JNTU ONLINE EXAMINATIONS [Mid 2 - ACS]

1. An equilibrium state X_e of the system is stable in the sense of Liapunov, S(ε) there exists an S(δ) such that the trajectories starting in S(δ)
a. Does leave S(ε) as t 0
b. Does not leave S(ε) as t α
c. Does leave S(ε) as t α
d. Does leave S(ε) as t 0

2. A scalar function $V(X)=(X_1+X_2)_2$ is
a. Indefinite
b. definite
c. Semidefinite
d. +Ve Semi definite

3. A scalar function V(x) is said to be definite if
a. -V(x) is -Ve definite
b. -V(x) is +ve definite
c. V(x) is +Ve definite
d. V(x) is

4. A scalar function V(x) is said to be '-Ve' semi definite if -V(x) is
a. positive definite
b. -Ve definite
c. +Ve definite
d. +Ve Semi definite

5. A scalar function V(x)= is
a. +Ve Semi definite
b. Indefinite
c. +Ve definite
d. -Ve semidefinite

6. A spherical region in the n-dimensional state space around an equilibrim state X_e as
a.
b.
c.
d.

7. If `δ' does not depends on " " the equilibrium state is said to be
a. uniformaly unstable
b. non uniformly stable
c. uniformaly Asymptotic stable
d. uniformly stable

8. An equilibrium state `X_e' is said to be unstable if for some real number
a. , δ < 0
b. , δ > 0
c. , δ <0
d.

9. A scalar function V(x) is said to be positive definite in a region `Ω' if
a. V(x) <, V(0) = 0
b.
c. V(x)>0 for all non zero values of X in `Ω' V(0)=0
d. V(x)>0 for all non zero values of X in `Ω'

10. In second method of Liapunov the time derivative of the total energy must be
a. +Ve definite
b. -Ve definite
c. Indefinite
d. Semi definite

11. Fnd a Liapunov function for the following system
a. Function is +Ve definite
b. Function is -Ve definite
c. Function is Semi definite
d. Function is Indefinite

12. Liapunov function is $V(X) = X_TPX$, what is ?
a. -XQX, where $Q = (A_TP+PA)$
b. $-X_TQX$, where $Q = -(A_TP+PA)$
c. X_TQX, where $Q = -(A_TP+PA)$
d. QX where Q = PA

13. For an Linear Time invariant system f(x(t),t)=AX(t) = 0, if `A' is non singular there is _ _ _ _ _ _ Equilibrium point
a. Two
b. Three
c. One
d. Five

14. In second method of Liapunov, what is vibratory system
a. Zero input
b. Non zero input
c. Zero input under vibratory initial condition
d. Non zero input vibratory initial conditions

15. For an Linear time invariant system f(x(t), t) = AX(t)=0, if `A' is singular there are _ __ _ number of state variable
a. Finite
b. Infinite
c. Two
d. Four

16. If mathop V limits.(X)is negative definite scalor function the system is
a. Stable
b. UInstable
c. Asymptotically stable
d. Marginally stable

17. What is the necessary and sufficient condition of Q
a. $Q = -(A_TP+PA)$ is +Ve definite
b. $Q = -A_TP$ is -Ve definite
c. Q = PA is definite
d. $Q = -AP_T$ is +Ve definite

18. If the system is non Linear there may be _ _ _ _ _ equilibrium points
a. One
b. Two
c. One (or) more
d. more

19. Find the equilibrium points of the system mathop X limits.(t) =
a. (0, 1)
b. (0, 2)

c. (0, 5)
d. (0, 0)

20. The trajectories starting in S(δ) does not leave
a. S(δ)
b. δ
c. ε
d. S(ε)

21. As for as a L T I V system is concerned, if the system is locally stable it is automatically _ _ _ _
a. Instable
b. Stable
c. Globally stable
d. Indefinite

22. Stability in the sense of Liapunov and if evey solution starting _ _ _ _ _
a. Within S(δ)
b. Out of S(δ)
c. Within S(ε)
d. Out of S(ε)

23. S(δ) consists of all the points such that _ _ _ _
a. > δ
b. < δ
c. ≤ δ
d. δ

24. S(ε) consists of all the points such that _ _ _ _
a. > ε
b. < ε
c. ε
d. ≤ ε for all τ t_0

25. After chosing the region S(ε), then what region will you find in the 'n'-diamensional space
a. δ
b. S(δ)
c. ε
d. S(ε)

