University of Mumbai
Examination 2020 under cluster Vidyavardhini's College of Engg & Tech

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016 (CBCGS)

Examination: Second Year Semester IV

Course Code: ELX402 Course Name: Electronic Devices and Circuits II

Time: 1hour **Max. Marks: 50**

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Note:

1. All Questions are compulsory and carry equal marks.

2. Assume suitable data wherever necessary.

Q1.	Which of the following is not an improvement if negative feedback is introduced in a CE amplifier circuit?
Option A:	Higher input impedance
Option B:	Better stabilized voltage gain
Option C:	Improved frequency response
Option D:	Improved voltage gain
Q2.	Determine the voltage gain with feedback for a voltage-series feedback having A = –1000, Rin = 175 kΩ, Ro = 2.5 kΩ, and a feedback of β = –0.25.
Option A:	3.85
Option B:	–3.85
Option C:	–9.09
Option D:	9.09
Q3.	In a RC phase-shift oscillator, the gain of the amplifier stage must be greater than _____ to satisfy Barkhausen's criteria.
Option A:	19
Option B:	29
Option C:	30
Option D:	1
Q4.	The frequency of a Wien bridge oscillator is dependent on the following components?
Option A:	R1 and C1
Option B:	C1 and C2
Option C:	R1, R2, C1, and C2
Option D:	R1 and R2
Q5.	An amplifier incorporates negative feedback using voltage-shunt feedback connection. This feedback will result in _____
Option A:	Increased input impedance and increased output impedance
Option B:	Increased input impedance and decreased output impedance
Option C:	Decreased input impedance and increased output impedance

Option D:	Decreased input impedance and decreased output impedance
Q6.	Which of the following capacitances does not affect the low frequency response of an RC coupled CE amplifier?
Option A:	Input coupling capacitance
Option B:	AC bypass capacitance
Option C:	output coupling capacitance
Option D:	Millers capacitance
Q7.	An amplifier has a input impedance of 1.2 kΩ. The input coupling capacitor is 1 µF. Determine the approximate lower cutoff frequency.
Option A:	133 KHz
Option B:	1.33 kHz
Option C:	13.3 kHz
Option D:	133 Hz
Q8.	The frequency at which the magnitude of the short circuit current gain of RC coupled voltage amplifier goes to 1 (one) is called as _____.
Option A:	Critical frequency
Option B:	Beta cut-off frequency
Option C:	Alpha cut-off frequency
Option D:	Unity-gain frequency
Q9.	The overall bandwidth of two identical voltage amplifiers connected in cascade Will _____ .
Option A:	Be better if stage gain in low and worse if stage gain is high
Option B:	Be worse than that of a single stage
Option C:	Remain the same as that of a single stage
Option D:	Be better than that of a single stage
Q10.	If three amplifiers with voltage gains of 10db, 25db and 20db are cascaded together, what will be the overall voltage gain?
Option A:	5500db
Option B:	550db
Option C:	55db
Option D:	5000db
Q11.	RC coupling is not used in amplifiers to amplify extremely low frequencies, because of _____ .
Option A:	Electrical size of the coupling capacitor
Option B:	Low efficiency
Option C:	There is considerable power loss
Option D:	There is a hum in the output
Q12.	The overall gain of a multistage amplifier is less than the product of the gains of individual stages due to _____ .
Option A:	The use of many capacitors

Option B:	Loading effect of the next stage
Option C:	The use of many transistors
Option D:	Power loss in the coupling device
Q13.	_____ coupling is used to amplify d.c. signal in a multistage amplifier.
Option A:	Transformer
Option B:	RC
Option C:	Impedance
Option D:	Direct
Q14.	A differential amplifier has a differential gain of 2000 and a common mode gain of 0.2. The CMRR in dB is equal to _____ .
Option A:	400
Option B:	80
Option C:	40
Option D:	10000
Q15.	If output is measured between two collectors of transistors, then the Differential amplifier with two input signal is said to be configured as _____ .
Option A:	Single Input Balanced Output
Option B:	Dual Input Unbalanced Output
Option C:	Dual Input Balanced Output
Option D:	Dual Input Unbalanced Output
Q16.	To increase the value of CMRR, which circuit is used to replace the emitter resistance R_E in differential amplifier?
Option A:	Constant current bias
Option B:	Diode in parallel with Re
Option C:	Resistor in parallel with Re
Option D:	Resistor in series with Re
Q17.	A widlar current source is used
Option A:	to get high value of CMRR
Option B:	to get low voltage gain
Option C:	to get low value of current
Option D:	to get high value of Output
Q18.	CE amplifier is used as a large signal class A amplifier because_____ .
Option A:	it has very high input impedance
Option B:	it has very high output impedance
Option C:	it is very much stable
Option D:	it has very high voltage gain
Q19.	The DC operating (Q) point in class B amplifier lies in _____ region.
Option A:	Cut off
Option B:	Active
Option C:	Between saturation and active

