Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - –Control Systems
Course Code - PCCEC601

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- DIP.EE
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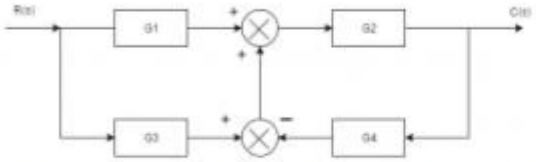
Answer all the questions. Each question carry one mark.

9. 1.



If the transfer function of the system is given by T(s)=G1G2+G2G3/1+X. Then X is:

Mark only one oval.

G2G3G4

Option 1

G2G4

Option 2

G1G2G4

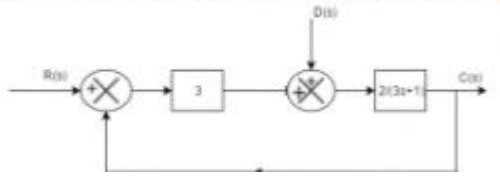
Option 3

G3G4

Option 4

10. 2.

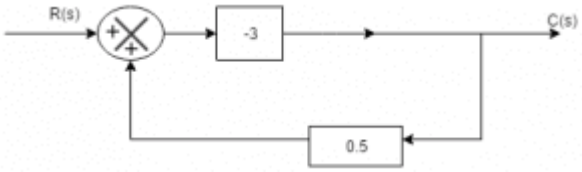
The transfer function from D(s) to Y(s) is :



Mark only one oval.

- 2/3s+7
- 2/3s+1
- 6/3s+7
- 2/3s+6

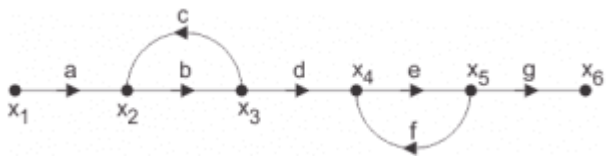
11. 3.



Mark only one oval.

- -9/5
- -6/5
- 6/5
- 9/5

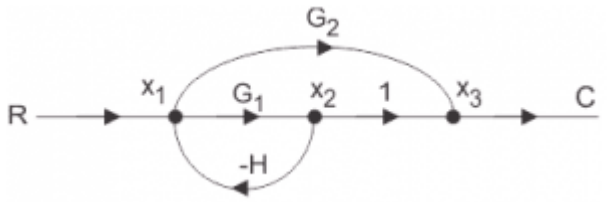
12. 4.



Mark only one oval.

- abd/1-(ac)
- abdeg/1-(bc+ef)+bcef
- abd/1-(bc+ef)+bcef
- adcdef/1-(bc+ef)+bcef

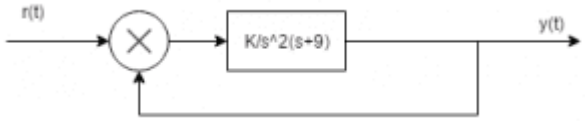
13. 5.



Mark only one oval.

- G1/1+G2H
- G1+G2/1+G1H
- G2/1+G1H
- None of the mentioned.

14. 6.



Mark only one oval.

- 2,3
- 2,2
- 3,3
- None of the mentioned.

15. 7.A tachometer is added to servomechanism because:

Mark only one oval.

- It is easily adjustable
- It can adjust damping
- It reduces steady state error
- It converts velocity of the shaft to a proportional Dc voltage

16. 8. Backlash in a stable control system may cause:

Mark only one oval.

- Under damping
- Over damping
- High level oscillations
- Low level oscillations

17. 9. Which of the following is not the feature of modern control system?

Mark only one oval.

- Quick response
- Accuracy
- Correct power level
- No oscillation

18. 10. The principle of homogeneity and superposition are applied to:

Mark only one oval.

- Linear time invariant systems
- Nonlinear time invariant systems
- Linear time variant systems
- Nonlinear time variant systems

19. 11.When deriving the transfer function of a linear element

Mark only one oval.

- Both initial conditions and loading are taken into account
- Initial conditions are taken into account but the element is assumed to be not loaded
- Initial conditions are assumed to be zero but loading is taken into account
- Initial conditions are assumed to be zero and the element is assumed to be not loaded

20. 12. If the initial conditions for a system are inherently zero, what does it physically mean?

Mark only one oval.

