Total No. of Questions : 8]

SEAT No. :

PE4338

[Total No. of Pages : 2

[6582]-112

S.E. (Robotics & Automation Engineering)

CONTROL SYSTEM ENGINEERING

(2019 Pattern) (Semester - IV) (211509)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***All questions are compulsory i.e. Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Assume suitable data, if necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) State the properties of root locus. **[8]**

b) Find range of K for stability unity feedback system with Characteristics equation, G(S) = K / [S (S+2) (S+4) (S+6)]. Also define what is pole, zero & S-Plane. **[9]**

OR

Q2) a) Explain Routh's array with stability criteria, state advantages and disadvantages of Routh's criteria. **[8]**

b) Sketch root locus of unity feedback system with open loop transfer function G(S) = K / [S (S+1) (S+3) (S+5)] **[9]**

Q3) a) Draw the polar plot for G(S) = 1 + as. **[8]**

b) State Nyquist theorem and explain Nyquist stability criteria. **[9]**

OR

Q4) a) Define phase margin, gain margin. Derive the expression for Resonant frequency and Resonant Peak. **[8]**

b) Draw Bode plot of system with open loop transfer function G(s) = 100 / (S+1) (S +2) (S +5) & comment on its stability. **[9]**

Q5) a) What is sampling? Explain the process of sampling with waveform. **[9]**

b) Explain input and output field devices used in PLC (any 9). **[9]**

OR

Q6) a) Explain the selection criteria used for PLC. **[9]**

b) Explain Digital Control System with Block diagram. Enlist its advantages and disadvantages. **[9]**

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Q7) a) What is phase lag compensation? Enlist effects, advantages, disadvantages of phase lag compensation. **[9]**

b) Explain the Procedure to design of lag compensator using root locus.**[9]**

OR

Q8) a) What is a compensator? Explain Cascade compensation techniques.**[9]**

b) Explain the Procedure to design of lead compensator using root locus.**[9]**

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