Registration no:

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B.TECH
FEEE6301

6th Semester Regular / Back Examination 2015-16
INDUSTRIAL PROCESS CONTROL AND DYNAMICS

BRANCH(S): EEE, ELECTRICAL, METTA, MM
Time: 3 Hours
Max Marks: 70
Q.CODE:W585

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: **(2 x 10)**

a) What is need for linearization of signals?
b) Draw the circuit of an integrator for analog signal conditioning.
c) State the parameter considered for analysis of OpAmp with non-ideal response.
d) Draw the circuit diagram of a differential amplifier.
e) What is Pyrometry?
f) What is meant by tuning a controller?
g) How capacitive sensor used for measurement of displacement.
h) State the advantage and disadvantage of feed-forward control scheme.
i) What is offset error in proportional controller?
j) Why derivative controller cannot be used alone?

Q2 **a)** Explain the operation of voltage to current converter with suitable diagram. Derive the relation between maximum load resistance and maximum current. **(5)**

b) Draw circuit diagram and explain application of instrumentation amplifier in signal conditioning circuits. **(5)**

Q3 **a)** Explain the principle of operation of a parallel-feedback A/D converter. **(5)**

b) State the characteristics of DAC. **(5)**

Q4 For an error signal where, e_p=t for time, t= 1 to 2 sec, ep = 1 for t = 1 to 3 sec and e_p=0 for t > 3 sec. Plot a graph of a PID controller output as a function of time for given Kp=2, Ki= 0.5s-1, Kd =0.5s and P (0) = 50%. **(10)**

Q5 **a)** Draw the PLC block diagram and explain each block. **(5)**

b) Explain the PLC scan cycle. What is scan time? **(5)**

Q6 **a)** With a suitable example describe the working of a self-regulated process and why is it called self regulated? **(5)**

b) Describe characteristic of Proportional-Integral Controller. **(5)**

Q7 **a)** Explain various schemes of ratio controller. **(5)**

b) Distinguish between feed forward and feedback control scheme. **(5)**

Q8 Write short notes on any two of the following **(5 x 2)**

a) Flapper-Nozzle system

b) Cascade control of Jacketed CSTR

c) Auctioneering control of Catalytic tubular reactor

d) Thermocouple