

Roll No

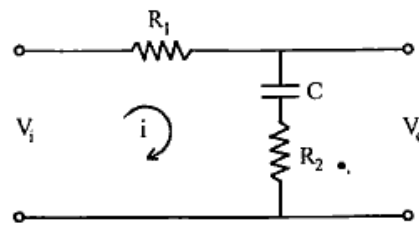
EX-602 (GS)**B.E. VI Semester**

Examination, May 2018

Grading System (GS)**Control Systems***Time : Three Hours**Maximum Marks : 70*

- Note:** i) Attempt any five questions out of eight.
ii) All questions carry equal marks.

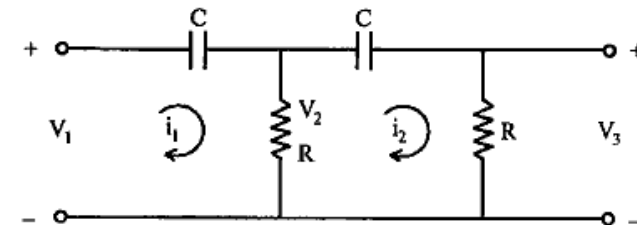
1. a) Describe the open-loop and closed-loop system. Also mention the advantages and disadvantages of open-loop and closed-loop control system. 7
b) Determine the transfer function of the following network. 7



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[2]

2. a) Explain the following terms with reference to SFG (Signal Flow Graph): 7
- Input node
 - Output node
 - Chain node
 - Forward path
 - Feedback loop/Feedback path
 - Path gain
 - Non-touching path
- b) Describe the construction and working of motor suitable for the use in a.c. servo system. Give the torque speed characteristics and derive the transfer function of it. 7
3. a) Obtain signal flow graph and hence the transfer function of the circuit by Mason's gain formula. 7



- b) What are the different types of Control action? Explain effect of each control action on system performance. 7

[3]

4. a) Characteristic equation of a system is given as:

$$S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$$

Find the roots to ascertain if it is marginally stable or unstable. 7

- b) What are the difficulties arising in the Routh-Hurwitz stability criterion? How these difficulties are overcome? 7

5. Sketch the complete root locus of the system having: 14

$$G(s)H(s) = \frac{K}{s(s+1)(s+2)(s+3)}$$

Find the range of K, over which the system is stable.

6. Sketch the Bode plot of the transfer function: 14

$$G(s) = \frac{4}{s(1+s)(2+s)}$$

Determine the:

- a) Phase margin
b) Gain margin

7. a) Describe the phase-lead compensation circuit and find out the transfer function. 7

- b) What are the effects of Phase Lag compensation on the system performance? 7

[4]

- 8 Write a short note on any two of the following: 7 each

- a) Standard Test Signals
b) Poles and Zeros
c) Power amplifier

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