IV. a) Describe the cause, effects and control measures of water pollution.

OR

b) Explain the role of individual in disaster management. 15

V. a) "Earth is over populated". Do you agree with the statement ? Justify.

OR

b) Explain the role of Information Technology in environment and human health. 15

M 25360

Reg. No. : .....

Name : .....

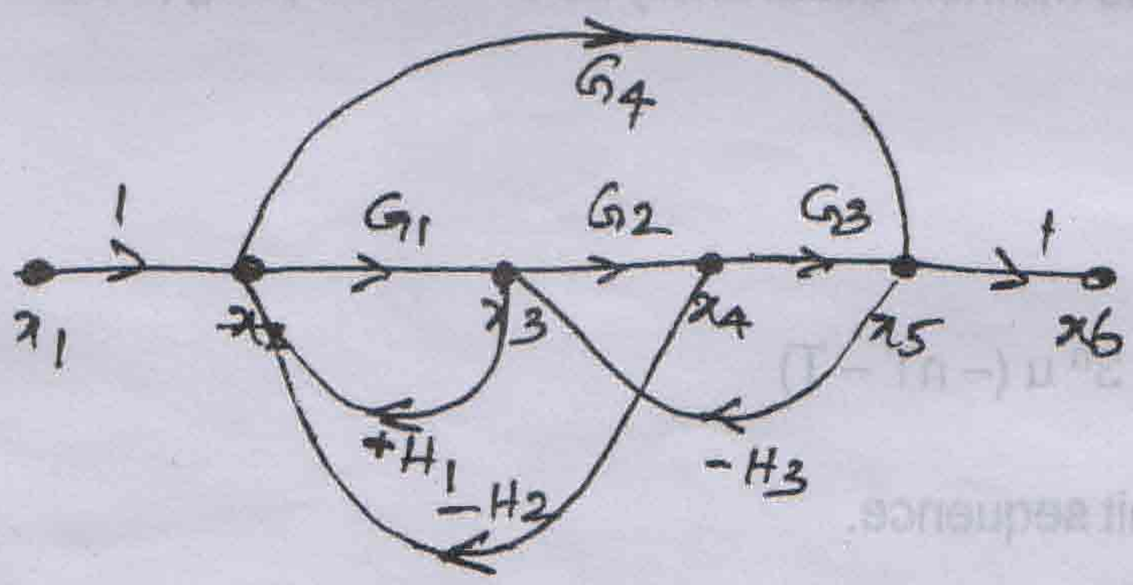
VI Semester B.Tech. Degree (Regular/Supplementary/Improvement – Including Part Time) Examination, May 2014
(2007 Admn. Onwards)
PT2K6/2K6 EC/AEI 602 : CONTROL SYSTEMS

Time: 3 Hours Max. Marks : 100

Instructions : *Answer* ***all*** *questions.*
Assume *the missing data suitably,* ***if any****.*

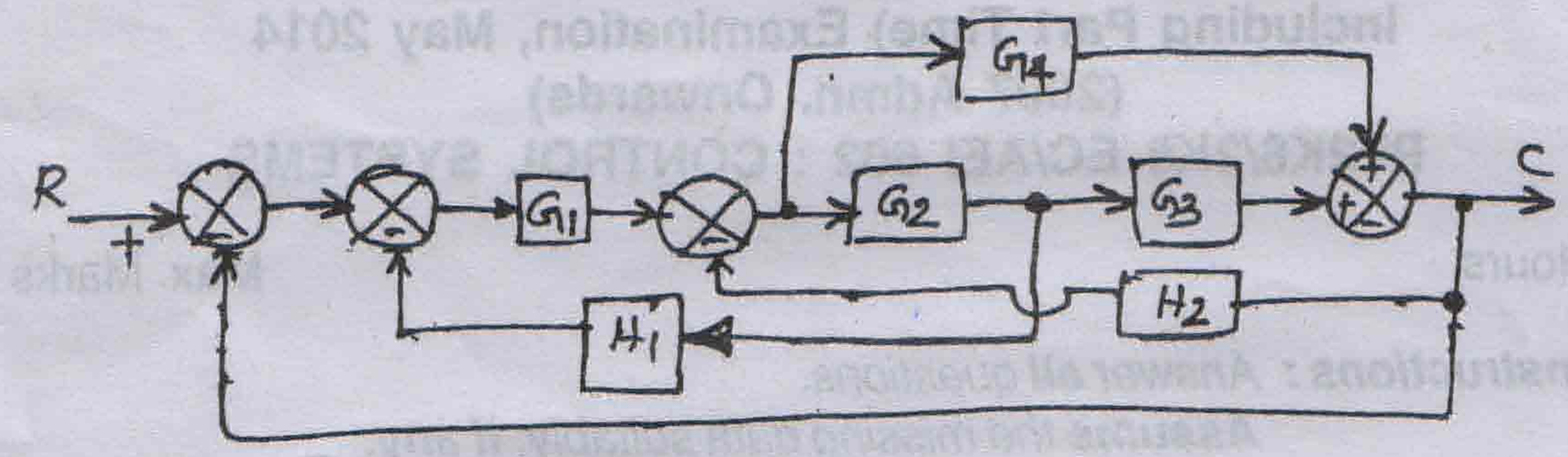
1. a) What are the assumptions made for the derivation of Laplace transform ?
   b) State any two properties of a signal flow graph.
   c) Explain relative stability of a system.
   d) Explain how gain and phase margin are measured from Bode plot.
   e) Explain about sample data control systems.
   f) What is bilinear transformation ?
   g) Explain what is state and state variable representation.
   h) Compare the representation of a system in state space and transfer function. **(8×5=40)**

2. a) Find the transfer function x_5/x_1 for the system whose signal flow graph is given below : **15**



OR

b) Obtain the transfer function of the feedback control system by block diagram reduction technique. 15



3. a) Sketch the root locus of the open loop transfer function :

$$G(s)\,H(s) = \frac{K}{s(s+2)\,(s^2+2s+5)}.$$ 15

OR

b) A unity feedback system has a plant transfer function of

$$G(s)\,H(s) = \frac{K(s+4)}{(s-1)\,(s-2)}.$$

1) For K = 8, draw the Bode plots and find there from the PM and GM.

2) What should be the value of K for a phase margin of 30° and what is the corresponding gain margin ? 15

4. a) Explain in detail about the mathematical analysis of the sampling process. 15

OR

b) Find the z-transform of

$$x(nT) = \left(\frac{1}{2}\right)^n u(nT) + 3^n u(-nT-T)$$

where u (nT) denotes unit sequence. 15

5. a) Obtain a state modes of the system described by the transfer function

$$\frac{y(s)}{u(s)} = \frac{5}{s^3 + 6s + 7}.$$ **15**

OR

b) Obtain the response y(t) of the following system.

$$\dot{X} = \begin{bmatrix} -1 & -0.5 \\ 1 & 0 \end{bmatrix} X + \begin{bmatrix} 0.25 \\ 0 \end{bmatrix} u$$

$X(0) = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ where u(t) is the unit step input occuring at t = 0. **15**
