

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: MR301

Course Name: LINEAR CONTROL SYSTEMS

Max. Marks: 100

Duration: 3 Hours

PART A

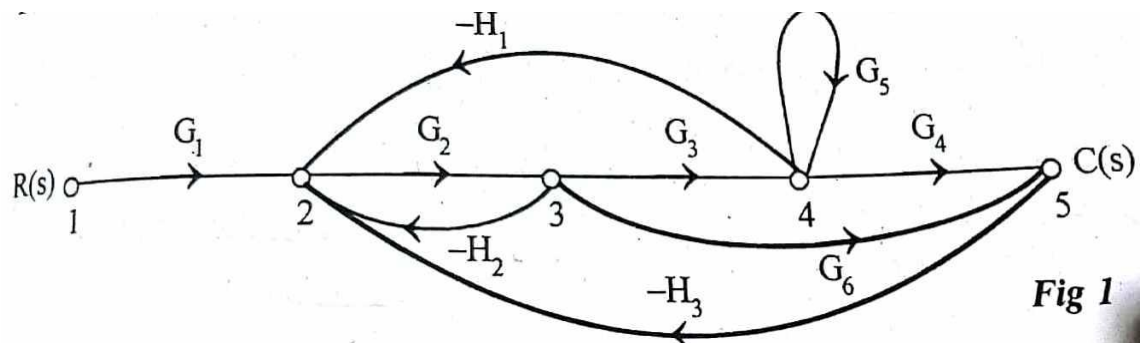
Answer all questions, each carries 5 marks.

- | | | Marks |
|---|--|-------|
| 1 | Differentiate between open loop and closed loop control system | (5) |
| 2 | Write a note on torque-voltage and torque –current analogy | (5) |
| 3 | What is steady state error? What are static error constants? | (5) |
| 4 | Explain about location of poles and zeros on root locus | (5) |
| 5 | What is non minimum phase system? | (5) |
| 6 | What are the steps in logarithmic plots ? | (5) |
| 7 | What is lead compensation? | (5) |
| 8 | Describe about PID Controller | (5) |

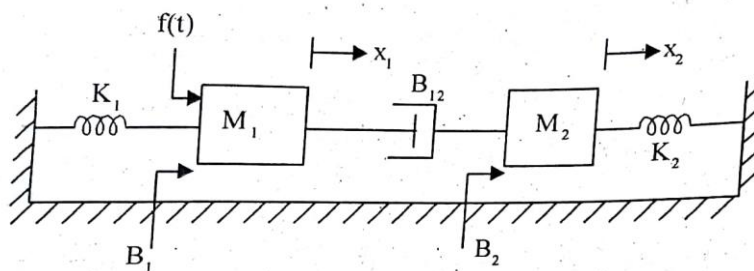
PART B

Answer any three questions, each carries 10 marks.

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|---|---|------|
| 9 | a) Using Masons gain formula find the transfer function | (10) |
|---|---|------|



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|----|--|-------|
| 10 | a) Write a note on transfer function of electrical systems | (5) |
| | b) Determine the transfer function | (5) |



- 11 a) A Unity feedback control system is characterised by open loop transfer function, (10)
 $G(S) = \frac{0.4S+1}{S+0.6}$ Determine the transient response for unit step input

- 12 a) Sketch the root locus For unity feedback control system , having open loop transfer function, (10)

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

- 13 a) What is the stability of a system? (3)
 b) Determine the location of roots on S-plane and hence the stability of a system having CE (7)
 $S^7 + 5S^6 + 9S^5 + 9S^4 + 4S^3 + 20S^2 + 36S + 36 = 0$

PART C

Answer any two questions, each carries 15 marks.

- 14 a) Explain briefly about Frequency Domain Specifications with its formula and write any 2 types of frequency response plots. (15)
 15 a) Draw the bode plot and obtain K

$$G(S) = \frac{KS^2}{(1+0.2S)(1+0.02S)} \quad (15)$$

- 16 a) Explain in detail about PID Controller (7)
 b) What is the role of control system in Mechatronics ?explain (8)
 17 a) Explain in detail about case studies of (15)
 (i) Automatic street light control
 (ii) Automatic Temperature control
 (iii) Automatic traffic light control