26. The real number `δ' depends on _ _ _ _ _ _
a. ε
b. t_0
c. ε and t_0
d. S(ε)

27. The trajectory starting in S(δ) does not leave S(ε) as `t' go to _ _ _ _
a. α
b. finite
c. 0
d. $t = t_0$

28. The region S(δ) such that the trajectories orginating within _ _ _ _ _ _ does not leave S(ε).
a. S(ε)
b. δ
c. ε
d. S(δ)

29. If the system is not globally stable, to findout the _ _ _ _ region in state space for which the system is stable
a. small
b. large
c. δ
d. ε

30. Stability in the sense of Liapunov and every solution converges _ _ _ _ _ _
a. within S(δ)
b. without leaving S(ε)
c. without leaving S(δ)
d. with leaving S(ε)

31. A Scalar function V(X) is said to be positive definite in a region _ _ _ _ _ _
a. ε
b. δ
c. Ω
d. S(ε)

32. A scolar function $V(X) = -(3X_1+2X_2)_2$ is
a. Semi definite
b. Negative Semi definite
c. Indefinite
d. Positive definite

33. Which of the following system is to produce zero input under vibratory initial conditions?
a. Translational system
b. Rotational system
c. Mechanical system
d. Vibratory system

34. In second method of Liapunov, total energy is _ _ _ _ _ definite function
a. Negative
b. Non zero
c. Positive
d. Semi

35. If the origin of the linear system is stable it is automatically _ _ _ _
a. Asymptotic stability in the large
b. Instable
c. Stable
d. Asymptotic stable

36. The trajectory starting within S(δ) and converges without leaving S(ε) then the system is
a. Stable
b. Unstable
c. Asymptotically stable
d. Globally stable

37. Vibrating system is stable when the total energy is continuously _ _ _ _
a. increasing
b. decreasing
c. constant
d. decresing and again increases

38. Liapunov function is _ _ _ _ _
a. Scalar function
b. Vector function
c. Algeberaic function
d. Quadratic function

39. What is Liapunov function?
a. Energy function
b. Non Energy function
c. Vector function
d. Fictitious Energy function

40. In spring mass damper system, the total Energy consists of
_ _ _ _ _
a. Potential Energy
b. Kinetic Energy
c. Potential & Kenetic energy
d. No energy

41. A scholar function V(X) = -(3X_1+2X_2)$_2$ is
a. Negative Semi definite
b. Positive definite
c. Negative definite
d. Negative Semi definite

42. The Linear system is globally asymptotically stable at origin if and only if for any given symmetric positive definite matrix P & Q satisfies
a. A_TP+PA = -Q
b. AP$_T$+PA = Q
c. AP + A_TP=Q
d. AP+PA = -Q

43. The Linear system is globally asymptotically stable at origin if and only if for any given
a. Positive definite matrix
b. Symmetric positive definite matrix
c. Symmetric positive definite matrix P & Q
d. Negative matrix

44. Symmetric positive definite matrix `P' exists which is the unique solution the scalar function is
a.
b. V(X) = X_TPX
c.
d.

45. In time varying function V(X, t) is said to be positive definite in a region `Ω' if
a. for all t to
b. V(o, t)=0 for all t to
c. V(X, t) > V(X) for all t to
d. for all t to

46. A scalar function V(X) is said to be definite if -V(X) is
a. Semi definite
b. Positive definite
c. Positive Semi definite
d. Negative definite

47. A scalar function V(X) is said to be negative semi definite if -V(X) is
a. Semi definite
b. Negative definite
c. Positive definite
d. Positive Semi definite

48. A scalar function V(X)=X_1 $_2$+(X_1+X_2)$_2$ is
a. Negative definite
b. Indefinite
c. Positive definite
d. Semi definite

49. A scalar function V(X)=2X_2 $_2$+X_1 X_2 is
a. Indefinite
b. Semi definite
c. Positive definite
d. Negative definite

50. A scalar function V(X) is said to be indefinite in region Ω if it asume
a. Positive values
b. Positive and Negative values in `Ω'
c. Negative value
d. Positive definite

51. What are the methods available for fiuding nonlinear continuocs time autonomous systems
a. The Krasovskii method
b. The variable Gradient method
c. Krasovskii & Variable Gradient method
d. Liupunov method

52. Standard (or) Canonic forms of systems have been proposed by _ _ _ _ _ _ _ _ _ _ _ _ _ for wich lyapunov functions have been developed
a. Lure & Letov
b. Gibson
c. Kravisokii
d. Lyapunov

53. Matrix 'P' is known to be symmetric there are only _ _ _ _ _ _ _ _ _ _ _ _ independent equations to be solved
a. (n+1)/2
b.
c.
d.

