

**B.TECH. SEM -V BIO MEDICAL 2014 COURSE (CBCS) : WINTER -
2017**

SUBJECT: INSTRUMENTATION & CONTROL SYSTEM

Day: **Thursday**
Date: **11/01/2018**

Time: **02.30 PM TO 05.30 PM**
Max Marks. **60**

W-2017-2167

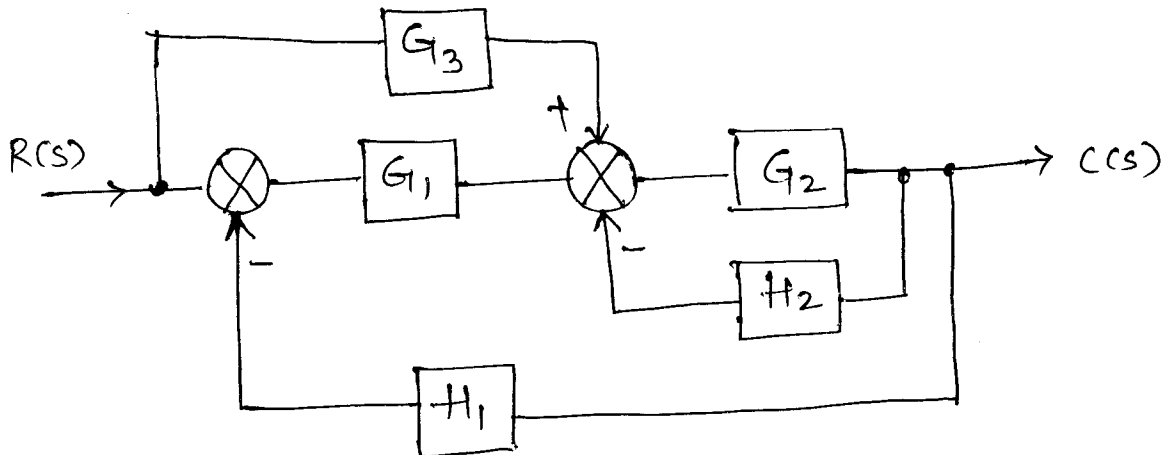
N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non – programmable calculator is **ALLOWED**.
- 4) Assume suitable data, if necessary.

Q.1 Discuss feedback and non - feedback control systems. Write rules of block diagram algebra. **(10)**

OR

Q.1 Reduce the block diagram and obtained its transfer functions. **(10)**



Q.2 Discuss the construction and working of electromagnetic flow meter. **(10)**

OR

Q.2 a) What is gauge factor? Derive expression for it. **(05)**

b) Resistance wire strain gauge uses a soft iron wire of small diameter. The gauge factor is 4.2. Neglecting piezo resistive effects, calculate the poisson's ratio. **(05)**

Q.3 Derive expression of steady state error (ess) for type – 0 , type – 1 and type – 2 system with various inputs (step, ramp, parabolic). **(10)**

OR

Q.3 If $G(s) H(s) = \frac{20}{s(1+4s)(1+s)}$, then determine K_p , K_v , K_a & steady state **(10)**

error if input $r(t) = 2+4t + \frac{t^2}{2}$.

P.T.O

Q.4 For unity feedback system $G(s) = \frac{K}{s(1+0.4s)(1+0.25s)}$, find range of value of K, marginal value of K and frequency of sustained oscillations. **(10)**

OR

Q.4 For unity feedback system $G(s) = \frac{K}{s(s+4)(s+2)}$ Sketch rough nature of root locus showing all details on it. Comment on stability. **(10)**

Q.5 For unity feedback system $G(s) = \frac{K}{s(s+2)(s+10)}$ Determine marginal value of K for which system will be marginally stable. **(10)**

OR

Q.5 a) Explain effect of addition of poles & zeros on system stability. **(06)**
b) State and explain Nyquist stability criteria. **(04)**

Q.6 Describe PI & PD control action in detail. **(10)**

OR

Q.6 Describe PLC in detail. Also write its applications. **(10)**

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