Total Number of Pages: 02   **M.TECH**
                                                                                                                 EIPC102

1st Semester Back Examination – 2016-17
PRPOCESS DYNAMICS AND CONTROL
BRANCH(S): M.TECH
Time: 3 Hours
Max marks: 70
Q.CODE:Y958
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 do you mean by "Tuning of a Controller"?
   b)   Draw the signal pressure versus gap distance characteristics of a nozzle/flapper system.
   c)   Define rate and reset controller.

   d)   Explain Proportional Band.
   e)   Why do we choose negative feedback to design control system?
   f)   A stepper motor has 10 degree per step and must rotate at 250 rpm. What input pulse rate, in pulses per second is required?
   g)   Write the control valve chacteristics.
   h)   State the difference between control variables and manipulated variables.
   i)   Write the measuring device of Flow, Liquid Level and Composition.
   j)   State the three major functions of adaptive control system.

Q2 a) Determine the stability of a system having following characteristics equation using the   (5)
        Ruth-Hurwitz method $S^6 + S^5 + 5S^4 + 3S^3 + 2S^2 + 4S + 8 = 0$

   b)   Explain the control system parameter with examples.   (5)

Q3   A controller outputs a 4-20mA signal to control motor speed from 140-600 rpm with a   (10)
        linear dependence. Calculate
        a) Current corresponding to 310 rpm.
        b) Value of (a) expressed as % of controller output.

Q4   What is adaptive control system? Write the names of the adaptive schemes and describe   (10)
        these schemes briefly.

Q5 a) Explain, the PID controllers and write uses of P-controller, I- Controller, D,-Controller. (5)
    b) An integral controller is used for speed control with a set point of 12 rpm within range (5)
        10 to 15 rpm. The controller output is 22% initially. The constant K_I = -0.15%
        controller output per second per percentage error. If the speed jumps to 13.5 rpm,
        calculate the controller output after 2s for constant e_p.

Q6 a) Explain the concept of feedback control and types of feedback controllers. (5)
    b) Explain the concept of Direct action and Reverse action. (5)

Q7   What is Degree of Freedom? State all conditions to find the Degree of Freedom. (10)
        Mention the advantages and disadvantages of Degree of Freedom.

Q8   **Write short notes on any two** 5 x 2)
    a) Feedback Control System
    b) Nozzle / Flapper system
    c) Feed forward control