54. The nonlinear system is asymptotically stable at the origin if there exists a constant positive definite, symmetric matrix P such that
a. F = J_T (x) P + PJ(x)
b. F = J_T (x) P
c. F= PJ(x)
d. F = J_T (x) P + P_TJ (mathop x limits)

55. Which of the following provides a simple test for stability, without the need to solve for roots
a. Kravasiki
b. Gibson
c. Routh huriuitz
d. Lyapunov

56. Who suggest the variable gradient method for generating lyapunov function?
a. Krasovskii
b. Schultz & Gibson
c. Schultz
d. Gibson

57. In variable gradient method grad V (x) must be symmetric, the toral equations is
a.
b. n/2
c.
d.

58. Equilibrium stability of non linear autonomous system was studied using
a. Gibso
b. Kravosskii
c. Second method of Lyapvnov
d. Indirect method of lyapvnov

59. Lyapunov function is basically a generalization of _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

a. total system energy
b. energy
c. half system energy
d. 3/4 of system energy

60. Which of the following method provides necessary & sufficient conditions for stability?
a. Lyapunov indirect method
b. Lyapunov direct method
c. Gradient method
d. Kravoskii method

61. The feedback system is given by Y = X find the system is observable (or) controllable?
a. controllable
b. observable
c. controllable but not observable
d. not observable

62. Without loss of generality, the controllability matrix of system is
a.
b. U = [B:AB]
c. U = [A B]
d. U = [B AB$_T$]

63. The Lyapunov functions for linear systems result in a simple method for studying _ _ __ _ _ _ _ _ _ _ of systems
a. stcady state behaviour
b. transient behaviour
c. dynamic behaviour
d. stable

64. If system is controllable and b_i is the column of B, then there exists a feedback matrix k_i, such that the single input system mathop X limits. = (A + B Ki) X + b_i r_i is
a. not controllable
b. controllable
c. observable
d. not observable

65. Consider a SISO, mathop X limits.= X the system is
a. controllable
b. both controllable and observable
c. observable
d. not controllable

66. The pair { A+BK$_1$, b_1 } is
a. Observable
b. Controllable
c. Not observable
d. Not controllable

67. Consider a SISO system (mathop X limits) = X + U Y = X is the given system is observable (or) controllable?
a. observable & controllable
b. not observable
c. controllable
d. not controllable

68. Consider a SISO system (mathop X limits) = X + U Y = X is the system is controllable?
a. controllable, not observable
b. controllable
c. not controllable
d. observable not controllable

69. What is the main goal of a feedback design is
a. to improve the transient behaviour
b. not to improve stability
c. not to improve transient
d. improve dynamic behaviour

70. Who was presented the fundamental result on pole placement by state feedback?
a. Kravasokii
b. Wonham
c. Gibson
d. Lyapunov

71. The coefficients of the characteristic polynomial can be given by
a. (A+BK)
b.
c. (A + b)
d.

72. For a multi input system, there will be _ _ _ _ _ _ _ _ _ control laws which achieve the same pole configuration
a. One
b. Two
c. Many
d. Three

73. In SISO systems, while the poles are shifted by state feedback, the zero's remain _ _ _ _ _ _
a. changed
b. unchanged
c. unchanged after the introduction of state feedback
d. changed after the introduction of state feedback

74. The zero's can have a profound effect upon the shape of the _ _ _ _ _ _ _ _
a. steady state respone
b. transient response
c. dynamic response
d. stable response

75. The state feedback control law for pole placement is unique for _ _ _ _ _ _ _ _ _ _ _ _
a. single output system
b. multiple input systems
c. multiple output system
d. single input systems

