SAMPLE QUESTION PAPER

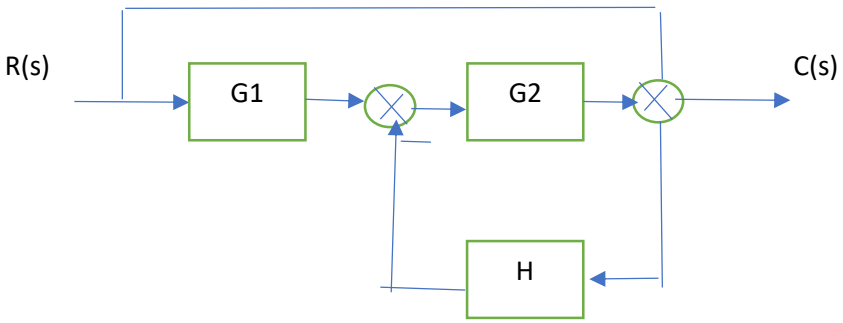
SE (ELECTRONICS)

R-2012

Subject: PRINCIPLE OF CONTROL SYSTEM

ALL Questions carry equal marks (02 EACH)

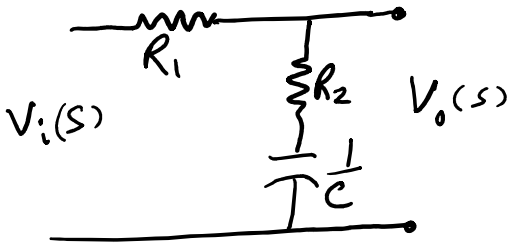
1. Find C(s)/R(s) for the block diagram below



a) $\frac{G1G}{1+G2H}$ b) $\frac{G1G2}{1+G2H}+1$ c) $\frac{G1G}{1+G1H}$ d) $\frac{G1G2}{1+G1H}+1$

2. In a signal flow graph , an input node is one on which
a) Only incoming branches are connected
b) Only outgoing branches are connected
c) Both incoming and outgoing branches are connected
d) All the nodes are connected.

3. Vo(s)/Vi(s) for the circuit below is



a) $\frac{1+R_1+R_2}{1+R_1Cs}$
b) $\frac{1+R_1Cs+\ {}_2Cs}{1+R_1Cs}$
c) $\frac{1+R_1Cs+R_2Cs}{1+R_2Cs}$
d) $\frac{1+R_1Cs+R_2}{1+R_1Cs}$

4. The zeros of G(s)=(s+5)/s(s+2) are
a) 0 b) -2 c) -5 d) -5/2

5. The initial slope of Bode plot for open loop transfer function is

a) +20db/d b)-20db/d c) 40db/d d) -40 db/d

6. In order to stability of a system from Bode plot
   a) Only Gain margin should be positive
   b) Only phase margin should be positive
   c) Both gain and phase margin should be positive
   d) Neither gain nor phase margin should be positive

7. The analysis of control system using state space approach is carried out in _____ by representing a system in the form of _____
   a) Time domain, first order differential equations
   b) Frequency domain, first order differential equations
   c) Time domain, second order differential equations
   d) frequency domain, second order differential equations

8. The angle and magnitude condition for a stable system in root locus approach is
   a) $\angle G(s)H(s) = \pm(2q-1)180^0 \ and \ |G(s)H(s)| = -1$
   b) $\angle G(s)H(s) = \pm(q+1)180^0 \ and \ |G(s)H(s)| = 1$
   c) $\angle G(s)H(s) = \pm(2q+1)180^0 \ and \ |G(s)H(s)| = 1$
   d) $\angle G(s)H(s) = \pm(q+1)180^0 \ and \ |G(s)H(s)| = -1$

9. The root locus plot starts from_____ nd ends at _____
   a) Open loop zero, open loop pole
   b) Infinity , open loop pole
   c) Open loop pole, open loop zero or infinity
   d) Infinity, open loop zero

10. The number of branches of root locus plot for $G(s)H(s)=K/(s+2)^3$
    a) 1 b) 2 c) 3 d) 4

11. The Nyquist plot for G(s)H(s)=10/s(s+1)(s+_2) will cross the real axis axis at
    a) 8+j0
    b) -0.8+j0
    c) 0.8+j0
    d) 0+j8

12. The velocity error constant for G(s)H(s)=10(1+s)/s(1+2s) will be

a) 1 b) 10 c)5 d) 0

13. The velocity error constant for G(s)H(s)=10(1+s)/s(1+2s) will be

a)1 b) 10 c)5 d) 0

14. The steady state response of a system is that part of time response that goes to _____ as time goes to _____
    a) Infinity, zero
    b) Infinity, infinity
    c) Zero, infinity
    d) Zero, zero

15. The laplace transform of unit ramp function is
    a) 1 b) 1/s c) $1/s^2$ d) $1/s^3$

16. In order to find stability from routh Hurwitz criteria, the number of _____ in the first column of array, indicates _____
    a) Zeros, no. of roots with positive real part
    b) ones, no. of roots with positive real part
    c) sign changes, no. of roots with positive real part
    d) sign changes, no. of roots with negative real part

17. The range of K for for stability for characteristic equation $s^3+2ks^2+(k+2)s+4=0$ is
    a) K=1
    b) K>2.73
    c) K<2.73
    d) K>10

18. Using the property of state transition matrix $\emptyset^{-1}(t) =$ _____
    a) $\emptyset^{-1}(-t)$
    b) $\emptyset^{-1}(0)$
    c) $\emptyset^{-1}(t)$
    d) I

19. According to Kalman's test, a linear time invariant continuos system described by state equations
    $[\dot{X}] = [A][X] + [B][U]$
    [Y]=[C][X]
    Is completely controllable if the rank of _____ matrix is equal to n
    a) $[B : AB : AB^2 : \ldots. : AB^{n-1}]$
    b) $[A : AB : AB^2 : \ldots. : AB^{n-1}]$
    c) $[B : AB : A^2B : \ldots. : A^{n-1}B]$
    d) $[B : AB : A^2B : \ldots. : A^{n-1}B]$

20. Gain margin is the reciprocal of magnitude|G(jw)| at the frequency at which
    a) Phase angle is -180
    b) Phase angle is -120
    c) Phase angle is 0
    d) Phase angle has no relation.

21. The gain crossover frequency is one where the magnitude of open transfer function is
    a) 10 db
    b) 1db
    c) 0 db
    d) -1db

22. When a pole is added in the forward path of a second order system
    a) Band width decrease
    b) Rise time reduces

c) Resonant peak reduces
d) System becomes more stable

23. Which of the following is not time response specification
    a) Maximum overshoot
    b) Delay time
    c) Rise time
    d) Band width

24. If initial slope of Bode plot is +20 b/d, it indicates presence of
    a) Zero at origin
    b) Pole at origin
    c) Zero at infinity
    d) Pole at infinity
25. The check for , a part of real axis lies on root locus , is
    a) If number of poles to the right of section is odd
    b) If number of zeros to the right of section is odd
    c) If number of poles plus zeroes to the right of section is even.
    d) If number of poles plus zeroes to the right of section is odd