

Roll No. ....

**24357**

**B. Tech. 6th Semester (M.E.)**

**Examination – May, 2014**

**Automatic Control**

**Paper : ME-308-F**

**Time : Three hours ]**

**[ Maximum Marks : 100**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Question number 1 is **compulsory** and attempt **five** questions in total, selecting **one** question from each Unit.

1. (a) Define Transfer function .

**10 × 2 = 20**

(b) What do you mean by forward path and feedback path in use of signal flow graph ?

(c) Define steady state response.

(d) What do you mean by closed loop transfer

- (e) Define the term gain margin.
- (f) What do you mean by process delays ?
- (g) What is the application of control valve ?
- (h) State final value theorem.
- (i) Define settling time.
- (j) Write the generalized state equation in matrix form .

### SECTION – A

- 2. Classify and explain different types Engine governing in detail. 20
- 3. Discuss the Principal working of Hydraulic and pneumatic controllers. 20

### SECTION – B

- 4. Write short notes on: 20
  - (a) Error constant
  - (b) Proportion cum derivative control
  - (c) Polar plots

- 5. For a unity feedback system, with open loop transfer

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 function of  $\frac{K}{s(0.2s^2 + 0.5s + 1)}$ , draw for  $K=1$ , the open

### SECTION – C

6. Draw complete Nyquist plot for a control system with open loop transfer function of  $\frac{1}{[s^4(s+5)]}$  and find if the system is stable or not. 20
7. Sketch root loci for a system with open loop transfer function of  $\frac{K(s+2)}{(s+3)(s^2+4s+5)}$ . Also find the value of K, at which stability occurs. 20

### SECTION – D

8. Write short notes on : 20
- (i) Root locus method
  - (ii) Nyquists Criterion
9. Obtain a state space representation of  $\frac{y(s)}{u(s)} = \frac{12(1-s)}{(s+2)(s+5)}$ . Also find expression for output  $y(t)$  for a unit step input  $u(t)$ . Take initial conditions as zero. 20
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