

Minoufia University
 Faculty of Electronic Engineering
 Industrial Electronics and Control Eng.
 Course: Control Systems Application-3
 Course Field: Specialization Requirements
 Academic Level: Fourth Year, 1st Semester
 Academic Year: 2018 / 2019
 Course Code: ACE 414



Final Term Exam
 Date: 20 / 1 / 2019
 Exam Type: Written
 No. of Exam Pages: 2
 No. of Exam Questions: 5
 Exam Marks: 60 Points
 Exam Time: 3 Hours

Answer the following questions:

Question-1:

[12 Points]

1. What happened when we applied + V_x on hydraulic valve?
2. What happened when we applied - V_x on hydraulic valve?
3. What is the relation between flow & V_x ?
4. What is the relation between flow & pressure valve?
5. Draw block diagram of velocity servo mechanism?
6. Stat the Basic Components of a Pneumatic System.



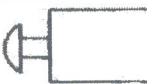

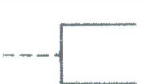
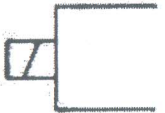
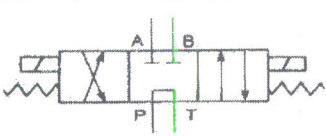
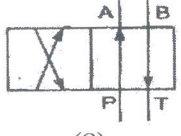
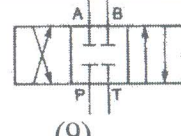
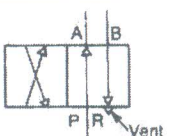
Question-2: Put True (✓) or False (×) signs for the following expressions:

[10 Points]

1. The characteristic feature of stationary hydraulics is that valves are mainly solenoid operated.
2. The characteristic feature of mobile hydraulics is that the valves are frequently manually operated.
3. Fluid logic control: This type of system is controlled by hydraulic oil or air. The system employs fluid logic devices such as AND, NAND, OR, NOR, etc.
4. Electronic control: This type of system is controlling the fluid power systems by switches, relays, timers and solenoids.
5. Electrical control: This type of system is controlled by microelectronic devices. The electronic brain is used to control the fluid power muscles for doing work.
6. Hydrodynamic systems use fluid motion to transmit power. Power is transmitted by the kinetic energy of the fluid.
7. A hydrostatic system uses fluid pressure to transmit power. Hydrostatics deals with the mechanics of still fluids and uses the theory of equilibrium conditions in fluid.
8. Pneumatic and hydraulic systems require relief valves to direct and regulate the flow of fluid from compressor or pump to the various load devices.
9. Check valves only allow flow in one direction.
10. The simplest pressure regulating device is the control valve.

Question-3: stat the name of each Graphic symbols

[10 Points]

 (1)	 (2)	 (3)	 (4)	 (5)
 (6)	 (7)	 (8)	 (9)	 (10)

Question-4: Fill in the Blanks

[10 Points]

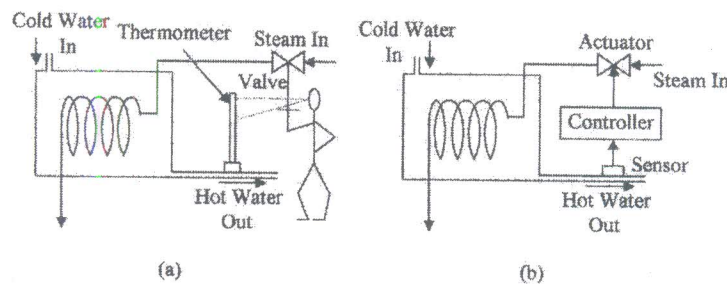
1. ----- is the desired amplitude of an output variable from a process.
2. ----- is the elapse time between the instant an error occurs and when the corrective action first occurs.

3. ----- is the time required for a control system to return a measured variable to its set point after there is a change in the measured variable.
4. ----- is a set hysteresis between detection points of the measured variable when it is going in a positive or a negative direction.
5. ----- is the difference between a set reference point and the amplitude of the measured variable
6. ----- is the signal path from the output back to the input to correct for any variation between the output level from the set level.
7. ----- is the monitored output variable from a process.
8. ----- is the input variable or parameter to a process that is varied by a control signal from the processor to an actuator.
9. ----- are devices that can change one form of energy to another.
10. ----- are devices that can detect physical variables.

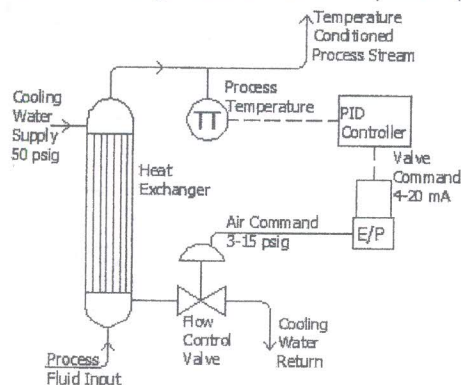
Question-5:

[18 Points]

1. Write the types of sensors and actuators and controllers used in PCS (Process Control System) TRAINING SET and explain the working principle of temperature PT100 sensor.
2. Explain in details and draw the block diagram of pressure control experiment.
3. State the type of the control which is used in each process and draw the block diagram of each of them.



4. Draw the block diagram of the elements that make up the feedback path in a process-control loop.
5. Fig shows the block diagram of a closed-loop flow control system. Identify the following elements: (a) the sensor, (b) the transducer, (c) the actuator, (d) the transmitter, (e) the controller, (f) the manipulated variable, and (g) the measured variable.



6. A voltage of 14.82 mV is measured with a type J thermocouple with a 25 °C reference temperature. Find the temperature of the sensing junction. (From the table for J-type thermocouples, it is found that $V_M = 14.677\text{mV}$ is between $V_L = 14.67\text{mV}$ and $V_H = 14.94\text{mV}$. These voltages have corresponding temperatures of $T_L = 270.0\text{ }^\circ\text{C}$ and $T_H = 275.0\text{ }^\circ\text{C}$. The temperature of the reference junction is 25 °C, and from the J-type table is 0.143mV.)

With best wishes