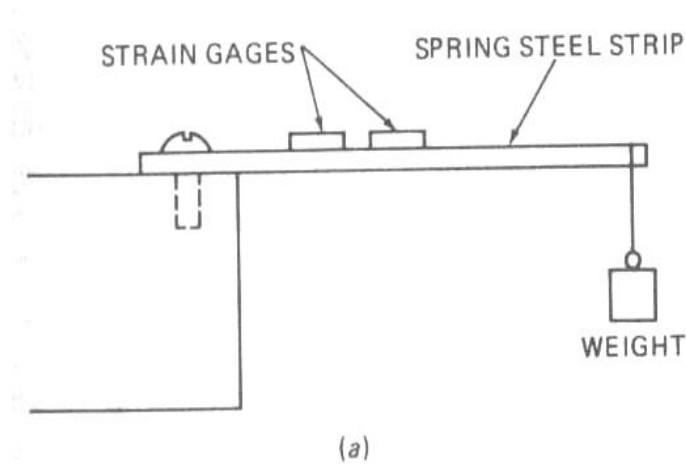
- One end of a piece of spring steel is attached to a fixed surface.
- A strain gage is glued on top of the flexible bar.
- The force or weight to be measured is applied to the unattached end of the bar.
- As the applied force bends the bar, the strain gage is stretched, increasing its resistance.
- The change in resistance is directly proportional to the applied force.
- If a current is passed through the strain gage, then the change in voltage across the strain gage will be proportional to the applied force.

Ans to the Que No 3(B)

Paddle Wheel Method:

- A paddle wheel is put in the flow as in Fig.
- The rate at which paddle wheel turns is proportional to the rate of flow of a liquid or gas.
- An optical encoder can be attached to the shaft of the paddle wheel to produce digital information as to how fast the paddle wheel is running.
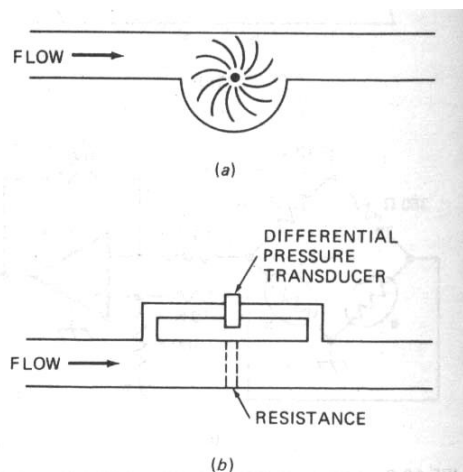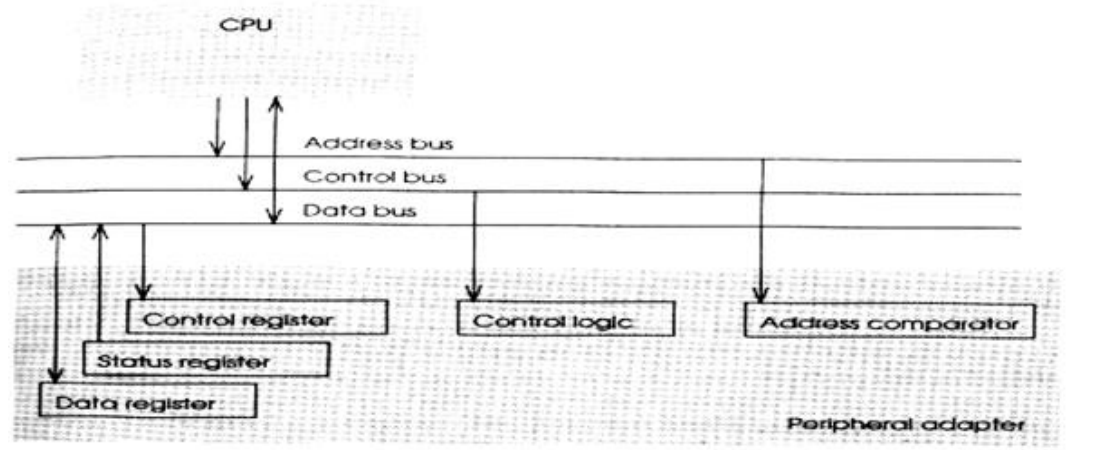

FIGURE 10-13   Flow sensors. (a) Paddle wheel.
(b) Differential pressure.

Ans to the Que No 5(A)

Peripheral Adapter:

A Peripheral Interface Adapter (PIA) is a peripheral integrated circuit providing parallel I/O interfacing for microprocessor systems.

Data Highways Bus:

Ans to the Que No 5(B)
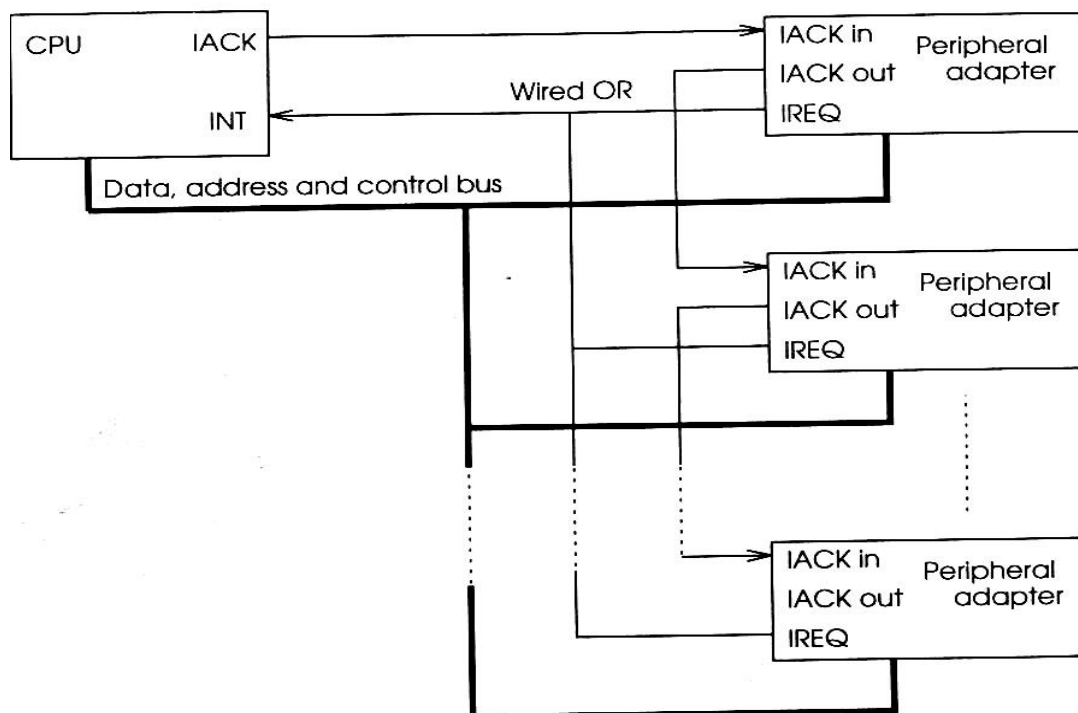
Priority Interrupts connection using Daisy Chains:

Figure 2.8 *Priority interrupts using a daisy chain*

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