Option D:	Saturation
Q20.	If DC power for a Class A amplifier is 1000W and AC power is 300W, what is its efficiency?
Option A:	30%
Option B:	50%
Option C:	20%
Option D:	75%
Q21.	Cross over distortion occurs in power amplifiers because of the following:
Option A:	due to resistors
Option B:	due to Inductors
Option C:	due to Capacitors
Option D:	switching of transistors after every half cycle
Q22.	The structure of the IGBT is a
Option A:	P-N-P-N structure connected by a MOS gate
Option B:	N-P-N-P structure connected by a MOS gate
Option C:	P-N-P structure connected by a MOS gate
Option D:	N-N-P-P structure connected by a MOS gate
Q23.	When a reverse bias voltage exceeding the breakdown voltage is applied to an IMPATT diode, it results in:
Option A:	thermal runaway
Option B:	avalanche multiplication
Option C:	break down of depletion region
Option D:	high reverse saturation current
Q24.	The negative resistance region in UJT characteristics lies between_____.
Option A:	after valley point
Option B:	between peak and valley points
Option C:	before peak point
Option D:	in all regions
Q25.	The control element of an SCR is _____.
Option A:	Anode supply
Option B:	Anode
Option C:	Gate
Option D:	Cathode

University of Mumbai
Examination 2020 under cluster Vidyavardhini's College of Engg & Tech

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016 (CBCGS)

Examination: Second Year Semester IV

Course Code: ELX404 Course Name: Digital System Design

Time: 1 hour **Max. Marks: 50**

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Note:

1. All Questions are compulsory and carry equal marks.

2. Assume suitable data wherever necessary.

Q1.	A _____ is type synchronous sequential circuit whose output values are determined only by its present state.
Option A:	Mealy Machine
Option B:	Moore Machine
Option C:	Asynchronous machine
Option D:	Finite State Machine
Q2.	Which of the following is not basic component of ASM chart?
Option A:	State box
Option B:	Transition Table
Option C:	Decision box
Option D:	Conditional output box
Q3.	MSI Chip IC74169 is the
Option A:	Synchronous 4 bit UP/DOWN Binary counter
Option B:	Synchronous Decade UP/DOWN Binary counter
Option C:	Synchronous 4 bit UP Binary counter
Option D:	Asynchronous 4 bit UP/DOWN Binary counter
Q4.	Which of the following is type of signal assignment operator?
Option A:	: =
Option B:	<=
Option C:	==
Option D:	!=
Q5.	Which of the following line is correct for detecting rising edge of a clock?
Option A:	if (clk'EVENT AND clk = '0')
Option B:	if (clk'EVENT AND clk = '1')
Option C:	if (clk'EVENT OR clk = '0')
Option D:	if (clk'EVENT OR clk = '1')
Q6.	CPLD Stands for
Option A:	Common Programmable Logic Device

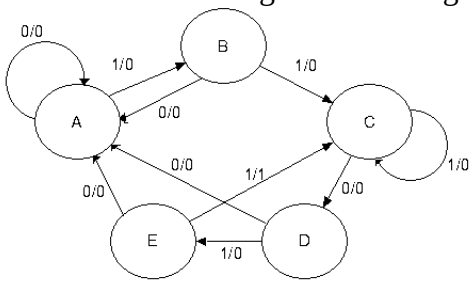
Option B:	Complex Programmable Level Device
Option C:	Complex Programmable Logic Device
Option D:	Complete Programmable Logic Device
Q7.	_____ is not a type state reduction technique.
Option A:	Inspection
Option B:	K-map
Option C:	Implication Chart
Option D:	Partition
Q8.	_____ box indicates the effect of input on control subsystem.
Option A:	State Box
Option B:	Data Box
Option C:	Control Box
Option D:	Decision Box
Q9.	IC7493 consist of
Option A:	Mod 2 counter and Mod 5 Counter
Option B:	Only Mod 8 counter
Option C:	Mod 2 and Mod 4 counter
Option D:	Mod 2 and Mod 8 Counter
Q10.	In VHDL, PROCESS is a _____ statement.
Option A:	Sequential
Option B:	Concurrent
Option C:	Conditional
Option D:	Functional
Q11.	Identify type of library specified in following statement. `use IEEE.std_logic_1164.all;`
Option A:	Use
Option B:	IEEE
Option C:	.all
Option D:	std_logic_1164
Q12.	In _____ both OR array and AND arrays are programmable.
Option A:	Programmable logic array
Option B:	Programmable array logic
Option C:	Programmable level array
Option D:	Programmable Adder Logic
Q13.	How many state variables required to represent 3 states?
Option A:	2
Option B:	1
Option C:	3
Option D:	4

