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| **S NO** | **IMPORTANT QUESTIONS** | **KNOWLEDGE****LEVEL** | **CO** |
| **UNIT I** |
| **1** | What is control systems and also explain the different types of control systems with its merits and demerits  | **K2** | **CO1** |
| **2** | Differentiate between open loop and closed loop control systems | **K2** | **CO1** |
| **3** | Determine the differential equations governing the mechanical translational system shown in fig. and determine its transfer function  | **K2** | **CO1** |
| **UNIT 2** |
| 1 | Explain the time response of the first order system for different test signals | **K2** | **CO2** |
| 2 | Classify the second order system based in damping ratio, explain the response of system for unit step input signal in undamped condition | **K4** | **CO2** |
| 3 | The open loop transfer function of a unity feedback system is G(S) = $\frac{4}{s\left(s+1\right)}$ Determine the nature of response of a closed system for a unit step input .Also determine the rise time, peak time, Peak overshoot and settling time. | **K3** | **CO2** |
| **UNIT 3** |
| **1** | By means of RH criteria determine the stability of the systems represented by the following characteristic equations. For the system found to be unstable determine the number of roots on right half of S-plane.**(i)S4+2S3+10S2+20S+5=0****(ii)S6+2S5+S4+2S3+3S2+4S+5=0** | **K2** | **CO3** |
| **2** | Test the stability of the system with the following characteristic equation by Routh’s test **s6 + 2s5 + 8s4 + 20s2 + 16s + 16 = 0** | **K3** | **CO3** |
| **3** | Explain the construction rules for root locus technique | **K2** | **CO3** |
| **UNIT 4** |
| **1** | For the following transfer function draw bode plot and obtain the gain cross over frequency G(s) = $\frac{20}{s(1+3s)(1+4s)}$ $\frac{20}{s(1+3s)(1+4s)}$  | **K2** | **CO3** |
| **2** | Sketch the polar plot and determine the Gain margin and Phase margin of the open loop transfer function of a unity feedback system is given by $\frac{1}{s(1+s)(1+2s)}$  | **K2** | **CO3** |
| **3** | Sketch Bode plot for the following transfer function and determine system gain K for the gain cross over frequency to be 5 rad/sec G(s) = $\frac{k(s^{2})}{\left(1+0.2s\right)(1+0.02s)}$  | **K3** | **CO3** |
| **UNIT 5** |
| **1** | Explain the different steps to be followed for the design of lag compensator using Bode plot | **K3** | **CO3** |
| **2** | A unity feedback system has a open loop transfer function G(S) = $\frac{K}{s(1+2s)}$ .Design a suitable lag compensator so that phase margin is 400 and the steady state error for a ramp input is less than or equal to 0.2 | **K3** | **CO3** |
| **3** | Explain the different steps to be followed for the design of lead compensator using Bode plot | **K3** | **CO3** |
| **UNIT 6** |
| **1** | Obtain the complete time response of the system **(t) =** X(t), X(0) =, Y(t) = X(t) | **K4** | **CO4** |
| **2** | Find out the time response for unit step input **(t)** = X(t)+ U(t) and Y(t)= X(t);X(0)=  | **K3** | **CO4** |
| **3** |  Define the properties of State Transition Matrix Consider a matrix A compute eAt ; A=  | **K4** | **CO4** |