College of Engineering, Pune
Instrumentation & Control
IE – 09005 Control System Components

Academic Year: 2013- 14

Timing: 3 hr
Max. Marks: 60

End Semester Examination

Instructions:
1. All Questions are compulsory
2. Assume suitable data
3. Draw neat diagrams wherever necessary
4. Use of non programmable calculators are allowed

Q. 1	A	Why Hydraulic systems are chosen for any applications. Explain the components and draw the symbols for below mentioned components.
		    1. Single acting spring return cylinder
		    2. Check valve
		    3. External gear rotary type pump
		    4. Two way spool type of valve
			Marks
			 5

	B	In a die stamping machine, a die is to be stamp by a part attached to a plunger of the cylinder and then the plunger is to be retracted back after pressing on die. List all hydraulic components that are to be used for application and draw hydraulic circuit diagram.	5
Q. 2	A	List down advantages and limitations of pneumatic circuits. Explain compressor and pressure regulating component in pneumatic circuits in detail. Draw the symbol for both the components.	5
	B	A vehicle door is to be operated by using a pneumatic circuit. Opening and closing of the door is controlled by ON and OFF push button. List down the pneumatic components used for the application. Draw a pneumatic circuit for above application .	5
Q. 3	A	Explain basic operation of stepper motor. What are different stepping modes of stepper motor? Describe the modes in detail. State the applications of stepper motor	5
Q. 3	B	State and explain two methods of speed control of induction motor. An induction motor is used for driving a pump at three different speeds. Select the method of speed control which is simple and ease to implement with minimum number of components. High lagging power factor is also permitted in this electrical circuit.	5
Q. 4	A	What is slip and percentage slip in induction motor? Why it is necessary? State the power flow in induction motor. Derive the relation between rotor copper loss and rotor output with slip (s).	5

	B	An efficiency of a 6 pole, 3-phase, 45 kW, 50 Hz induction motor is 92 percent. The stator losses equal 102 kW. Determine (i) the slip, (ii) the rotor copper loss, (iii) the input, (iv) the friction and windage losses. The motor runs at 975 rpm	5
Q.5	A	What is working principle of Synchronous motor? Why it is not a self starting motor? State and explain two different methods for starting the synchronous motor.	5
	B	Explain construction of squirrel cage motor with stator and rotor parts. A 12 pole, 3 phase alternator is driven at 500 rpm, supplies power to 8 pole, 3phase induction motor. If the slip at full load is 3%. Calculate the full load speed of the motor.	5
Q. 6	A	A motor is to be driven to pump cement slurry to height of 10 meters. The motor should start when start push button is pressed. The motor runs with 230VAC and push button operates with 12 VDC. Develop a electrical wiring diagram for the application and specify the switch and other electrical components those are used.	5
	B	Write short note on 1. Types of motors 2. Construction of DC motor	5

----------------------------ALL THE BEST----------------------------