Q14.	How many flipflops required to design Moore machine sequence detector for sequence "1011"
Option A:	3
Option B:	2
Option C:	4
Option D:	5
Q15.	ASM Chart has
Option A:	4 exits
Option B:	3 exits
Option C:	2 exits
Option D:	Any number of exits
Q16.	Condition: IC74163 , CLR=ENP=ENT=1 , LD=0, ABCD=1010 , What is Output at pin QD, QC,QB,QA
Option A:	1010
Option B:	0101
Option C:	1100
Option D:	0010

Q17.	The architecture describes _____ digital circuit implemented by _____ modeling.
	ARCHITECTURE my_arch OF my_design IS
	BEGIN
	y1 <= a xor b xor c;
	y2 <= (a and b) or (a and c) or (b and c);
	END my_arch;

Option A:	Half adder, behavioral
Option B:	Full adder, behavioral
Option C:	Half adder, dataflow
Option D:	Full adder, dataflow
Q18.	What kind of logic is represented by the given code? ARCHITECTURE my_function of my_logic is BEGIN Y <= x SRL 2; END my_function;
Option A:	Divide by 2
Option B:	Divide by 4
Option C:	Multiply by 2
Option D:	Multiply by 4
Q19.	FPGA consist of CLB's, CLB uses _____ to generate _____.
Option A:	LUT, input
Option B:	Look up table, output
Option C:	input, output
Option D:	LUT, LUT

Q20. Write state table for given state diagram.



Option A:

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
A	A	B	0	0
B	A	C	0	0
C	D	C	0	0
D	A	E	0	0
E	A	C	0	1

Option B:

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
A	B	B	1	0
B	A	C	0	0
C	C	C	0	0
D	B	E	0	0
E	E	C	0	1

Option C:

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
A	A	A	0	0
B	A	C	0	0
C	D	C	0	1
D	B	E	0	0
E	A	C	0	1

Option D:

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
A	A	B	0	0
B	A	C	0	0
C	D	E	0	0
D	A	E	0	0
E	A	C	0	1

Q21. What logic circuit is described by the following code?

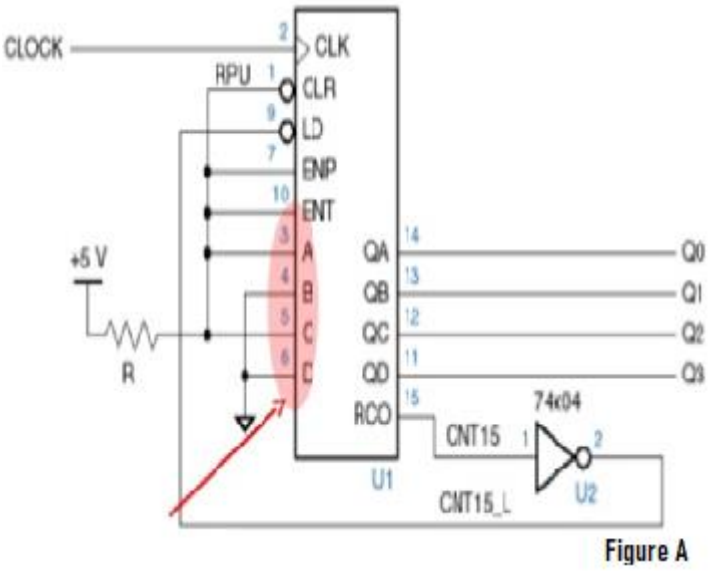
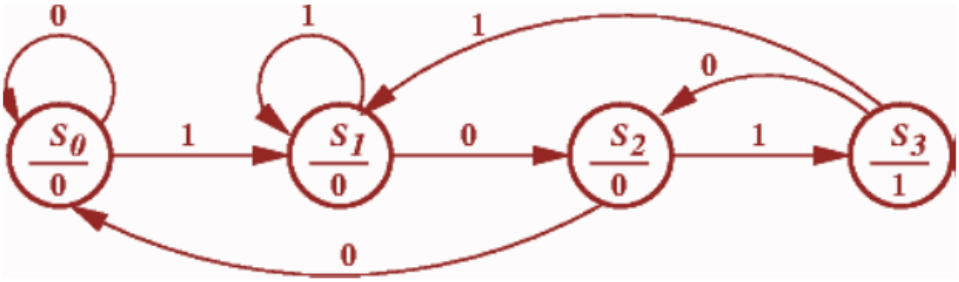
```
ARCHITECUTRE my_circuit OF my_logic IS
BEGIN
WITH ab SELECT
Y <= x0 WHEN "00';
        x1 WHEN "01";
        x2 WHEN "10";
        x3 WHEN "11";
END my_circuit;
```