76. Wonham showed that a controllable system is always pole assignable by appropriate _ _ _ _ _ _ _ _ _
a. input
b. output
c. state feedback
d. state forward path

77. The main goal of a feedback design is to stabilize
a. stable behaviour
b. stable plant
c. input
d. unstable plant

78. Who was developed time domain methods?
a. Kravasokii
b. Anderson
c. Gibson
d. Wonham's

79. In MIMO, the numerators ors of some elements of the transter function matrix will be changed after introducing _ _ _

_ _ _ _ _ _ _

a. state feedback
b. state forward path
c. forward path
d. feedback path

80. In full order observers, the measurement model may be written as _ _ _ _ _ _ _ _ _
a. Y = AX
b. Y =CX
c. Y = AX+BU
d. Y = MX

81. The differnce (t)=y(t)- (t) is multiplied by an nXq real constant matrix M, then this observer is
a. Asymptotic estimator
b. Estimator
c. Instable
d. Stable estimator

82. The output Y=CX, is compared with = C the difference (t) is
a. (t)=y(t)- (t) - y(t)
b. (t) = y(t) - (t)
c. (t) = (t) ± y(t)
d. (t) = X(t) - (t)

83. The dynamical equation of the asymptotic estimator is given by
a. (t) = A (t)
b. X(t) = AX +BU
c. (t) = A (t) + BU(t) - M (t)
d. (t) = M (t)

84. In full order observers, the state error vectors is
a. x(t) = (t)- X(t)
b. (t) = X(t) - (t)
c. y(t) = (t) -X(t)
d. mathop x limits. (t) = AX+BU

85. The pair {A,C } is observable, by duality the pair {A } is
a. Observable
b. Not observable
c. Not controllable
d. Controllable

86. In full order observer, the plant model of linear time invariant system is given by
a. mathop X limits. = AX + BU; X(0) = X_0
b. mathop X limits. = AX + BU
c. mathop X limits. =X (0)
d. mathop X limits. = AX + BU

87. In full order observer, the error will decay to 0 if M is chosen such that all the eigen values of the matrix (A+MC) lie in the _ _ _ _ _ _ _ _ _ _
a. RHS
b. On Imaginal
c. Left half plane
d. On centre

88. In full order observer, M is completely observable the matrix M is chosen _ _ _ _ _ _ __
a. Real value
b. Conjugate pairs
c. Complex value
d. Real & distinct

89. In full order observer, the gain matrix 'M' quite large, the observer very sensitive to any
a. Vibration
b. Observer noise
c. Noise
d. Parameter variation

90. In full order observer, the problem of determining a stable observer & the state feedback control law separately is called _ _ _ _ _ _ _ _ _
a. Separation principle
b. Controllable
c. Observable
d. Principle of superposition

91. An observer contains redundancy because 'q' state variable can be directly obtained from _ _ _ _ _ _ _ _ _
a. q input
b. 'q' output
c. P input
d. P output

92. In reduced order observer, the output vector may be expressed as _ _ _ _ _ _ _ _ _ _
a. Z = $C_{12} X_1$
b. Z = $C_{22} X_1$
c. Z = BU
d. Z = $A_{21} X_1$

93. The characteristic equation will become a_k (s) = s_2 - s+k_1 + k_2 s, the stability depends on
a. not depends on k_1 & k_2
b. choice of k_1
c. proper selection of k_2
d. proper choice of k_1 and k_2

94. The matrix (A-BK) decides the stability of the system, by properly selecting K the sytem is
a. Stable
b. Unstable
c. Asymptotically stable
d. Instability

95. In reduced order observer, apparent difficulty in implementing the observer is the differntiation of the _ _ _ _ _ _ _ _ _ _ _
a. Input 'X' is required
b. Input 'X' is not required
c. Output 'Y' is required
d. Output 'Y' is not required

96. In full order observer, state represent what is representation in reduced order observer?
a.
b. b
c.
d. b

97. In full order observer, state vector represented by A-what is representation of state vector in reduced order observer?
a.
b.
c.
d.

