Reg. No. : | | | | | | | | | | |

Question Paper Code: 59404

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Elective

Electronics and Communication Engineering

15UEC904–LINEAR CONTROL ENGINEERING

(Regulation 2015)

Duration: 1.15 hrs Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. In closed loop control system, with positive value of feedback gain the overall gain of the system will CO1- R

   (a)increase (b)decrease (c) be unaffected (d)any of the above

2. Loop which do not possess any common node are said to be _____ loops. CO1- R

   (a) Forward gain (b) Touching loops

   (c) Non touching loops (d) Feedback gain.

3. The type 0 system has _____ at the origin CO2-U

   (a) no pole (b) net pole

   (c) simple pole (d) none of the above

4. The damping ratio and peak overshoot are measures of: CO2- R

   (a) Relative stability (b) Speed of response

   (c) Steady state error (d) Absolute stability

5. By equating the denominator of transfer function to zero, which among the following will be obtained? CO3-R

   (a) Poles (b) Zeros

   (c) Both a and b (d) None of the above

6. If the system is represented by $G(s)\,H(s) = k(s+7)/s(s+3)(s+2)$, what would be its magnitude at $w=\infty$? CO3-U

   (a) 0 (b) ∞ (c) 7/10 (d) 21

7. Technique gives quick transient and stability response CO4 R

   (a) Root locus (b) Bode (c) Nyquist (d) Nichols

8. A conditionally stable system exhibits poor stability at CO4-U

(a) Low frequencies (b) reduced values of open loop gain

(c) Increased values of open loop gain (d) None of the above

9. State space analysis is applicable even if the initial conditions are _____ CO5-R

(a) Zero (b) Non-zero

(c) Equal (d) Not equal

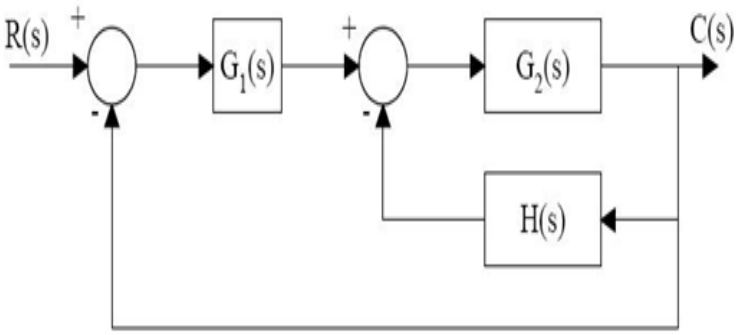
10. According to the property of state transition method, e0 is equal to _____ CO5-R

(a) I (b) A (c) e^{-At} (d) $-e^{At}$

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

16. (a) Estimate the overall transfer function of the system shown in the fig. CO1- App (8)



17. (a) A unity feedback control system has an open loop transfer function *G(S) = 10/s(s+2)*. Find the rise time, percentage over shoot, peak time and settling time. CO2-App (8)

18. (a) Consider a unity feedback system having an open loop transfer function $G(s) = \frac{K}{s(s+0.5s)(1+4s)}$ CO3-Ana (8)

Outline the polar plot and determine the value of K so that

(i) Gain margin is 20db

(ii) Phase margin is 30°.

19. (a) Discuss the stability of a system with characteristics equation CO4-App (8)

$s^4+s^3+20s^2+9s+100 = 0$

Using Routh Hurwitz criterion

20. (a) Develop the Transfer function of the matrix from the data given below. CO5-Ana (8)

$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix}; B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}; C = \begin{bmatrix} 1 & 2 \end{bmatrix}$ and D=0. Also analyze the stability condition of the system.