

Enrolment No:



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

Course: Process Instrumentation and Control
Program: B.Tech FSE engineering
Course Code: ECEG 3009

Semester: VI
Time 03 hrs
Max. Marks: 100

Instructions:

1. Attempt all the questions (Theory, Numerical, Case study etc.) on A4 size blank sheets.
2. Attempt all questions serially as per question paper.
3. Answer should be neat and clean. Draw a free hand sketch for circuits/tables/schematics wherever required.
4. Scan the whole answer script and check the resolution carefully before upload on the blackboard. Note that answer scripts will be considered for evaluation only through Blackboard. No other mode of submission is acceptable.
5. You are expected to be honest about each attempt which you make to progress in life

SECTION A [Case Based Study/design] 40 Marks

S. No.		Marks	CO
Q 1 (a)	What do you mean by the self the K-type thermocouple? What is the measuring range of K-type thermocouple?	5x4=20	CO4
(b)	What is the advantage of the law of intermediate junction? Explain the working principle of the bead type thermistor with a neat sketch.		
(c)	Compare and contrast a thermocouple with a thermistor as a temperature transducer		
(d)	A temperature alarm unit with a time constant of 120 s is subjected to a sudden rise of temperature 50 ⁰ C because of fire. If an increases of 30 ⁰ C is required to actuate the alarm what will be the delay in signaling the sudden temperature increase.		
Q 2 (a)	Given the unity feedback control system with $G(s) = \frac{K}{s(s+a)}$	10x2=20	CO4
(b)	Find the value of K and a to yield K _v (velocity constant) and 20 % peak overshoot. Elucidate the mathematical equation of PID controller. What is the advantage of PI controller over PD controller?		

NOTE : The submission time of the Question Paper Answer Sheet is 24 Hrs from the scheduled time (exceptional provision due to extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas).

No Submission will be entertained after 24 Hrs

SECTION B [Numerical and Short/broad Answers] 60 Marks

Q 3	What is an LVDT? What are the parameters that can be measured by this? Describe with a diagram and output characteristics the principle of its construction and operation giving typical design data. How are the readings affected by variations in ambient temperature and transverse displacements of its cylindrical core?	10	CO1
Q 4	What do you understand by automation? Differentiate between different types of automation. Draw automation pyramid in with all the stages. How automation is changing with IT and communication, explain with an example?	10	CO2
Q 5	<p>For the following block diagram determine the output C due to U_1, U_2 and R</p> <p>Also list various impacts of SCADA failure in brief.</p>	10	CO2
Q 6	Define various static error coefficients along with their expressions. Also derive the 'e _{ss} ' values for "Type 0 system" for unit step and unit ramp inputs.	10	CO 4
Q 7	For the following systems comment on the stability: $s^5 + 6s^4 + 10s^2 + 5s + 24$	5	CO3
Q 8	What do you understand by static characteristics of an instrument?	5	CO1
Q 9	What do you understand by transducer? Differentiate between (i)Active and passive transducers (ii) Primary and secondary transducers	5	CO3
Q 10	Describe the features and economic benefits of SCADA system.	5	CO3

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