- The system is at rest but stores energy
- The system is working but does not store energy
- The system is at rest or no energy is stored in any of its part
- The system is working with zero reference input

21. 13. The overall transfer function from block diagram reduction for cascaded blocks is :

Mark only one oval.

- Sum of individual gain
- Product of individual gain
- Difference of individual gain
- Division of individual gain

22. 14. Transfer function of the system is defined as the ratio of Laplace output to Laplace input considering initial conditions_____

Mark only one oval.

- 1
- 2
- 0
- Infinite

23. 15. Loop which do not possess any common node are said to be _____ loops.

Mark only one oval.

- Forward gain
- Touching loops
- Non touching loops
- Feedback gain

24. 16. Signal flow graphs:

Mark only one oval.

- They apply to linear systems
- The equation obtained may or may not be in the form of cause or effect
- Arrows are not important in the graph
- They cannot be converted back to block diagram

25. 17. Benefits of feedback:

Mark only one oval.

- Performance of system is greater.
- Need for system much larger path gain and system instability.
- Controlled variable accurately follows the desired value
- Affected by parameter variations

26. 18. Multiple signals as input can be used in which systems:

Mark only one oval.

- Feedback systems
- Non feedback systems
- Feedforward systems
- None of the mentioned

27. 19.Standard test signals in control system are:

Mark only one oval.

- Impulse signal
- Ramp signal
- Unit step signal
- All of the mentioned

28. 20.Ramp input :

Mark only one oval.

- Denotes constant velocity
- Value increases linearly with time
- It denotes constant velocity and varies linearly with time
- It varies exponentially with time

29. 21. The transfer function of the system is G(s) =100/(s+1) (s+100). For a unit step input to the system the approximate settling time for 2% criterion is:

Mark only one oval.

- 100 sec
- 4 sec
- 1 sec
- 0.01 sec

30. 22. Laplace transform of unit impulse signal is :

Mark only one oval.

- A/s
- A
- 1
- 1/s

31. 23. The damping ratio and peak overshoot are measures of:

Mark only one oval.

- Relative stability
- Speed of response
- Steady state error
- Absolute stability

32. 24. Which one of the following is the most likely reason for large overshoot in a control system?

Mark only one oval.

- ◯ High gain in a system
- ◯ Presence of dead time delay in a system
- ◯ High positive correcting torque
- ◯ High retarding torque

33. 25. The output of a feedback control system must be a function of

Mark only one oval.

- ◯ Reference and output
- ◯ Reference and input
- ◯ Input and feedback signal
- ◯ Output and feedback signal

34. 26. The effect of adding feedback makes the system_____

Mark only one oval.

- ◯ Linear
- ◯ Non-linear
- ◯ Time variant
- ◯ Time invariant

35. 27. In a control system the output of the controller is given to

Mark only one oval.

- Final control element
- Amplifier
- Comparator
- Sensor

36. 28. The system in originally critically damped if the gain is doubled the system will be :

Mark only one oval.

- Remains same
- Overdamped
- Under damped
- Undamped

37. 29. For the system 2/s+1, the approximate time taken for a step response to reach 98% of its final value is:

Mark only one oval.

- 1s
- 2s
- 4s
- 8s

38. 30. The maximum overshoot is:

Mark only one oval.

- ◯ To measure the relative stability
- ◯ A system with large overshoot is desirable
- ◯ It occurs at second overshoot
- ◯ A system with large overshoot is desirable & It occurs at second overshoot

39. 31. For critically damped second order system, if the gain constant(K) is increased, the system behavior

Mark only one oval.

- ◯ Becomes oscillatory
- ◯ Becomes under damped
- ◯ Becomes over damped
- ◯ Shows no change

40. 32. Which principle does the linear system follow?

Mark only one oval.

- ◯ Principle of energy conservation
- ◯ Principle of mass conservation
- ◯ Principle of electromagnetism
- ◯ Principle of superposition

41. 33. _____ control systems have unpredictable & non-repeatable.

Mark only one oval.

- Static
- Dynamic
- Deterministic
- Stochastic

42. 34. On what difference does the pneumatic system works?

Mark only one oval.

- Speed
- Pressure
- Area
- Length

43. 35. How many parameters does process control refer to?

Mark only one oval.

- 1
- 3
- 5
- 7

44. 36. In a temperature control system, what conversion in signal takes place?