98. How to eliminate noise in full order observer?
a. LC filter
b. LC parallel filter

c. Kalman filter
d. RC filter

99. In reduced order observer has direct link from the observed
variable y(t) _ _ _ _ _ _ _
_ _ _ _

a. to the estimate state (t)
b. to the state X(t)
c. to the estimate state Y(t)
d. to the state Y(t)

100. In reduced order observer, the estimate (t) will be more sensitive to measurement errors in Y(t) than the setimate senerated by _ _ _ _ _ _ _ _ _

a. Observer
b. Full order observer
c. Reduced order observer
d. Output noise

101. If the inequality Δf= f(x)-f(x^*) 0 then the 'f' has an _ _ _ _ _
_
_

a. relative maximum
b. local minimum
c. relative minimum
d. absolute minimum

102. If the inequality Δf= f(x)-f(x^*) 0 the 'f' holds for all _ _ _ _ _
_
_

a. xε D
b. x D
c. x D
d. x D

103. What is the main theoretical approaches to the optimal control system design?

a. Calculus of variations
b. Optimal control
c. Control law
d. Trajectory form

104. Calculus of variations is used to finding of trajectories that
_ _ _ _ _ _ _ _ _ a given functional

a. Maximize
b. Minimize
c. Maximize or minimize
d. Optimize

105. The classical results are transformed into modern optimal
control framework through the introduction of _ _ _ _ _ _ _

a. feed back
b. plant equation constraints
c. feed forward path
d. control law

106. The optimal control is said to be in the _ _ _ _ _ _ _ _ _

a. Control function
b. Open loop form
c. Control law
d. Closed loop form

107. The Optimal control is said to be in the closed loop form and the function 'f' is
called the _ _ _ _

a. Open loop form
b. Control law
c. Optimal control law
d. Closed loop form

108. Calculus of variations is the branch of _ _ _ _ _ _ _ _ _

a. Chemistry
b. Physics
c. Science
d. Mathematics

109. The optimal control theory techniques as minimum principal of _ _ _ _ _ _ _

a. Pontryagin
b. Additive
c. Homogenity
d. Superposition

110. Algebraically, the maximization of a function implies the
_
_ _ _ _ _ _ _ _ _

a. Minimization of its negative
b. Minimization of positive
c. Maximize of negative
d. Maximize of positive

111. What is the increment of functional J ?

a. ΔJ = J(x^*)<0
b. ΔJ = J(x^*) 0
c. ΔJ = J (x) 0
d. ΔJ = J(x) -J(x^*)

112. A function 'f' is a linear function of 'q' if and only if it satisfies the principle of _ _
_ _ _ _ _ _

a. Additivity
b. Homogeneity
c. Additivity & Homogeneity
d. Non additivity

113. The domain of the functional is _ _ _ _ _ _ _ _ _

a. complex number
b. real number
c. complex conjugate
d. odd number

114. The set of all real numbers associated with the functions in 'Ω' is called the _ _ _
_ _ _

a. Range of Functional
b. Real Number
c. Complex Number
d. Boundary values

115. The principle of Homogeneity represents _ _ _ _ _ _ _

a. f(α q) = α f(q)
b. f(q) = αf (q)
c. f(α q) = f(q)
d. f(α q) ≠ αf(q)

116. The necessary condition for differentiable function 'f' at the point x^* be _ _ _ _ _

a. df(x,Δx)=0
b. df(x x)=0
c. df(x x) ≠0
d. d^2f(x, Δx) >0

117. What is a functional 'J' is a transformation ?

a. Mapping
b. Minimization
c. Maximization
d. Variation

118. A functional 'J' is a transformation that assigns to each function 'x' in a certain
class Ω is called _ _ _ _ _

a. Minimum number
b. Parameters
c. Domain of functional
d. Calculum of variation

119. The domain of a functional is a class of _ _ _ _ _ _ _ _ _ _
a. Vectors
b. Functions
c. Number
d. S col ars

120. A functional 'J' with domain Ω has a relative minimum for $x_*(t)$ if there is a neighbourhood of $x_*(t)$ such that _ _ _ _ _ _ _
a. for every x(t)
b. x(t) N
c. X(t)
d. X(t) ε M

121. is called _ _ _ _ _ _ _ _ _ _
a. Lagrangine equation
b. Euler equation
c. Tracking problem
d. Control problem

122. Find an extremal for the functional dt, boundary condition
x(0) = 0 &
x(π/2) =1
a. $x_*(t)$ = cos (t)
b. $x_*(t)$ = tan (t)
c. $x_*(t)$ = sin (t)
d. $x_*(t)$ = cot (t)

