

B.TECH SEM - III (2007 COURSE) (E & TC ENGG.) : WINTER - 2017

SUBJECT: FUNDAMENTALS OF INSTRUMENTATION AND CONTROL

Day: Wednesday
Date: 17/01/2018

Time: 10.00 AM TO 01.00 PM
Max. Marks: 80

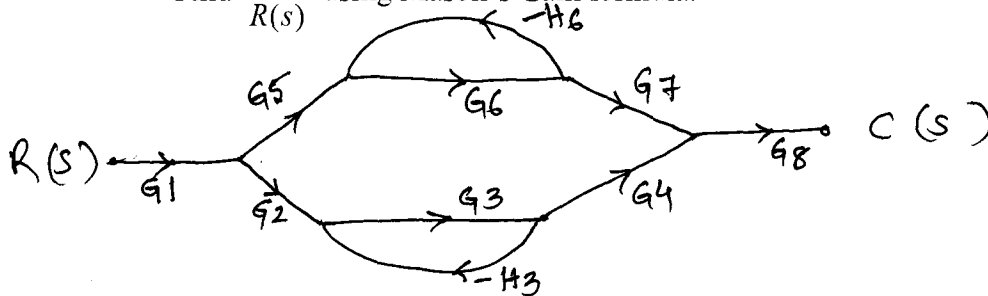
W-2017-2392

N.B:

- 1) **Q. No. 1 and Q. No.5 are COMPULSORY.**
- 2) Out of the remaining attempt **ANY TWO** questions from each section.
- 3) Answers to the two sections should be written in **SEPARATE** answer book.
- 4) Draw neat and labeled diagrams **WHEREVER** necessary.
- 5) Figures to the right indicate **FULL** marks.
- 6) Assume suitable data if **NECESSARY**.

SECTION-I

- Q.1 a)** Find $\frac{C(s)}{R(s)}$ using Mason's Gain formula. (06)



- b)** Derive the expression for static error coefficients and steady state error for type-2 system for unit step input. (04)
- c)** Define Gain margin and Phase margin. (04)
- Q.2 a)** Determine stability of a system whose characteristic equation is given by $F(s) = s^6 + 3s^5 + 4s^4 + 6s^3 + 5s^2 + 3s + 2 = 0$ (06)
- b)** Derive an expression for the response of a second order control system when it is excited by a step function. (07)
- Q.3 a)** Sketch the root locus for system having $G(s)H(s) = \frac{K}{s(s^2 + 2s + 2)}$. (08)
- b)** Determine the resonance peak and resonant frequency for following system $\frac{C(s)}{R(s)} = \frac{5}{s^2 + 2s + 5}$ (05)
- Q.4 a)** Sketch the Nyquist plot for unity feedback system with $G(s) = \frac{s+1}{s^2-4}$ (07)
- b)** State and explain Mapping theorem. (06)

SECTION-II

- Q.5 a)** Classify the temperature transducers with examples. (05)
- b)** Compare PLC and relay logic. (04)
- c)** Explain signal conditioning circuit for strain gauge with neat diagram. (05)
- Q.6 a)** What are thermistors? Give advantages, disadvantages and applications of thermistors. (07)
- b)** Explain working of Electromagnetic flow meter. (06)
- Q.7 a)** Explain components used in digital signal conditioning. (07)
- b)** Write a note on "Synchro transmitter and receiver". (06)
- Q.8 a)** Explain PID controller in detail. (06)
- b)** Draw and explain architecture of PLC. (07)