Mark only one oval.

- Digital to Analog
- Analog to Digital
- Error to Digital
- Error to Analog

45. 37. In a second order feedback control system natural frequency and damping

Mark only one oval.

- In a second order feedback control system natural frequency and damping
- Cannot be designed by changing the gain of the individual system
- Are independent on the type of input excitation
- None of the mentioned

46. 38. Normalized response of a dynamic system refers to:

Mark only one oval.

- Characteristic feature of a response due to specific excitation irrespective of its amplitude
- Response of dynamic system divided by its maximum value
- Response of dynamic system divided by a standard value
- None of the mentioned

47. 39. A linear time invariant system is stable if :

Mark only one oval.

- ◯ System in excited by the bounded input, the output is also bounded
- ◯ In the absence of input output tends zero
- ◯ System in excited by the bounded input, the output is also bounded & In the absence of input output tends zero
- ◯ System in excited by the bounded input, the output is not bounded

48. 40. Stability of a system implies that :

Mark only one oval.

- ◯ Small changes in the system input does not result in large change in system output
- ◯ Small changes in the system parameters does not result in large change in system output
- ◯ Small changes in the initial conditions does not result in large change in system output
- ◯ All of the above mentioned

49. 41. Roots with higher multiplicity on the imaginary axis makes the system :

Mark only one oval.

- ◯ Absolutely stable
- ◯ Unstable
- ◯ Linear
- ◯ Stable

50. 42. If the roots of the have negative real parts then the response is _____

Mark only one oval.

- Stable
- Unstable
- Marginally stable
- Bounded

51. 43. The stability of the linear system:

Mark only one oval.

- Determined by the location of the poles
- Dependent entirely of whether or the system is driven
- The stability of the undriven linear system is dependent on the magnitude of the final initial state.
- Stability cannot be determined by the open loop poles

52. 44.The necessary condition of stability are:

Mark only one oval.

- Coefficient of characteristic equation must be real and have the same sign
- Coefficient of characteristic equation must be non-zero
- Coefficient of characteristic equation must be real and have the same sign & Coefficient of characteristic equation must be non-zero
- Coefficient of characteristic equation must be zero

53. 45. Routh Hurwitz criterion gives:

Mark only one oval.

- Number of roots in the right half of the s-plane
- Value of the roots
- Number of roots in the left half of the s-plane
- Number of roots in the top half of the s-plane

54. 46. Consider the following statement regarding Routh Hurwitz criterion:

Mark only one oval.

- It gives absolute stability
- It gives gain and phase margin
- It gives the number of roots lying in RHS of the s-plane
- It gives gain, phase margin and number of roots lying in RHS of the s-plane

55. 47. The characteristic equation of a system is given as s3+25s2+10s+50=0. What is the number of the roots in the right half s-plane and the imaginary axis respectively?

Mark only one oval.

- 1,1
- 0,0
- 2,1
- 1,2

56. 48. The necessary condition for the stability of the linear system is that all the coefficients of characteristic equation 1+G(s)H(s) =0, be real and have the :

Mark only one oval.

- Positive sign
- Negative sign
- Same sign
- Both positive and negative

57. 49.A system with unity feedback having open loop transfer function as G(s) = K(s+1)/s3+as2+2s+1. What values of 'K' and 'a' should be chosen so that the system oscillates ?

Mark only one oval.

- K =2, a =1
- K =2, a =0.75
- K =4, a =1
- K =4, a =0.75

58. 50. Determine the stability of closed loop control system whose characteristic equation is s5+s4+2s3+2s2+11s+10=0.

Mark only one oval.

- Stable
- Marginally stable
- Unstable
- None of the mentioned

59. 51. Determine the value of K such that roots of characteristic equation given below lies to the left of the line s = -1. s3+10s2+18s+K.

Mark only one oval.

- K>16 and K<9
- K<16
- 9
- K<9

60. 52. The characteristic equation of a feedback control system is s3+Ks2+9s+18. When the system is marginally stable, the frequency of the sustained oscillation:

Mark only one oval.

- 1
- 1.414
- 1.732
- 3

61. 53. The polynomial s4+Ks3+s2+s+1=0 the range of K for stability is _____

Mark only one oval.

