EI-802

B.E. VIII Semester

Examination June, 2013

Digital Control Systems

Time : Three Hours

Maximum Marks : 100 ***Minimum Pass Marks :35***

Note: Attempt one question from each unit. All questions carry equal marks.

Unit - I

1. a) Explain advantages and disadvantages of digital control systems. 5

   b) State and explain sampling theorem. 10

   c) Drive the transfer function of zero order hold devices. 5

Or

2. Explain the principal of digital to analog conversion with the help of schematic diagram. Discuss weighted resistor D/A converter in detail. 20

Unit - II

3. a) Find inverse Z transform of $F(Z)=\frac{Z^2}{(Z-1)(Z-0.2)}$ 10

   b) What are the popular methods are used to find the inverse Z transform. Explain each of them.

Or

4. Find the Z transform of (10+10)

   i) $f(t) = t^2$

   ii) $f(t) = e^{-at} \sin wt$.

Unit - III

5. a) What is root locus analysis? Discuss summary of steps for constructing root loci. 10

   b) Explain steady state error analysis for stable and unstable system. 10

Or

6. a) A simplified form of the open loop transfer function of an airplane with an autopilot in the longitudinal mode is

$$G(S)H(S)=\frac{K(S+a)}{S(S-b)(S^2+2lw_n s+w_n^2)} \quad \begin{matrix} a>0 \\ b>0 \end{matrix}$$

such system involve open loop pole in right half S-plane may be conditionally stable. Sketch root loci when a=b=1, l=0.5 and w_n=4. Find the range of gain K for stability. 20

Unit - IV

7. a) Explain Pseudo continuous time control system with proper example. 10

   b) What are Jordon transformation. Discuss its advantages over other transformation methods. 10

Or

8. Find state model for the following difference equation. Obtain different canonical forms.

   $Y(K+3)+5Y(K+2)+7Y(K+1)+3Y(K)=0$. 20

Unit - V

9. a) Explain the concept of controllability and observability of discrete time control system. 10

   b) Discuss state variable representation of discrete time Siso system using phase variables. 10

Or

10. Short notes (any two) (10+10)

   a) System stability

   b) State variable representation in Z domain.

   c) State transition equation

******