B.TECH SEM - III (2007 COURSE) (ELECTRONICS) : SUMMER - 2018

SUBJECT : FUNDAMENTALS OF INSTRUMENTATION AND CONTROL

Day : **Wednesday** | Time : **02.30 PM TO 05.30 PM**
Date : **23/05/2018** | **S-2018-2577** | Max. Marks : 80

N.B.

1) **Q. No. 1** and **Q. No. 5** are **COMPULSORY**. Out of remaining attempt **ANY TWO** questions from each section.
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in **SEPARATE** answer books.
4) Draw neat and labelled diagram **WHEREVER** necessary.
5) Use of non-programmable calculator is **ALLOWED**.
6) Assume suitable data, if necessary.

SECTION – I

Q. 1 **a)** Write various block diagram Reduction rules. **(05)**

b) For a system **(05)**

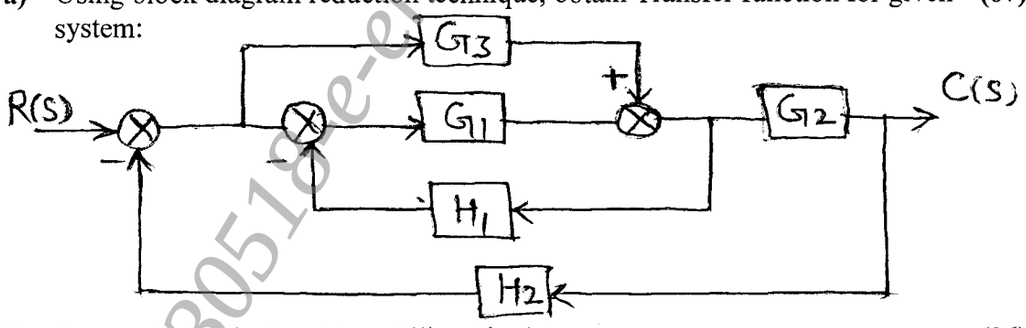
$$G(s)\,H(s) = \frac{8}{s^2\left(s^2+4s+8\right)\left(s^2+3s+12\right)}$$

Determine the error coefficients with the input r(t) = 5.

c) Draw the real axis loci and angle of asymptotes for: **(04)**

$$G(s)\,H(s) = \frac{k}{s\,(s+6)\,(s+9)}$$

Q. 2 **a)** Using block diagram reduction technique, obtain Transfer function for given system: **(07)**



b) State and explain Routh's stability criterion. **(06)**

Q. 3 **a)** Find the range of k for a system given below, so that system is stable. **(07)**

$$G(s)\,H(s) = \frac{k}{(s+4)(s+6)(s+10)}$$

b) Draw and explain transient Response specifications. **(06)**

Q. 4 For a unity feedback system **(13)**

$$G(s) = \frac{k}{s(s+2)(s+10)}$$, Draw Bode plot. Also determine value of k.

P. T. O.

SECTION - II

Q. 5 **a)** Describe construction and working of capacitive transducer. **(05)**

b) Describe synchro transmitter. **(05)**

c) Draw various notations used in ladder diagram. **(04)**

Q. 6 **a)** Describe construction and working of tachometer. **(07)**

b) Define gauge factor. A resistance of strain gauge with a gauge factor of 2 is cemented to steel member which is subjected to a strain of 1×10^{-6}. If the original resistance value of the gauge is 130 Ω. Calculate the change in resistance. **(06)**

Q. 7 **a)** Explain need of signal conditioning. Also draw various signal conditioning circuits. **(07)**

b) Draw and explain signal conditioning circuit for pressure transducer. **(06)**

Q. 8 Write short notes on: **(13)**

a) PID controller

b) PLC and relay

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