

B.TECH SEM – V (2007 COURSE) (BIOMEDICAL ENGG.) :
SUMMER - 2018
SUBJECT: CONTROL SYSTEM

Day : **Wednesday**
 Date: **23/05/2018**

S-2018-2691

Time : **10.00 AM TO 01.00 PM**
 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) Define: (05)

- i) System
- ii) Control system
- iii) Input
- iv) Output
- v) Disturbance

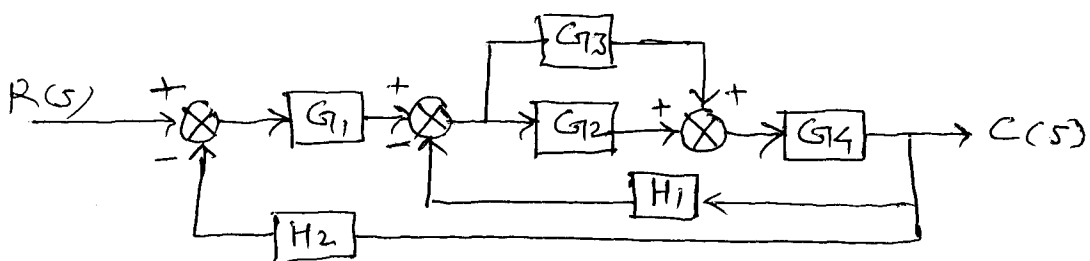
b) State and explain Masson's Gain Formula. (05)

c) Describe static error coefficients. (04)

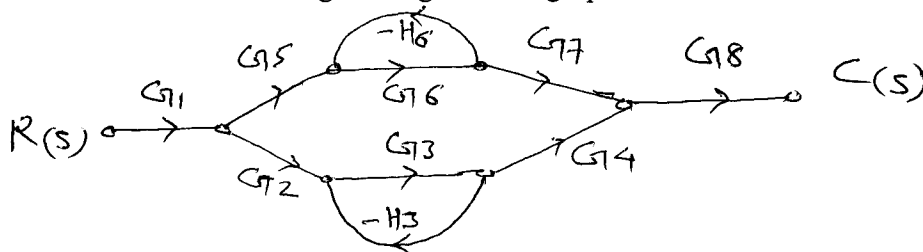
Q.2 a) Describe various elements of control system. (07)

b) Explain feedback and non-feedback control system. (06)

Q.3 a) Obtain $\frac{C(s)}{R(s)}$ for system: (07)



b) Find transfer function of given signal flow graph: (06)



Q.4 a) A unity feedback system has $G(s) = \frac{20}{s(1+4s)(1+s)}$. (07)

Determine k_p, k_v, k_a and steady state error (e_{ss}) if input $r(t) = 2 + 4t + \frac{t^2}{2}$.

P. T. O.

b) For $\frac{C(s)}{R(s)} = \frac{25}{s^2 + 5s + 25}$ (06)

Obtain maximum overshoot, peak time, rise time and settling time.

SECTION - II

Q. 5 a) State and explain Routh's stability criterion. (05)

b) Explain : i) Gain Margin (05)
ii) Phase Margin

c) Describe working of AC Servomotor. (04)

Q. 6 a) Determine stability of system: (07)

$s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16$. using Routh's criterion.

b) A unity feedback control system has $G(s) = \frac{10}{s(s+1)(s+2)}$. Draw (06)
Nyquist plot and comment on closed loop stability.

Q. 7 For a unity feedback system (13)

$G(s) = \frac{k}{s(s+2)(s+10)}$. Draw Bode plot.

Q. 8 a) Describe synchro control transformer. (07)

b) Write short note on Tacho-generator. (06)

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