UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2020

Programme Name: B.Tech/ Electronics+IoT **Semester : VIII**
Course Name   : Computer Control **Time   : 03 hrs.**
Course Code   : ICEG411 **Max. Marks : 100**
Nos. of page(s) : 4
Instructions: Attempt all the questions. Assume the necessary data.

S. No.		Marks
Q.1	**A. Cascade control is characterized by:** a) a special relay or function block to compensate for nonlinear process gain b) one controller providing a setpoint for another controller c) the presence of a "dead time" relay or function block d) two controllers whose outputs are selected either by high or low value **B. Adaptive gain is used for controlling processes.** a) Nonlinear b) Time-variant c) Dead time d) Fast **C. The purpose of feedforward control is to:** a) Eliminate the need for feedback control in a process b) Reduce the effect of load variation on the process variable c) Save energy d) Reduce the effect of process variable noise on stability **D. Which system exhibits the initiation of corrective action only after the output gets affected?** a) Feed forward b) Feedback c) Both a and b	**(5*1=5)**

	d) None of the above
	
	E. A good control system should be sensitive to which of the following.
	
	    a) Internal disturbances
	    b) Environmental parameters
	    c) Parametric variations
	    d) Input signals (except noise)	

Q 2	**A. Which of the following is the objectives of computer Control?**
	    a) Safety
	    b) Ease of Operation
	    c) Improved Product
	    d) All of the above
	B. Which of the following is known as conditional data transfer?
	    a) Interrupt
	    b) Polling
	    c) Parallel Communication
	    d) Serial Communication
		(2*2.5=5)

Q 3	**A. The method of synchronising the processor with the I/O device in which the device sends a signal when it is ready is?**
	
	    a) Exceptions
	    b) Signal handling
	    c) Interrupts
	    d) DMA
	B. Which of the followings define the time delay between two successive initiations of memory operation?
	
	    a) Memory access time
	    b) Memory search time
	    c) Memory cycle time
	    d) Instruction delay
		(2*2.5=5)

Q 4	**State true or false for the followings:**
	
	    a) Information about the status of each task is not held in a block of memory by the RTOS. **T/F**
	    b) Real-time systems have to specify time constraints that are either a hard constraints or a soft constraints. T/F
	    c) Computer Control involves many different activities that have to be carried out concurrently. **T/F**
		(5*1=5)

	d) In order to control the industrial process, it can be de divided into two parts which are batch and Continuous. **T/F** e) PID Controller can give error free output without using the integral term. **T/F**	
Q 5	**By Considering, following points as control engineer's responsibility fill in the blanks.** a) To define and program the sequence control procedures necessary for the ……………………….. of plant operation. b) To tune the control scheme, that is to select the appropriate gains so that it performs according to ……………………. Specifications.	**(2*2.5=5)**
Q 6	Write the full forms of following terms. a) SIMD b) MISD c) MIMD d) RISC e) CISC	**(5*1=5)**
Q 7	Define the elements of a computer control system. List the objectives / aims of computer-based control.	(10)
Q 8	OSI reference layer model is used for interconnecting host 1 and host 2. Write the name of each layer, mention its function and write one example of each layer.	(10)
Q 9	Illustrate the function of Real Time Multi Task Operating System (Write your answer point wise). What are the basic functions of Task Management?	(10)
Q 10	List the various task states available in RTOS and define each of them (Write specific definitions).	(10)
Q 11	Following are the few control design algorithms that are used in computer-based control of any industrial process. Describe these algorithms in the words without using, diagram, and mathematical expression. Each algorithm should have five points such that these algorithms are explained. a) Adaptive & Model Predictive Controllers b) Optimal Controller **OR** Describe the following methods for design of real-time systems. You are required to explain these methods point wise. a) Ward and Mellor Method b) Hatley and Pirbhai Method	(10)

Q 12	Present a detailed case study of any industrial process having computer control, highlight the computer control methods, computer interfacing and communication techniques adopted to control the process. As mentioned in the description this case study should have following four major headings: 1. Industrial Process to be controlled including the variables of interest. 2. Control methods implemented 3. Computer Interfacing methods 4. Communication Techniques Note: You are required to present this case study without numerical expressions and diagrams. The case study should not exceed 900 words.	(20)