

### SECTION-C

**Note:** Long answer type questions. Attempt any three questions.  $3 \times 10 = 30$

- Q.3 Explain in detail automatic controlled closed loop system.
- Q.4 Explain the procedure for plotting root locus for a given open loop transfer function.
- Q.5 Explain the response of a first order control system subjected to unit impulse input function.
- Q.6 Differentiate between linear and non linear control system.
- Q.7 Write short note on any two
- (a) Routh - Hurwitz criterion.
  - (b) Split range control system.
  - (c) Time response specifications.

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**4th Sem. / EI**

**Subject : Basics of Control Systems**

Time : 3 Hrs.

M.M. : 100

### SECTION-A

**Note:** Very Short Answer type questions. Attempt any 15 parts.  $(15 \times 2 = 30)$

- Q.1
- a) Write the laplace of unit step function.
  - b) Write one advantage of open loop control system.
  - c) Define poles of transfer function.
  - d) Write one advantage of automatic control system.
  - e) Define damping ratio.
  - f) Write characteristic equation of first order control system.
  - g) Define rise time.
  - h) What is break away point.
  - i) One non-linearity of control system.

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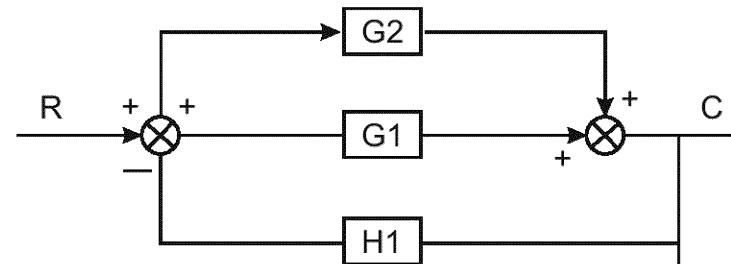
- j) While Mason's gain formula.
- k) Name one test signal used in time response analysis.
- l) Define static response.
- m) What is the value of damping ratio for under damped system.
- n) What is the centroid of root locus plot.
- o) By which method absolute stability is determined.
- p) Define rise time.
- q) What is backlash.
- r) What is non touching loops.

### SECTION-B

**Note:** Short answer type questions. Attempt any ten parts 10x4=40

- Q.2
- i) Describe open loop control system.
  - ii) Find inverse laplace of  $F(s) = \frac{1}{s^2-4}$
  - iii) Write short note on transfer function.

- iv) Explain impulse function.
- v) Explain mechanical control system.
- vi) Write short note on bode plot.
- vii) Draw the signal flow graph of the following.



- viii) Write the advantages of signal flow graph.
- ix) Write short note on error constants.
- x) Explain over damper system.
- xi) What do you understand by split range.
- xii) Describe servo mechanism.
- xiii) Explain the effect of feedback on time constant of a control system.
- xiv) What do understand by Dead zone.
- xv) Explain ratio control system.