

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

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	Draw the hierarchical functional levels of distributed control system. Briefly explain them.	4	CO1
Q.2	List the five DCS vendors commercially available. Present a comparative study of their products by mentioning their features.	4	CO2
Q.3	Define the reliability parameters of the systems. Also, mention their mathematical expressions.	4	CO2
Q.4	Discuss the steps in implementing a DCS. What do you understand by “cutover” in a distributed control system?	4	CO3
Q.5	Present a brief comprehensive study of programming languages used in a distributed control system. Highlight major languages with their characteristics.	4	CO4

SECTION B

Q.6	Explain the data base organization of distributed control system. Classify the database at each hierarchical level.	10	CO1
Q.7	With reference to the distributed control system architecture and operation, describe the following: i. Field Stations ii. Intermediate Stations iii. Human Machine Interface. iv. Field Devices.	10	CO1
Q.8	Summarize the communication systems with respect to distributed control system. Mention the components and methodologies of each and Draw the labelled diagrams.	10	CO2
Q.9	Outline the components of a system software used in distributed control system in detail. Write the functions of these components. Draw the diagrams and mention the examples. OR Analyze 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	<p>Integrate the individual operations; draw the complete block diagram and Present the hierarchical DCS based integrated control of any one of the following plants:</p> <ol style="list-style-type: none"> 1. Iron and Steel making plants 2. Thermal Power Plants 	20	CO4
Q.11	<ol style="list-style-type: none"> A. Derive the closed loop control algorithm using PID controller. Mention the individual advantages and disadvantages of P, I, D terms in the controller. B. Design the following control algorithms and mention the relevant examples: <ol style="list-style-type: none"> i. Feedforward Controller ii. State feedback Controller iii. Adaptive Controller iv. Optimal Controller 	10+10	CO3