123. If the functional J(x) = ; ;then the function is _ _ _ _ _ _ _ _
_ _
a. Linear function
b. Non linear function
c. Quadratic function
d. Euler function

124. The fundamental theorem of the calculus of variations is if
x_* is an external, the variation of J must vanish on x_* _ _ _ _ _
a.
b.
c. for all admissible
d. = for all admissible

125. Functional of function is defined as _ _ _ _ _ _ _
a. J(x) =
b. J(x) =
c. J(x) =
d. J(x) =

126. The principle of additivity is _ _ _ _ _ _
a. f(α q) = α f(q)
b. f(q + q)≠ f(q + f(q
c. f(q + q) = f(q + f(q
d. f (α q) ≠ α f(q)

127. If f(t) = 5 t for all 't' , then the function is _ _ _ _ _ _ _ _ _
a. Linear function
b. Non Linear function
c. Quadratic function
d. Euler function

128. If the functional J(x) = ; ;then the function is _ _ _ _ _ _ _ _
_ _ to
a. Linear function
b. Non linear function
c. Quadratic function
d. Euler function

129. The fundamental theorem to determine extrema of functionals depending on a _ _ _ _ _ _ _ _ _
a. Single function
b. Double function
c. Euler function
d. Quadratic function

130. In control problems state trajectories are determined by _ _ _ _ _ _ _ _ _ _
a. Control Histories
b. Control Histories & Initial conditions
c. Initial Conditions
d. Functionals

131. In variational problem, $x(t_f)$ free, t_f specified what is the boundary conditions?
a. $X_*(t_0) = X_0$
b. $X(t_0) = X_0$
c. $X(t_0)=X_f$
d. $X_*(t_0)= X_0$,

132. Find a trajectory joining (t_0, x_0) to (t_1, x_1)such that the integral along this trajectory $x=x_*(t)$ given by
a.
b.
c.
d.

133. In variational problem, $x(t_f)$, t_f both specified what is the boundary conditions?
a. $X_*(t_0) = X_0$, $X^*(t_f)=X_f$
b. $X(t_0) = X_0$, $X_*(t_f)= X_f$
c. $X_*(t_0)= X_0$, $X(t_f)=X_f$
d. $X(t_0)=X_0$

134. In fixed end points problem, the necessary condition for $x_*(t)$ to extremize J(x), may be expressed as
a.
b.
c.
d.

135. What is Euler Lagrange equation in fixed end points problem?
a.
b.
c.
d.

136. The total increment in 'J' due to variation ' ' in 'x' is given by
a. J(x)= J(x+)
b. Δ J(x, δx) = Jx
c. Δ J (x, δx)= J(x+δx) - J(x)
d. Δ J (x, δx)= J(x+δx)

137. Find the Euler Lagrange equation for extremal of the functional J(x)=
a.
b.
c.
d.

138. In constrained minimization, the Euler-Lagrange equation must be satisfied by

external regardless of the _ _ _ _ _ _ _ _ _
a. Optimal control
b. Boundary condition
c. Augmented functional
d. Energy

139. In constrained minimization, a set of necessary conditions
for an (n+p)X1 Vector
function Z* to be an extremal for a functional of the form _ _ _ _
_ _ _ _ _
a. J(z)=
b. J(y)=
c. J(z)=
d. J(x)=

140. What is the assumption for obtain the solution of optimal control porblems?
a. U was unbounded
b. U was bounded
c. λ was unbounded
d. λ was bounded

141. What is optimal control law in continuous time linear regulators?
a. $U^*(t)=K(t)Y(t)$
b. $U^*(t)=X(t)$
c. $U^*(t)=K(t)X(t)$
d. U(t)=K(t)X(t)

142. What is optimal performance index in continuous time linear Regulator?
a.
b.
c.
d.

143. In minimum principle, U is unbounded, the control equation is _ _ _ _ _ _ _ _ _
a.
b.
c.
d.

144. In pontryagin's original work is referred to as the maximum principle because of
the sign difference in the definition of _ _ _ _ _ _ _ _ _
a. Hamiltonain
b. Euler
c. Cribson
d. Kravoskii

