

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**Subject: – LINEAR CONTROL SYSTEMS (EC-311)**

|  |  |  |
| --- | --- | --- |
| Faculty Name: Mr.G. SATISH | Year / Sem: B.Tech in EEE - III/I | Academic Year: 2020-21 |

**SCHEME OF EVALUATION OF INTERNAL QUESTION PAPERS**

**ASSIGNMENT-1**

|  |  |
| --- | --- |
| 1. Derive the transfer function and block diagram for speed control of DC servo motor? |  |
| * Deriving Transfer Function | **4M** |
| * Drawing Block Diagram | **2M** |
| 2. Obtain the transfer function of the closed loop control system shown in fig. using the block body reduction technique. |  |
| * Step by Step Procedure of Block Diagram Reduction till the Transfer Function | **6M** |
| 3. Find the transfer function of the signal flow graph shown in fig. using the mason’s gain formula. |  |
| * Finding the Forward Paths | **1M** |
| * Finding Independent Loops | **1M** |
| * Finding Nontouching Loops | **1M** |
| * Calculating Delta | **1M** |
| * Writing the Transfer Function | **2M** |
| 4. Derive the expression for peak, rise time in terms of ξ and ωn for a second order control system. |  |
| * Peak Time Derivation | **4M** |
| * Rise Time Derivation | **2M** |

|  |  |
| --- | --- |
| 5. A unity feedback system is characterized by a open loop transfer function    Determine the gain K so that the system will have a damping ratio of 0.5. For this value of K determine settling time, peak overshoot, and time to peak overshoot for unit step input |  |
| * Finding K | **1.5M** |
| * Finding settling time | **1.5M** |
| * Finding Peak Overshoot | **1.5M** |
| * Finding Peak time | **1.5M** |
| 6. Find all steady state errors for open loop transfer function with unity feed back given by |  |
| * Finding Positional Error | **2M** |
| * Finding Velocity Error | **2M** |
| * Finding Acceleration Error | **2M** |



**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**Subject: – LINEAR CONTROL SYSTEMS (EC-311)**

|  |  |  |
| --- | --- | --- |
| Faculty Name: Mr.G. SATISH | Year / Sem: B.Tech in EEE - III/I | Academic Year: 2020-21 |

**SCHEME OF EVALUATION OF INTERNAL QUESTION PAPERS**

**MID-I**

**SECTION-A 6\*1=6M**

|  |  |
| --- | --- |
| 1. a) Define system, control system |  |
| * Definition of system & control system | **1M** |
| b) Distinguish between linear and nonlinear control system |  |
| * Two Differences between Linear and Non linear system | **1M** |
| c) State disadvantages and advantages of signal flow graph. |  |
| * Total 4 points with at least 1 advantage and a disadvantage | **1M** |
| d) What are the standard test signals? |  |
| * Names of 4 test signals | **1M** |
| e) Define the term rise time, settling time. |  |
| * 2 definitions | **1M** |
| f) Define steady state response and steady error. |  |
| * 2 definitions | **1M** |

**SECTION-B 1\*6=6M**

|  |  |
| --- | --- |
| 2. Write the differential equations for mechanical system shown in figure and obtain an analogous electrical circuit in force-voltage analogy. |  |
| * 2 Differential Equations | **4M** |
| * Drawing Analogous Circuit | **2M** |
| 3. Draw the signal flow graph and derive the transfer function of the system using mason’s gain formula. |  |
| * Constructing Signal Flow Graph | **2M** |
| * Finding Transfer Function | **4M** |

**SECTION-C 1\*6=6M**

|  |  |
| --- | --- |
| 4. Write the expression for time domain specification of a second order control system and indicate with neat sketch? Also how damping ratio affect the time response of second order system. |  |
| * Response of Second Order System | **2M** |
| * Diagram for time domain specification | **2M** |
| * Effect of Damping ratio on second order system | **2M** |
| 5. Determine the stability of system represented by the characteristic equation  by means of Routh criterion. |  |
| * Forming Routh table & calculating all co-efficents | **3M** |
| * Identifying sign changes | **1M** |
| * Finding location of poles and type of stability | **2M** |