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 . $10 \times 2 = 20$

(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 function?

(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 function of $\frac{K}{s(0.2s^2+0.5s+1)}$, draw for K=1, the open loop frequency response plot and find the value of peak 'M' and the frequency at which it occurs. 20

SECTION – C

6. Draw complete Nyquist plot for a control system with open loop transfer function of $1/[s^4(s+5)]$ 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