Option A: Multiplexer

Option B: Demultiplexer

Option C: Decoder

Option D: Encoder

Q22.	Identify type of counter design using IC74163.  Figure A
Option A:	MOD 11 Counter with Count sequence from 5,6,7,8,9,10,11,12,13,14,15,5-15.
Option B:	MOD 11 Counter with Count sequence from 0,1,2,3,4,5,6,7,8,9,10,11.
Option C:	MOD 11 Counter with Count sequence from 0,1,2,3,4,5,6,7,8,9,10
Option D:	MOD 11 Counter with Count sequence from 5,6,7,8,9,10,11,12,13,14.
Q23.	What is Characteristics equation of D flipflop?
Option A:	$Q_n = Q_{n+1}$
Option B:	$Q_{n+1} = Q_n$
Option C:	$Q_{n+1} = D_n$
Option D:	$Q_n = \overline{Q_{n+1}}$
Q24.	Identify type of machine and the sequence? 
Option A:	Mealy machine, 101
Option B:	Moore machine, 101
Option C:	Mealy machine, 1010
Option D:	Moore machine, 1010
Q25.	IC74194, MR=1 , S0=1 ,S1= 0 ,DSL=X ,DSR=1, Initial output is

	Q0,Q1,Q2,Q3 =0 0 0 0 , What should be the output after 3 rd clock pulse applied
Option A:	1000
Option B:	1100
Option C:	1110
Option D:	1111

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Examination 2020 under cluster Vidyavardhini's College of Engg & Tech

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016 (CBCGS)

Examination: Second Year Semester IV

Course Code: ELX403 **Course Name: Microprocessors and Applications.**

Time: 1 hour **Max. Marks: 50**

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Note:

1. All Questions are compulsory and carry equal marks.

2. Assume suitable data wherever necessary.

Q1	8086 microprocessor has _____ bit Arithmetic Logic Unit.
Option A:	64
Option B:	32
Option C:	8
Option D:	16
Q2	8086 microprocessor has _____ byte pre-fetch queue in bus interface unit.
Option A:	6
Option B:	4
Option C:	2
Option D:	3
Q3	8086 microprocessor can access _____ segments at a time.
Option A:	1
Option B:	4
Option C:	3
Option D:	2
Q4	For which addressing mode, the offset address of the operands is directly specified in the instruction?
Option A:	Register
Option B:	Implied
Option C:	Direct
Option D:	Immediate
Q5	_____ string instruction is used to load AL/AX register with a byte / word from data segment.
Option A:	LODS
Option B:	STOS
Option C:	CMPS
Option D:	SCAS

Q6	Which instruction forms 2's complement of the specified destination in the instruction?
Option A:	NOT
Option B:	NEG
Option C:	CMP
Option D:	DAA
Q7	The end of a macro can be represented by _____directive.
Option A:	END
Option B:	ENDS
Option C:	ENDP
Option D:	ENDM
Q8	Which interrupt occurs whenever there is division error?
Option A:	INT 0
Option B:	INT 2
Option C:	INT 3
Option D:	INT 4
Q9	In 8086 microprocessor the total size of Interrupt vector table is _____
Option A:	1KB
Option B:	2KB
Option C:	128 KB
Option D:	256KB
Q10	If MN/$\overline{MX}$is low then 8086 operates in ----------mode.
Option A:	Minimum
Option B:	Maximum
Option C:	Multiprocessor
Option D:	Single processor
Q11	In 8086 maximum mode, _____ bus controller is used to generate memory and I/O control signals
Option A:	8286
Option B:	8288
Option C:	8284
Option D:	8087
Q12	_____ is multiprocessor mode of 8086.
Option A:	Minimum mode
Option B:	Maximum mode
Option C:	Master mode
Option D:	Master-Slave mode
Q13	$\overline{DEN}$ pin of 8086 is _____