145. Who was modified Minimum prinicple?
a. Jordan
b. Jordan and polak
c. Euler
d. Gibson

146. Who is the most significant contribution to optimal control
theory?
a. Kravosiki
b. Cribson
c. Euler
d. Pontryagins

147. In control and state variable inequality constraints, the state constraints are of the form
a.
b.
c.
d.

148. The minimum principle has been applied to problems in _ _ _ _ _ _ _ _ _
a. Control Systems
b. Optimal Control Systems
c. Continuous time system
d. Discrete time system

149. Minimum prinicple is not universally valid for the case of _
_ _ _ _ _ _ _ _
a. Discrete time system
b. Optimal control system
c. SISO
d. Continuous time systems

150. What is linear continuous time state equations?
a. X=A(t)X(t)
b. (t)= A(t)X(t)+B(t)U(t)
c. (f)= B(t)U(t)
d. X(t)=AX+BO

151. _ _ _ _ _ _ _ _ _ _ _ _ is used to finding of trajectories that maximize (or)
minimize a given functional
a. Euler principle
b. Chemistry
c. Calculus of variations
d. Physics

152. To improve the transient behaviour by using _ _ _ _ _ _ _ _
_ _ _
a. Feed back design
b. Feed forward
c. Controller
d. Change inputs

153. In minimum control problem, what is the performance measure?
a.
b.
c.
d.

154. is performance measure given by _ _ _ _ _ _ _ _ _ _ _
a. Tracking problem
b. Energy problem
c. Fuel problem
d. Minimm time problem

155. Functions is a class of the _ _ _ _ _ _ _ _ _ _ _
a. Real number
b. Scolars
c. Vectors
d. Domain functional

156. The equilibrium state is said to be uniformly state the `δ' does not depends on _
_ _ _ _ _ _ _ _ _ _
a. t_0
b. t_1
c. $(t_1 - t_0)$
d. t_2

157. Missiles is the example of _ _ _ _ _ _ _ _ _ _ _
a. Tracking problem
b. Control problem
c. Energy problem
d. Minimum time problem

158. Jordan and Polak was modified _ _ _ _ _ _ _ _ _ _ _
a. Energy problem
b. Control problem
c. Minimum principle
d. Maximum principle
159. What is the special case of Tracking problem?
a. Fuel problem
b. Energy problem
c. Time problem
d. Regulator problem
160. In Rocket engine, Rate of fuel consumption is proportional to the _ _ _ _ _ _ _ _ _ _ _
a. Rate of thrust
b. Magnitude of thrust
c. Square thrust
d. Square of fuel consumption
161. is called the norm of the _ _ _ _ _ _ _ _ _ _ _
a. Vector
b. Scalar
c.
d. Vector
162. An optimal control is defined as one that _ _ _ _ _ _ _ _ _ _ the performance measure
a. Minimizes
b. Maximizes
c. Minimize (or) maximize
d. Minimize and maximize
163. To transfer a system from an arbitrary initial state to a specified target set S is
a. Medium time
b. Maximum time
c. Undetermined
d. Minimum time
164. The positive and negative deviations are equally undesirable, the error is _ _ _ _ _ _ _ _ _ _ _
a. 2 times
b. Squared
c. 3 times
d. 4 times
165. An admissible trajectory X^* is called an _ _ _ _ _ _ _ _ _ _ _
a. Optimal control
b. Optimal trajectory
c. Minimum control
d. Maxmum control
166. The optimal control problem is to find a control which causes the system _ _ _ _ _ _ _ _ _ _ _
a.
b.
c.
d.
167. The perfromance measure to be minimized is _ _ _ _ _ _ _ _ _ _ _
a. $J = t_f - t_0$
b. $J = t_2 - t_1$
c. $J = t_2$
d. $J = t_0 - t_f$
168. Which of the followifng is the example of minimum time problem?
a. Electric heater
b. Heat Exchanger
c. Missiles
d. Dash pot
169. A possible performance measure is represents _ _ _ _ _ _ _ _ _ _ _ problem
a. Minimum time
b. Minimum control
c. Minimum control
d. Tracking
170. An admissible control u^* is called an _ _ _ _ _ _ _ _ _ _ _
a. Optimal control
b. Optimal trajectory
c. Minimum control
d. Maximum control
171. What is first order, continuous time system state equation?
a.
b.
c.
d.
172. What is first order, discrete time system state equation?
a.
b.
c.
d.
173. The design of an optimal controller is based on the following factors relating to the _ _ _ _ _ _ _ _ _ _ _
a. Plant & nature of connection
b. Plant
c. Nature of connection
d. Optimal control
174. A regulator problem, the desired state values are _ _ _ _ _ _ _ _ _ _ _
a. r(t) = 0
b.
c. r(t) = 0 for all t
d. r(t) = 0 for all
175. In tracking problem a performance measure _ _ _ _ _ _ _ _ _ _ _
a.
b.
c.
d.
176. An optimal control exists it may be _ _ _ _ _ _ _ _ _ _ _
a. Unique
b. Non unique
c. Unique & Non unique
d. Unique or Non unique
177. A regulator problem is the special case of a
a. Minimum time problem
b. Minimum control problem
c. Tracking problem
d. Minimum energy problem
178. The Magnitude of thrust of the rocket engine is proportional to the _ _ _ _ _ _ _ _ _ _ _

