Roll No. .....

24322

B. Tech. 6th Semester (EE)

Examination – May, 2019

CONTROL SYSTEMS ENGINEERING

Paper : EE-304-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 : Attempt *five* questions in all, selecting *one* question from each Section. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) Discuss the example of plants & their inputs & outputs. 5

(b) Explain signal flow graph. 5

(c) Discuss briefly Hurwitz stability criterion. 5

(d) Discuss application of lag & lead compensation. 5

SECTION – A

2. (a) Illustrate open loop & closed loop system with examples. 10

(b) Discuss the feedback effect on following parameters : 10

(i) Sensitivity

(ii) Stability

(iii) Overall gain

3. Differentiate between : 5 × 4 = 20

(i) Causal and Non-causal systems.

(ii) Continuous time and sampled data systems.

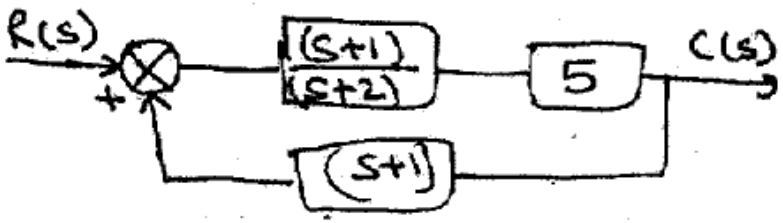
(iii) Linear and Non-linear systems.

(iv) Time varying and time invarying system.

SECTION – B

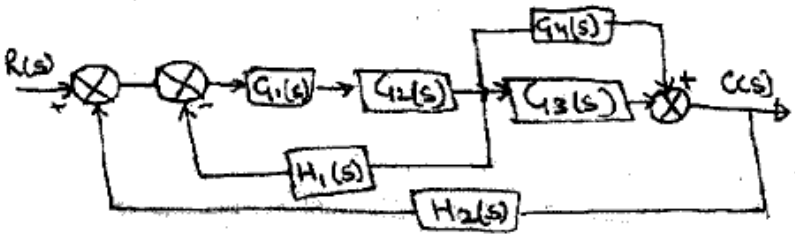
4. State and explain state space Representation of dynamic system. 20

5. (a) A system is given by block diagram shown below : 10



Determine its characteristic equation, type & order of system, poles-zero plot in s-plane.

(b) Determine the Transfer function $\frac{C(S)}{R(S)}$ of the system shown below : 10



SECTION – C

6. (a) Discuss time response of 2nd order system to step Input. https://www.haryanapapers.com 10

(b) Discuss steady state error and error constant. 10

7. Discuss root locus concept. Sketch the root locus for the OLTF of unity feedback control system : 20

$$G(S) = \frac{K}{S(S+1)(S+3)}$$

Also determine :

(i) Value of K for $\xi = 0.5$,

(ii) Value of K for the marginal stability.

SECTION – D

8. Write short notes on : 20

(a) Synchros AC and DC techo generators,

(b) Magnetic Amplifier.

9. Sketch the Bode plot for the transfer function given below : 20

$$G(S)\,H(S) = \frac{2\,(S+0.25)}{S^2(S+1)\,(S+0.2)}$$

From Bode plot, determine :

(i) Phase cross over frequency,

(ii) Gain cross over frequency,

(iii) Gain Margin,

(iv) Phase Margin,

(v) Phase Margin,

Is the system stable ?