Option A:	Direct Enable
Option B:	Data Entered
Option C:	Data Enable
Option D:	Data Encoding
Q14	8255 is known as _____
Option A:	Programmable Interrupt Controller
Option B:	Programmable Peripheral Interface
Option C:	Direct Memory Access Controller
Option D:	Programmable Interval Timer
Q15	In the I/O mode, the 8255 ports work as _____
Option A:	reset pins
Option B:	set pins
Option C:	programmable I/O ports
Option D:	only output ports
Q16	The number of vector interrupts provided by 8259 in a cascade mode is _____
Option A:	8
Option B:	16
Option C:	32
Option D:	64
Q17	In 8259, the register that stores all the interrupt requests in it in order to serve them one by one on a priority basis is _____
Option A:	Interrupt Request Register
Option B:	In-Service Register
Option C:	Priority resolver
Option D:	Interrupt Mask Register
Q18	The _____ pin is used by DMAC to request the microprocessor to release the system bus.
Option A:	HLDA
Option B:	HRQ
Option C:	ADSTB
Option D:	DACK
Q19	How many modes of data transfer 8237 has?
Option A:	2
Option B:	4
Option C:	6
Option D:	8
Q20	Pentium processor has _____ pipelines.
Option A:	Two

Option B:	Three
Option C:	Four
Option D:	Six
Q21	The instruction cache of Pentium processor is
Option A:	read-only cache
Option B:	write only cache
Option C:	read-write cache
Option D:	write back cache
Q22	In Pentium's super scalar architecture, the number of instructions that are executed per clock cycle is _____
Option A:	0
Option B:	1
Option C:	1.5
Option D:	2
Q23	The unit that is used to implement the multiple branch prediction in Pentium is ____
Option A:	control unit
Option B:	bus interface unit
Option C:	branch target buffer
Option D:	branch instruction register
Q24	The stage in which the CPU fetches the instructions from the instruction cache in super-scalar organization is_____
Option A:	Prefetch stage
Option B:	D1 (first decode) stage
Option C:	D2 (second decode) stage
Option D:	Final stage
Q25	When branch prediction is not correct and if the branch is executed in the U-pipeline then cycle penalty incurred is _____
Option A:	4 cycle penalty is incurred
Option B:	3 cycle penalty is incurred
Option C:	1 cycle penalty is incurred
Option D:	2 cycle penalty is incurred

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Examination 2020 under cluster Vidyavardhini's College of Engg & Tech

Program: Electronics Engineering
Curriculum Scheme: Rev2016 (CBCGS)
Examination: Second Year Semester IV

Course Code: ELX401 **Course Name: Applied Mathematics-IV**
Time: 1 hour **Max. Marks: 50**

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Note:
1. All Questions are compulsory and carry equal marks.
2. Assume suitable data wherever necessary.

Q1.	Find the extremal of $\int_{x_1}^{x_2} \frac{y'^2}{x} dx$
Option A:	$y = c_1x^3 + c_2$
Option B:	$y = c_1x^2 + c_2$
Option C:	$y = c_1x + c_2$
Option D:	$y = c_1x^3 + c_2x$
Q2.	The necessary condition for the functional $\int_{x_1}^{x_2} f(x, y, y', y")$ to be extremum is
Option A:	$\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y}\right)=0$
Option B:	$\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right)=0$
Option C:	$\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right) - \frac{d^2}{dx^2}\left(\frac{\partial f}{\partial y"}\right)=0$
Option D:	$\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right) + \frac{d^2}{dx^2}\left(\frac{\partial f}{\partial y"}\right)=0$
Q3.	The curve represents shortest distance between two points is a
Option A:	Straight line
Option B:	Parabola
Option C:	Exponential curve
Option D:	NONE
Q4.	For vector u=(2,3,0) and v=(4,2,1) which of the following holds
Option A:	$\|u \cdot v\| > \|\|u\| \cdot \|\|v\|\|$
Option B:	$\|u \cdot v\| = \|\|u\| \cdot \|\|v\|\|$
Option C:	$\|u \cdot v\| < \|\|u\| \cdot \|\|v\|\|$
Option D:	$\|u \cdot v\| < \|\|u\| \cdot \|\|u\|\|$
Q5.	Find the value of k for which u=(k,k,3) and v=(k,-6,3) are orthogonal
Option A:	k=-3
Option B:	k=3
Option C:	k=1
Option D:	k=2
Q6.	If W is subset of 2X 2 matrices of the form $\begin{bmatrix} a & 0 \\ 0 & b \end{bmatrix}$ and V is the set of all 2X2 matrices then

