Registration no: | | | | | | | | | | |

Total Number of Pages: 02

M.TECH

EMPC201

2nd Semester Back Examination – 2016-17

INDUSTRIAL INSTRUMENTATION AND CONTROL ENGINEERING

BRANCH(S): ENERGY CONSERVATION AND CONTROL

Time: 3 Hours

Max marks: 70

Q.CODE:Z490

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) Define true value, resolution and repeatability of the system.
b) State the definition of transfer function and write difference between open loop and closed loop system.
c) Give the expression of rise time of the step response for a second order system and define type and order of the system.
d) Draw functional elements of an instrument.
e) What is the basic objective of signal conditioning circuit?
f) A conveyer belt is travelling at 19 cm/s, a load cell with a length of 1.1 m is reading 3.7kgm. What is the flow rate of the material on the belt?
g) What is the different method of temperature measurement and which method is suitable very high temperature measurement?
h) State the equation of rate and reset controller.
i) Write the limitations of Routh Hurwitz criterion.
j) What are the difference between sensor, transducer and converter?

Q2 a) Briefly describe Data Acquisition System with a neat diagram. (5)

b) Explain static and dynamic characteristic of transducer. (5)

Q3 a) A unity feedback system control system has $G(S)=\frac{1}{S(S+2)}$. The input to the system is given by $r(t)=2+3t+2t^3$. Determine the generalized error co-efficient and steady state. (10)

Q4 Describe all types of controller with block diagram and write their applications. (10)

Q5 a) Describe liquid in metal with a neat diagram. (5)

b) Explain Bernoulli's theorem and equation of continuity. (5)

Q6 a) Explain functional element of an instrument with diagram. (5)

b) Determine the stability of the system with closed loop transfer (5)

function $\frac{C(S)}{R(S)} = \frac{10}{S^6 + 2S^5 + 2S^4 + 3S^3 + 5S^2 + 6S + 1}$.

Q7 a) Sketch the root locus plot for the system when open loop transfer function is given by $G(S)H(S) = \frac{K}{S(S+4)(S^2+4S+13)}$. (10)

Using angle condition find whether s= -0.75 is on the root locus or not.

Q8 Write short notes on any two (5 x 2)

a) Thermistor and RTD
b) DAC
c) Thermocouple.
d) Bimetallic Transducer.