Exam Date & Time: 30-Nov-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH END SEMESTER EXAMINATIONS, 29 NOVEMBER 2023
CONTROL SYSTEMS ENGINEERING [MIE 2128]

Marks: 50   **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates:
Answer ALL questions
Missing data may be suitably assumed
Use ePad only for all the sketches and graphs.

1)   With a neat sketch explain the generalized block diagram of a feedback control system.

(4)

   A)

   B)   With a neat sketch explain automatic tank level control system.

(3)

   C)   With an example explain an open loop control system.

(3)

2)   Draw the schematic diagram of armature controlled DC motor and obtain its transfer function.

(4)

   A)

   B)   Reduce the block diagram by reduction method as shown in the figure and obtain its transfer function.
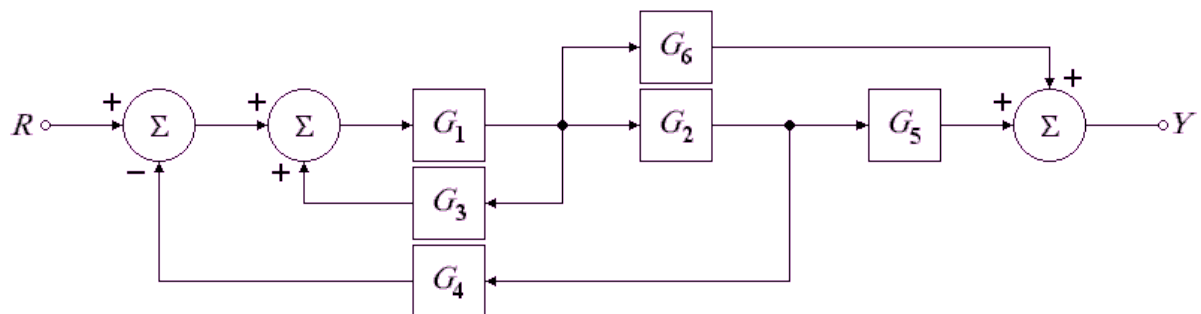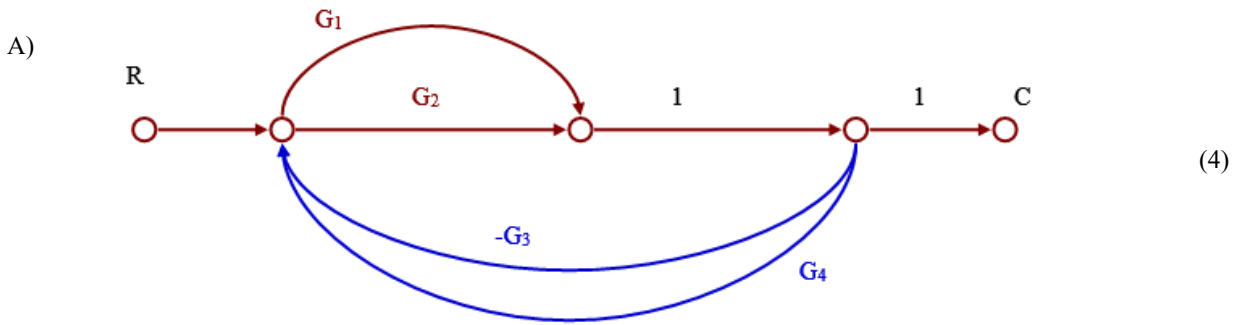

(3)

   C)   Draw the signal flow graph of the block diagram as shown in Figure
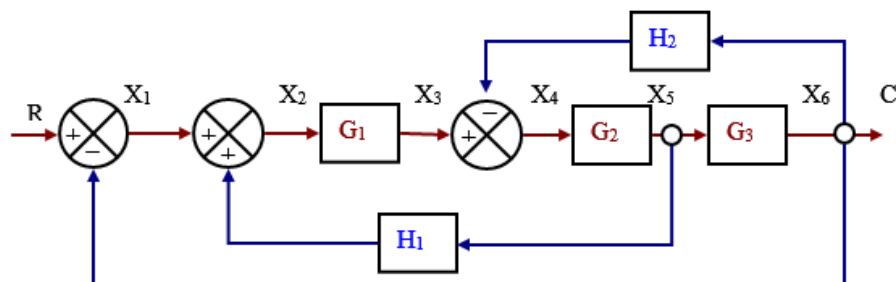
(3)

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3)   Obtain the transfer function of the system whose signal flow graph is as shown in Figure

A)

(4)

B)   Obtain the transfer function of the mechanical system as shown in figure

(3)

C)   Discuss the differences between Time Domain and Frequency Domain Analysis

(3)

4)   With a neat sketch explain standard test signals of a control system.

(4)

A)
B)   Describe the following time response specifications a) Delay time b) rise time c) settling time

(3)

C)   With a neat sketch explain the time response of first order system for a step input

(3)

5)

$$G(S)H(S) = \frac{10}{(S+2)(S+4)}$$

Draw the polar plot for the given control system

A)

(4)

B)

$$G(S)H(S) = \frac{K}{S(S+2)(S+10)}$$

For the given control system   Obtain the Nyquist plot.

(3)

C)

$$G(S)H(S) = \frac{K}{S(S+2)(S+10)}$$

For the given control system   Calculate the range of K for the
stability.

(3)

-----End-----