Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Programme Name: B.Tech Mechatronics **Semester: VII**
Course Name : Distributed Control System **Time: 03 hrs**
Course Code : MEEL406 **Max. Marks: 100**
Nos. of page(s) : 02
Instructions: Attempt all the questions.

SECTION A

S. No.		Marks	CO
Q 1	Define the following terms and write the formula associated with them. 1. Reliability 2. MTBF 3. MTTR 4. MTTF	**4**	**CO4**
Q.2	List the five DCS vendors commercially available. Mention the name of DCS along with few important features.	**4**	**CO1**
Q.3	Define the software configuration and parameterization. Explain the concept with the help of one industrial example.	**4**	**CO3**
Q.4	Discuss the significance of open systems interconnection model of ISO in communication process of DCS.	**4**	**CO3**
Q.5	Draw the chart for evolution of the programming languages. List the names of programming languages with one characteristics of each language.	**4**	**CO2**

SECTION B

Q.6	Describe the concepts, which are used to ensure the reliability of DCS. Present them with the help of neat diagrams.	**10**	**CO4**
Q.7	(A) Identify and describe the factors impacting technological development in DCS. (B) Draw the graph for evolution of successive generations of DCS technology.	**10**	**CO1/ CO2**
Q.8	Define Real Time Operating System. Describe its general structure and mention the inherent objectives.	**10**	**CO2/ CO3**

Q.9	Describe the monitoring and command facilities available in DCS. Explain the monitoring and command facilities of any DCS by considering the levels hierarchy in that.	**10**	**CO3**
	SECTION-C		
Q.10	(A) Illustrate the functionality of Iron and Steel making plant by describing all the individual operations. (B) Identify the recent trends in automation of Iron and Steel plants. Present the hierarchical DCS based integrated control of the plant. **OR** (A) Illustrate the functionality of Thermal Power plant by describing all the individual operations. (B) Identify the recent trends in automation of Thermal Power plant. Present the hierarchical DCS based integrated control of the plant.	**10+10**	**CO1/ CO2/ CO4**
Q.11	The choice of control algorithm of DCS depends upon the changes in plant variables. Suggest and describe the DCS algorithms used in following three categories of plant variable changes. 1. When changes in the process variables are known in advance. 2. When changes in process variables are directly measurable. 3. When changes in process variables are calculable based on some additional measurement.	**20**	**CO1/ CO2**

Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Programme Name: B.Tech Mechatronics **Semester: VII**
Course Name : Distributed Control System **Time: 03 hrs**
Course Code : MEEL406 **Max. Marks: 100**
Nos. of page(s) : 02
Instructions: Attempt all the questions.

SECTION A

S. No.		Marks	CO
Q 1	What are the general considerations of reliability in DCS? Define the system availability and non-availability with the help of examples. .	**4**	**CO4**
Q.2	Name the five commercially available DCS and highlight their important characteristics.	**4**	**CO1**
Q.3	Define the system software. List down the differences of system software and application software. Explain the concept with the help of one industrial example.	**4**	**CO2**
Q.4	Present the comparative study of protocols available for communication in the communication process of DCS.	**4**	**CO3**
Q.5	Describe the importance of application software in DCS and draw the sequential table for Yokogava DCS.	**4**	**CO3**
	SECTION B		
Q.6	Describe the Manufacturing Automation Protocol(MAP). Mention the objective of MAP and present the steps it implement it.	**10**	**CO3**
Q.7	(A) Describe the data transmission techniques in DCS with their advantages and disadvantages. (B) Describe the interconnection links of LOGISTAT CP 80 with the help of neat diagram.	**10**	**CO2/ CO3**
Q.8	List the programming languages available in DCS and describe the following with the help of examples. 1. Characteristics of higher level programming languages. 2. Characteristics of Process level programming languages.	**10**	**CO3/ CO2**
		10	**CO3**

Q.9	Present the possible classification of the softwares used in DCS and describe the possible components of a system software with the help of the chart.		
	SECTION-C		
Q.10	(A) Illustrate the functionality of Ammonia plant by describing all the individual operations. (B) Identify the recent trends in automation of Ammonia plants. Present the hierarchical DCS based integrated control of the plant. **OR** (A) Illustrate the functionality of Glass making Industry by describing all the individual operations. (B) Identify the recent trends in automation of Glass making Industry. Present the hierarchical DCS based integrated control of the plant.	**10+10**	**CO1/ CO2/ CO4**
Q.11	Describe the following DCS control algorithms with their mathematical models and description. 1. State Feedback Control 2. State Observer Control 3. State Estimation 4. Optimal Control	**20**	**CO1/ CO2**