Oct-22/BE/Insem-68

B.E. (Electrical)

ADVANCED CONTROL SYSTEM

(2019 Pattern) (Semester - VII) (403142)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

1) *Answer any one question from each pair of questions : Q.1 & Q.2 and Q.3 & Q.4*

2) *Figures to the right side indicate full marks.*

Q1) a) Draw Electrical network & Derive Transfer function of lag compensation network. **[5]**

b) For a certain system,

$$G(s) = \frac{5}{s(1+0.1s)(1+0.3s)}$$

Design a suitable lag compensator, phase margin = 50°. **[10]**

OR

Q2) a) Design lead compensation for the system having open loop transfer function. **[10]**

$$G(s)H(s) = \frac{25}{s(0.5s+1)(0.016s+1)} \text{ \& PM around } 42°$$

b) Explain steps to be taken to design lead network by bode plot approach. **[5]**

Q3) a) Explain any one peculiar behavior of nonlinear system : **[5]**

i) Jump resonance

ii) Limit cycle

iii) Sub-harmonic oscillation

P.T.O.

b) In unity feedback system an ideal relay with output equal to $\pm$ 1 unit is connected in cascade with **[10]**

$G(s) = \dfrac{20}{s(s+1)(s+3)}$ Determine amplitude and frequency of limit cycle if it Exist by describing function method.

OR

Q4) a) Explain Lyapunov stability analysis and its stability conditions. **[7]**

b) Explain common type of Nonlinearities with diagrams. **[8]**

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