B.Tech. Sem - V (2020 course) Electrical Winter - 2022

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)
B.Tech.Sem - V ELECTRICAL : WINTER- 2022
SUBJECT : INDUSTRIAL CONTROL SYSTEM-I

Day : Wednesday | Time : 02:30 PM-05:30 PM
Date : 14-12-2022 | **W-24559-2022** | Max. Marks : 60

N.B.:
1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Draw neat diagram labelled **WHEREVER** necessary.
4) Assume suitable data **WHEREVER** necessary.

Q.1 a) Explain with diagram the construction and principle of operation of potentiometer. **(05)**

b) Describe with diagram characteristics of synchro and synchro pair as an error detector. **(05)**

OR

Q.1 a) Describe with diagram characteristics of potentiometer and the working of potentiometer pair as an error detector. **(05)**

b) Explain with diagram construction and working principle of synchro. **(05)**

Q.2 a) Explain with necessary diagram and formulas: steady state error. **(05)**

b) Explain with necessary diagram and formulas: static error constants. **(05)**

OR

Q.2 a) Explain the significance of characteristic equation. **(05)**

b) Explain with diagram roots in complex plane and time response. **(05)**

Q.3 a) Explain what is a root locus. State the advantages of root locus. **(05)**

b) Plot root locus for second order system. **(05)**

$G(S)=\frac{1}{S(S+1)}$ *and* $H(S)=1$. Make necessary assumptions. Comment on stability of this system.

OR

Q.3 a) Write short note on Root locus system parameters and pole location for first order and second order system. **(05)**

b) Sketch a root locus for the transfer function. Make necessary assumptions. Comment on stability of this system. **(05)**

$$G(S)=\frac{K}{S(S+2)(S+4)}$$

Q.4 a) Explain with diagram proportional plus integral controller. **(05)**

b) Explain with diagram proportional plus derivative controller. **(05)**

OR

Q.4 a) Compare proportional, Integral and derivative controllers. **(05)**

b) Explain with diagram integral plus derivative controller. **(05)**

Q.5 a) Explain with necessary diagram and formulas polar plot. **(05)**

b) Explain with necessary diagram and formulas Nyquist stability criteria. **(05)**

OR

Q.5 Explain with diagram and necessary formula's procedure to sketch Bode plot. Describe following parameters of Bode plot. **(10)**

i) Phase margin
ii) Gain cross over frequency
iii) Gain margin
iv) Phase cross over frequency

Q.6 a) Explain what a compensating network is. Describe with diagram lag compensator. **(05)**

b) Explain effect of using compensation on system performance. Describe with diagram lead-lag compensator. **(05)**

OR

Q.6 a) Explain the elements of compensating network. Describe with diagram lead compensator. Describe with diagram lead compensation network. **(05)**

b) State the function of compensator. Describe with diagram lag- lead compensator. **(05)**

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