**18EE502**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
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| **July/August, 2023** | **Electrical & Electronics Engineering** | | |
| **Seventh Semester** | **Control Systems** | | |
| **Time:** Three Hours | | **Maximum:**50 Marks | |
| ***Answer question 1 compulsory.*** | | | **(10X1 = 10Marks)** |
| ***Answer one question from each unit.*** | | | **(4X10=40Marks)** |

|  |  |  | CO | BL | M |
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| 1 | a) | What are the advantages of Closed Loop System? | CO1 | L1 | 1M |
|  | b) | Write any two applications for feedback control system | CO1 | L1 | 1M |
|  | c) | Write Monson’s Gain Formulae? | CO1 | L1 | 1M |
|  | d) | What are the standard test signals used in the analysis of control systems? | CO2 | L1 | 1M |
|  | e) | What is difference between type number and order of the system? | CO2 | L1 | 1M |
|  | f) | What is the effect of adding zero to a system? | CO2 | L1 | 1M |
|  | g) | Define BIBO stability of a system. | CO3 | L1 | 1M |
|  | h) | What are the limitations of RH stability criterion? | CO3 | L1 | 1M |
|  | i) | Draw the polar plot for type 1 and order 2system | CO3 | L1 | 1M |
|  | j) | What is meant by Observability of the system? | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Write any four differences between open loop and closed loop systems. | CO1 | L2 | 4M |
|  | b) | Determine the transfer function of the mechanical system shown in below Fig | CO1 | L2 | 6M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Derive the transfer function of armature controlled DC servo Motor | CO1 | L3 | 6M |
|  | b) | Write any four rules, which are used in Block diagram reduction technique | CO1 | L2 | 4M |
| **Unit-II** | | | | | |
| 4 | a) | Derive the expression for rise time and peak over shootof second order system | CO2 | L3 | 5M |
|  | b) | Determine the step, ramp & parabolic error constants and their corresponding steady state errors for the following system with unity feedback.5M | CO2 | L2 | 5M |
| **(OR)** | | | | | |
| 5 | a) | Explain the effect of adding zeroes on the performance of over shoot, rise time and bandwidth | CO2 | L2 | 5M |
|  | b) | What isthe effect of PI Controller on response of the system?. | CO2 | L2 | 5M |
| **Unit-III** | | | | | |
| 6 | a) | Check the stability and comment on location of the poles of the system described by the characteristic equation . | CO3 | L2 | 5M |
|  | b) | Describe the frequency domain specifications | CO3 | L3 | 5M |
| **(OR)** | | | | | |
| 7 | a) | Sketch the bode plot for the transfer function .From the bode plot,Obtain Gain Crossover Frequency | CO3 | L2 | 10M |
| **Unit-IV** | | | | | |
| 8 | a) | Define root locus and Clearly Explain about the construction rules of root locus | CO4 | L2 | 5M |
| **(OR)** | | | | | |
| 9 | a) | Obtain the state model for the following differential equation 5M | CO4 | L2 | 5M |
|  | b) | Check the controllability for the above system | CO4 | L3 | 5M |



**\*\*\* Remove the border lines after typing the QP**