

2019

MSc

4th Semester Examination

ELECTRONICS

PAPER – ELC-403

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their

own words as far as practicable.

Illustrate the answers wherever necessary.

Answer Q. No 1 and any **THREE** from the rest.

1. (a) Open loop transfer function of a unity gain control system is given by

$$G(S) = \frac{5}{S(S+3)}$$

find the characteristic equation.

- (b) The open loop transfer function of unity feedback system is given by

$$G(S) = \frac{50}{(1+0.1S)(S+10)}$$

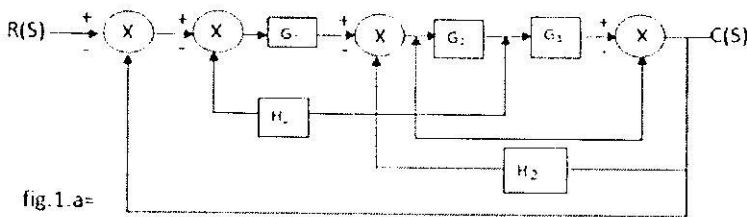
Determine the Static error co-efficients K_p .

- (c) Define phase margin and gain margin of a control system.

- (d) Differentiate between active transducer and passive transducer.

- (e) Write two application of instrumentation amplifier.

2. (a)



Draw the signal flow graph for the above block diagram shown in fig (1.a) above and find out C/R from the obtained Signal flow graph by using Mason's gain formula.

- (b) Using Routh – Hurwitz criterion, determine the stability of the closed Loop systems that have the following characteristic equation. Determine the number of roots that are in the right half s plane and on the $j\omega$ axis.

$$S^4 + 2S^3 + 10S^2 + 20S + 5 = 0$$

(2+4)+4

3. (a) The system shown in fig (2.a) when subjected to a unit step input, the out put Response is shown in fig (2.b). Determine the value of K and T from the Response curve .

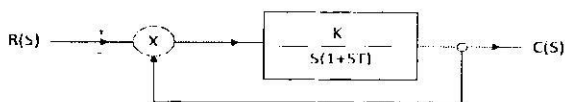


Fig (2.a)

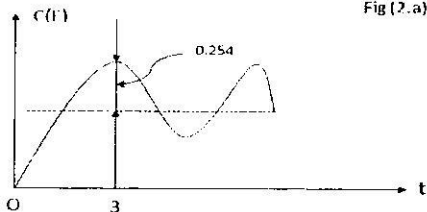


Fig (2.b)

- (b) Obtain the unit step response of a unity feedback system whose open loop Transfer function is

$$G(S) = \frac{4}{S(S+5)}$$

6+4

4. Consider a unity feedback control system with the following forward transfer Function

$$G(S) = \frac{K}{S(S^2 + 4S + 8)}$$

Plot the root locii for the system.

10

5. The open loop transfer function of a unity feedback system is given by

$$G(S)H(S) = \frac{5}{S(S+1)(S+2)}$$

Draw the Nyquist plot and hence find out whether the system is stable or not.

6+4

6. a) With the proper block diagram explain the operating principle of function

Generator.

b) Write down two application on spectrum analyzer.

c) What are the differences between dual beam CRO and dual trace CRO.

6+2+2

(Internal Assessment – 10 Marks)