a. Fuel consumption
b. Rate of fuel consumption
c. Inversily fuel consumption
d. Square of fuel consumpton

179. Optimal control theory is the set of _ _ _ _ _ _ _ _ _ _ _ _
a. State vector
b. Scalar values
c. State equations
d. State variables

180. Optimal control theory is the set of state equations which describes the behaviour of
a. Dynamics of plant
b. Dynamics of controller
c. Dynamics of whole system
d. Statics of plant

181. A state trajectory which satisfies the state variable constraints during the entire time interval [t_0, t_1] will be called _ _ _ _ _ _ _ _ _ _ _
a. Optimal control
b. Admissible control
c. Control law
d. Admissible trajectory

182. The performance index to be comes under _ _ _ _ _ _ _ _ _ _
a. Tracking problem
b. Minimum fuel problem
c. Minimum time problem
d. Minimum energy problem

183. Physical limitations of system components constraints on state variable and _ __ _ _ _ _ _ _ _ are frequently necessary
a. System components
b. State variable
c. Constraints
d. Control variable

184. A control which satisfies the control constraints during the entire control interval (t_0, t_1) of interest will be called _ _ _ _ _ _ _ _ _ _ _
a. Admissible trajectory
b. Control law
c. Admissible control
d. Optimal control

185. In Minimum Time Problem, the objective is to transfer a system from the initial state X_0 to the specified target sets in the _ _ _ _ _ _ _ _ _ _ _
a. Minimum time
b. Maximum time
c. Zero time
d. Infinite time

188. In minimum time problem the performance index to be minimized is _ _ _ _ _ _ _ _ _ _
a. $J = t_0 - t_1$
b. $J = t_1 - t_0$
c.
d.

189. What is example of minimum time problem?
a. Train
b. Bus
c. Aircraft
d. Car

190. The performance index to be , comes under _ _ _ _ _ _ _ _ _ _
a. Tracking problem
b. Minimum fuel problem
c. Minimum time problem
d. Minimum energy problem

191. What is the examples of minimum time problem?
a. Car
b. Missiles
c. Bus
d. Train

194. Relative to the desired state X_1, quantity can be viewed is the _ _ _ _ _ _ _ __ _ _
a. Instantaneous error
b. Integral square error
c. Instantaneous system error
d. Square error

195. Which of the following with a minimum expenditure of energy?
a. Minimm time problem
b. Tracking problem
c. Fuel problem
d. Minimum energy problem

196. Number of problems $u_2(t)$ is measure of instantaneous rate of expenditure of _ __ _ _ _ _ _ _ _
a. Power
b. Energy
c. Workdone
d. Tracking problem

197. Which of the following problem is in connection with the analysis of rocket propelled space craft?
a. Minimum Time Problem
b. Tracking problem
c. Minimum fuel problem
d. Minimum Energy problem

198. The rate of fuel consumption of a jet engine is proportional to the _ _ _ _ _ _ _ _ _ _
a. Energy
b. Mass
c. Fuel
d. Thrust developed

199. The performance index to be comes under _ _ _ _ _ _ _ _ _ _
a. Mini time problem
b. Minimum fuel problem
c. Minimum energy problem
d. Tracking problem

200. Which of the following with the minimum integral square error?
a. Tracking problem
b. Energy problem
c. State Regulator Problem