

Corrigé type

1. Read the text and answer the comprehensive questions

The first well-defined use of feedback control seems to have been James Watt's application of the flyball governor to the steam engine in about 1775. As a matter of interest, most of the early applications and theoretical investigations of feedback control were associated with governors, and these usually were in industrial applications. Broader use of automatic control began to be made in the late 1920s, and the first general theoretical treatment of automatic control was published in 1932. The growth in industrial usage has been steady and strong. Many new technologies have been applied to process control hardware as the industrial use of automation techniques has developed and matured in the past seventy years. An important example of this was the application of digital computer and microprocessor capabilities to process control in the 1960s. As a result, process automation received a significant and very special boost in technology. Today, many industries allocate in excess of 10 percent of their plant investment capital outlays for instrumentation and control. This percentage has doubled over the past thirty years and shows no signs of diminishing.

Comprehensive Questions:

1. Give a brief definition of the underlined words in the text;

feedback control: A system in which the value of some output quantity is controlled by feeding back the value of the controlled quantity and using it to manipulate an input quantity so as to bring the value of the controlled quantity closer to a desired value. Also known as closed-loop control system.

automatic control : contrôle automatique

Growth: evolution, progress, development

process control : contrôle des processus

digital computer : ordinateur ou calculateur numérique

capabilities : abilities,

boost : improvement, increase

allocate : assign, give an amount of money

diminishing: became smaller, weaker

2. According to the text, what is the first application of feedback control ?

The first well-defined use of feedback control seems to have been James Watt's application of the flyball governor to the steam engine in about 1775.

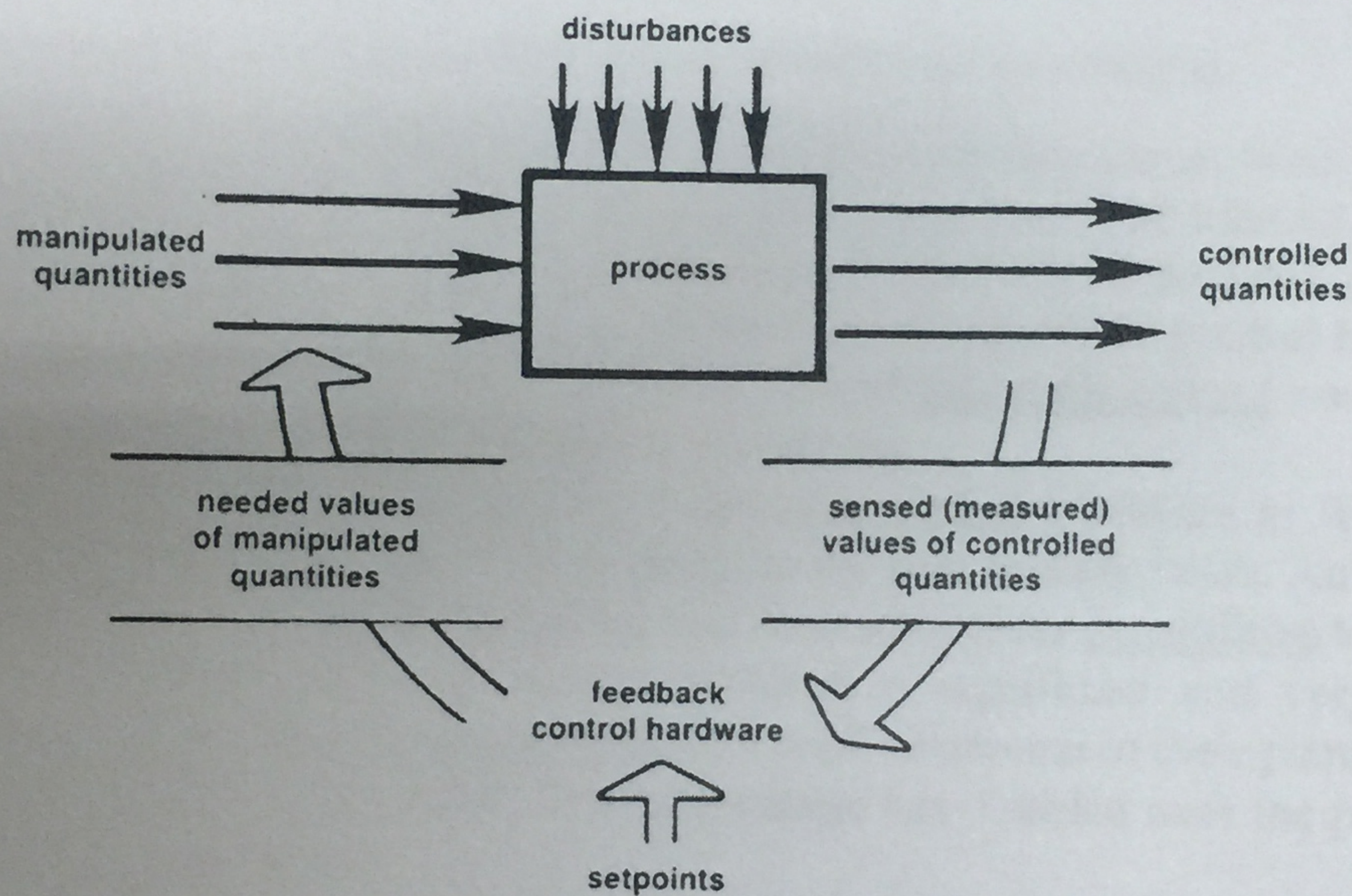
3. Translate the meaning of the text to French language.

4. What are the variables involved in automatic process control ?

reinforce your response with illustration.

The three important terms that are associated with any process: controlled quantities, manipulated quantities, and disturbances. These are illustrated in Fig1. The controlled quantities (or controlled variables) are those streams or conditions that the practitioner wishes to control or to maintain at some desired level. These may be flow rates, levels, pressures, temperatures, compositions, or other such process variables. For each of these controlled variables, the practitioner also establishes some desired value, also known as the set point or reference input.

2. The simplest way to automate the control of a process is through conventional feedback control shown in the following figure:



1. What is the difference between the feedback and feedforward control?

Feedback control worked to eliminate errors, but feedforward control operates to prevent errors from occurring in the first place

2. Give a brief description for feedback control?

The simplest way to automate the control of a process is through conventional feedback control. This widely used concept is illustrated in Fig. 2. Sensors or measuring devices are installed to measure the actual values of the controlled variables. These actual values are then transmitted to feedback control hardware, and this hardware makes an automatic comparison between the set points (or desired values) of the controlled variables and the measured (or actual) values of these same variables.

Based on the differences (“errors”) between the actual values and the desired values of the controlled variables, the feedback control hardware calculates signals that reflect the needed values of the manipulated variables. These are then transmitted automatically to adjusting devices (typically control valves) that manipulate inputs to the process.