- K>5
- -10
- K>-4
- K-1>0

62. 54. Root locus of s(s+2)+K(s+4) =0 is a circle. What are the coordinates of the center of this circle?

Mark only one oval.

- -2,0
- -3,0
- -4,0
- -5,0

63. 55. Number of roots of characteristic equation is equal to the number of _____

Mark only one oval.

- Branches
- Root
- Stem
- Poles

64. 56. If root loci plots of a particular control system do not intersect the imaginary axis at any point, then the gain margin of the system will be

Mark only one oval.

- 0
- 1
- 0.707
- Infinite

65. 57. If the gain of the open loop system is doubled, the gain of the system is :

Mark only one oval.

- Not affected
- Doubled
- Halved
- One fourth of the original value

66. 58. The gain margin in dBs of a unity feedback control system whose open loop transfer function, G(s) H(s) =1/s(s+1) is

Mark only one oval.

- 0
- 1
- -1
- Infinite

67. 59. OLTF contains one zero in right half of s-plane then

Mark only one oval.

- Open loop system is unstable
- Close loop system is unstable
- Close loop system is unstable for higher gain
- Close loop system is stable

68. 60. The critical value of gain for a system is 40 and gain margin is 6dB. The system is operating at a gain of:

Mark only one oval.

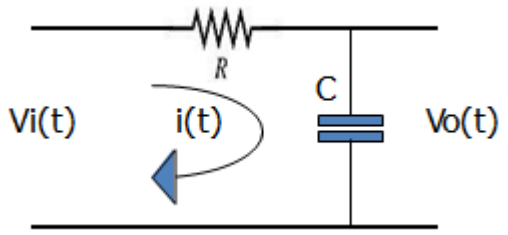
- 20
- 40
- 60
- 120

69. 61. Consider the following statements:

Mark only one oval.

- The effect of feedback is to reduce the system error
- Feedback increases the gain of the system in one frequency range but decreases in the other
- Feedback can cause a system originally stable to become unstable
- The effect of feedback is to reduce the system error & Feedback can cause a system originally stable to become unstable

70. 62. Write the transfer function of the network



Mark only one oval.

- 1/(sCR+1)
- sCR+1
- 1/(s+CR)
- s+CR

71. 63.

Determine the zeros of given transfer function.

$$G(s)=\frac{s(s+2)(s+4)}{s(s+3)(s+4)}$$

Mark only one oval.

- s=0, -2, -4
- s=0, -1, -4
- s=0, -2, -3
- s= -2, -4

72. 64.

Determine the poles of given transfer function.

$$G(s)=\frac{s(s+2)(s+4)}{s(s+3)(s+4)}$$

Mark only one oval.

- s=0, -3, -4
- s=0, -2, -4
- s=0, -1, -4
- s=-3, -4

73. 65. Write the poles of the given system

$$\frac{C(s)}{R(s)} = \frac{(s+2)}{s(s^2+2s+2)(s^2+7s+12)}$$

Mark only one oval.

- s=0, -3, -4, -1+j,-1-j
- s=0, -3, -4, -1+j
- s= -3, -4, -1+j,-1-j
- s=0, -3, -4

74. 66.

Consider a system with transfer function G(s) = s+6/Ks^2+s+6. Its damping ratio will be 0.5 when the values of k is:

Mark only one oval.

- 2/6
- 3
- 1/6
- 6

75. 67.

Determine the centroid of the root locus for the system having G(s) H(s) = K/(s+1)(s^2+4s+5)

Mark only one oval.

- -2.1
- -1.78
- -1.66
- -1.06

76. 68.

The angles of asymptotes of the root loci of the equation $s^3+5s^2+ (K+2) s+ K=0$ are:

Mark only one oval.

- 0° and 270°
- 0° and 180°
- 90° and 270°
- 90° and 180°

77. 69.

The open loop transfer function of the feedback control system is given by

$G(s) =K(s+3)/s(s+4)^2(s+5)(s+6)$. The number of asymptotes and the centroid of asymptotes of the root loci of closed loop system is

Mark only one oval.

- 4 and (-4,0)
- 3 and (-12,0)
- -4 and (-4,0)
- -3 and (-12,0)

78. 70.

The characteristic equation is $s^3+14s^2+ (45+K) s+ K =0$, centroid is located at (-x,0) then the value of x is _____

Mark only one oval.

- 1
- 2
- 3
- 4