Option A:	W is a subspace of V
Option B:	W is not a subspace of V
Option C:	V is a subspace of W
Option D:	Both are same
Q7.	$V = R^2$ with addition and scalar multiplication given by $(x_1, y_1) + (x_2, y_2) = (x_1 + x_2, 0)$; $k(x_1, y_1) = (kx_1, ky_1)$ is not a vector space as
Option A:	There is no additive identity
Option B:	There is no additive inverse
Option C:	V is not closed under addition
Option D:	V is not closed under multiplication
Q8.	$\lambda = 5$ is the eigenvalue of $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$. The eigenvector corresponding to eigenvalue $\lambda = 5$ is
Option A:	$[1 \ -1 \ 0]'$
Option B:	$[1 \ 2 \ 3]'$
Option C:	$[1 \ 1 \ 1]'$
Option D:	$[1 \ 0 \ -1]'$
Q9.	The set of all eigen vectors corresponding to a matrix is always
Option A:	Linearly dependent
Option B:	Linearly independent
Option C:	Not necessarily dependent
Option D:	Not necessarily independent
Q10.	$\begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}$ is similar to which of the following matrix?
Option A:	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$
Option B:	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$
Option C:	$\begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -3 \end{bmatrix}$

Option D:	$\begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$
Q11.	IF A $= \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ then eigen values of $3\,A^{-1} + 2A + I$ are
Option A:	-2,10
Option B:	-4, 8
Option C:	-5,7
Option D:	-1,3
Q12.	If the matrix A has eigen value -1 repeated twice then algebraic multiplicity of A is
Option A:	-1
Option B:	0
Option C:	1
Option D:	2
Q13.	If k is a constant, 'E' denotes expectation, 'V' denotes variance then which of the following is true?
Option A:	E (k) = 0, V(k) = 0
Option B:	E (k) = k, V(k) = 0
Option C:	E (k) = 0, V(k) = k
Option D:	E (k) = k, V(k) = k
Q14.	What is r -th Moment about origin μ'_r
Option A:	$E(x)^r$
Option B:	$E(x)^2$
Option C:	$E(x)^3$
Option D:	$E(x)^0$
Q15.	A die is thrown two times. What is the Probability that the sum neither 8 nor 9
Option A:	1/9
Option B:	¼
Option C:	¾
Option D:	5/9
Q16.	If mean is 4 and variance is 3 in Binomial distribution. Find number of trials in experiment
Option A:	16
Option B:	12
Option C:	4
Option D:	6
Q17.	A continuous random variable with p.d.f $f(X) = kx^2, 0 \leq x \leq 1$then k is
Option A:	4
Option B:	¼

Option C:	3
Option D:	1/3
Q18.	Evaluate rank correlation coefficient for the following data: X : 12 17 22 27 32 Y : 113 119 117 115 121
Option A:	0.2
Option B:	0.4
Option C:	0.5
Option D:	0.6
Q19.	The lines of regression are $6Y = 5X + 90$ and 15X=8Y+130. The coefficient of correlation r=?
Option A:	6/5
Option B:	15/8
Option C:	1.5
Option D:	2.25
Q20.	If r denotes coefficient of correlation then which of the following is true.
Option A:	$-\infty \leq r \leq \infty$
Option B:	$-1 \leq r \leq 1$
Option C:	$0 \leq r \leq \infty$
Option D:	$r > 1$
Q21.	Which of the following represents the poles of $f(z) = \frac{z^2+1}{1-z^2}$
Option A:	$1, i$
Option B:	0
Option C:	± 1
Option D:	$\pm i$
Q22.	Which of the following is the value of $\oint \frac{e^z}{z-2} dz$ along C, where C is $\|z\| = 3$?
Option A:	0
Option B:	$2\pi ie^2$
Option C:	$2\pi ie$
Option D:	$2\pi i$
Q23.	If f(z) is analytic and $f'(z)$ is continuous at all points inside and on a simple closed curve C, then which of the following statement is correct?
Option A:	$\oint_C f(z)\, dz = 1$
Option B:	$\oint_C f(z)\, dz = 2\pi i$
Option C:	$\oint_C f(z)\, dz = 0$
Option D:	$\oint_C f(z)\, dz \neq 0$

