

University of Mumbai

Examination June 2021

Examinations Commencing from 15th June 2021 to 26th June 2021

Program: S.E. (Electronics & Telecommunication) (REV. -2019 'C' Scheme) (Choice Based)

Curriculum Scheme: Rev2019 Examination: SE Semester: III

Course Code: ECC305 and Course Name: ELECTRONIC INSTRUMENTATION & CONTROL SYSTEMS

Time: 2 Hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The open loop transfer function is given below. Find the value of K which will cause sustained oscillations in the system and also find frequency of oscillation. $G(s) = \frac{K}{s(s+3)(s^2+s+1)}$
Option A:	K=2.437 and frequency of oscillation=0.866 rad/sec
Option B:	K=0.866 and frequency of oscillation= 2.437rad/sec
Option C:	K=2.437 and frequency of oscillation=2.437 rad/sec
Option D:	K=1.437 and frequency of oscillation=2.437 rad/sec
2.	When the number of poles is equal to the number of zeroes, how many branches of root locus tends towards infinity?
Option A:	1
Option B:	2
Option C:	0
Option D:	Equal to number of zeroes
3.	The system with the open loop transfer function $G(s) = \frac{K}{s(s+1)}$. is:
Option A:	Type 2 and order 1
Option B:	Type 1 and order 1
Option C:	Type 0 and order 0
Option D:	Type 1 and order 2
4.	A unity feedback system has $G(s) = \frac{K}{s(s+1)}$. The input to the system is described by $r(t) = 4 + 6t + 2t^2$. Find the steady-state error.
Option A:	zero
Option B:	infinity
Option C:	six
Option D:	Minus infinity
5.	Given a unity feedback system with $G(s) = \frac{K}{s(s+4)}$. What is the value of K for a damping ratio of 0.5?
Option A:	1
Option B:	16
Option C:	4
Option D:	2

6.	The Laplace transform of a parabolic signal is
Option A:	1
Option B:	A/s
Option C:	A/s ²
Option D:	A/s ³
7.	Which of the following transfer function will have the greatest maximum overshoot?
Option A:	$\frac{9}{s^2+2s+9}$
Option B:	$\frac{16}{s^2+2s+16}$
Option C:	$\frac{25}{s^2+2s+25}$
Option D:	$\frac{36}{s^2+2s+36}$
8.	Hey's bridge can be used for
Option A:	measurement of inductance
Option B:	measurement of capacitance and inductance
Option C:	measurement of resistance
Option D:	measurement of voltage and current
9.	The output of a transducer must
Option A:	be different at different environment conditions
Option B:	be same at all environment conditions
Option C:	be same at some environment conditions
Option D:	be zero always
10.	The principle of operation of LVDT is based on the variation of
Option A:	Mutual inductance
Option B:	Self-inductance
Option C:	Reluctance
Option D:	Permanence
11.	Thermistor is a transducer with _____ temperature coefficient
Option A:	Negative
Option B:	Positive
Option C:	Zero
Option D:	One
12.	_____ is the example of photo emissive cell
Option A:	LDR
Option B:	Photodiode
Option C:	Photomultiplier tube
Option D:	Photo transistor
13.	Examine the stability of the system having characteristic equation: $2s^4+s^3+3s^2+5s+10=0$ using Routh's criterion.

Option A:	Unstable with two poles RHS of s-plane
Option B:	Unstable with one poles RHS of s-plane
Option C:	Marginally stable with complex conjugate pole on imaginary axis
Option D:	stable with all poles on LHS of s-plane
14.	The characteristic equation of a system is given as $s^3+25s^2+10s+50=0$. How many roots are in the right half s-plane and the imaginary axis respectively?
Option A:	1,1
Option B:	0,0
Option C:	2,1
Option D:	1,2
15.	The second order system is defined by $T(s) = \frac{25}{s^2+5s+25}$. Find the settling time
Option A:	1.3
Option B:	1.6
Option C:	1.4
Option D:	1.2
16.	Schering bridge is used for
Option A:	low voltages only
Option B:	low and high voltages
Option C:	high voltages only
Option D:	intermediate voltages only
17.	Step signal is the signal whose values is:
Option A:	It is varying for all the time values greater than zero
Option B:	Determinate at zero
Option C:	It is varying for all the time values less than zero
Option D:	Indeterminate at zero
18.	The output of a transducer should be
Option A:	exponential
Option B:	Unit step
Option C:	Non-linear
Option D:	linear
19.	The position and velocity errors of a type-2 system are
Option A:	constant, constant
Option B:	constant, infinity
Option C:	zero, constant
Option D:	zero, zero
20.	A control system in which the control action is dependent on the output is known as
Option A:	Closed loop system
Option B:	Semi closed loop system
Option C:	Open system
Option D:	Dummy system

Q2.	Solve any Two Questions out of Three	10 marks each
A	Find $C(s)/R(s)$ for the given system using block diagram reduction technique. <div style="text-align: center;"> </div>	
B	A unity feedback system has $G(s) = \frac{100}{s(s+1)(s+2)}$. Draw the bode plot and hence find the gain margin and phase margin.	
C	Explain in detail the working principle of LVDT and explain its application.	

Q3.	Solve any Two Questions out of Three	10 marks each
A	Find the transfer function using Mason's gain formula <div style="text-align: center;"> </div>	
B	For the given unity feedback system, Sketch the Root Locus and comment on the system stability. $G(s)H(s) = \frac{k}{s(s+1)(s+5)}$	
C	Explain measurement of inductance using Maxwell bridge. Also list the application of it.	

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	C
Q3.	D
Q4	C
Q5	B
Q6	D
Q7	D
Q8.	A
Q9.	B
Q10.	A
Q11.	A
Q12.	C
Q13.	A
Q14.	B
Q15.	B
Q16.	B
Q17.	D
Q18.	D
Q19.	C
Q20.	A