Q24.	Which of the following represents the singularities of $f(z) = \frac{z-3}{(z-1)(z-2)}$?
Option A:	$z = 3$
Option B:	$z = 1, 2$
Option C:	$z = -1, -2$
Option D:	$z = 0$
Q25.	If $z = z_0$ is a simple pole of f(z), then which of the following represents Residue of f(z) at $z = z_0$?
Option A:	$\lim_{z \to z_0} f(z)$
Option B:	$\lim_{z \to z_0} (z - z_0) f(z - z_0)$
Option C:	$\frac{1}{(m-1)!} \lim_{z \to z_0} \frac{d^{m-1}}{dz^{m-1}} (z - z_0) f(z)$
Option D:	$\lim_{z \to z_0} (z - z_0) f(z)$

University of Mumbai

Examination 2020 under Cluster 06

(Lead College: Vidyavardhini's College of Engg Tech)

Examinations Commencing from 23rd December 2020 to 6th January 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2016

Examination: SE Semester IV

Course Code: **ELX406** and Course Name: **Linear Control Systems**

Time: 2 hour Max. Marks: 80

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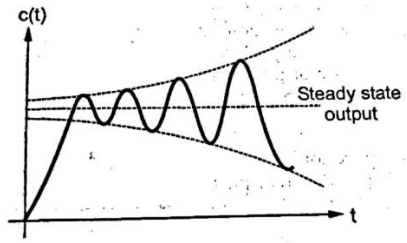
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	An automatic toaster is a _____ loop control system.
Option A:	Open
Option B:	Closed
Option C:	Partially closed
Option D:	None of the Options
2.	Transfer function of a system is defined as the ratio of output to input in
Option A:	Z-Transform
Option B:	Fourier Transform
Option C:	Laplace Transform
Option D:	Time domain
3.	In signal flow graph, a feedback loop consisting of only one node is called as
Option A:	Non-touching loop
Option B:	Touching loop
Option C:	Self-loop
Option D:	Forward path
4.	If for second order system damping factor is less than one, then system response will be
Option A:	Undamped

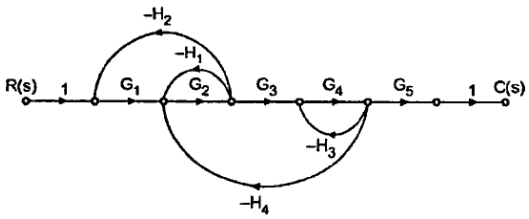
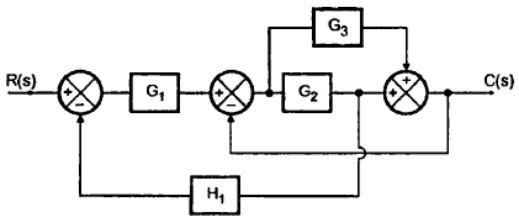
Option B:	Overdamped
Option C:	Critically damped
Option D:	Under damped
5.	'Type' of the system means
Option A:	Number of zeros at origin of an open loop transfer function
Option B:	Number of zeros at origin of a closed loop transfer function
Option C:	Number of poles at origin of an open loop transfer function
Option D:	Number of poles at origin of a closed loop transfer function
6.	Step signal is a signal whose value
Option A:	Increases linearly with time
Option B:	Remains constant with time for time greater than zero
Option C:	Varies exponentially with time
Option D:	Decreases linearly with time
7.	The state of the dynamic system is determined using
Option A:	State variables
Option B:	State space
Option C:	State vector
Option D:	State scalar
8.	State space analysis is applicable even if the initial conditions are _____
Option A:	Equal
Option B:	Unequal
Option C:	Zero
Option D:	Non-zero
9.	The minimum number of state variables required to describe an 'n^{th}' order differential equation are:
Option A:	n-1

Option B:	n
Option C:	n+1
Option D:	n/2
10.	State model of a linear system is described by
Option A:	State equation
Option B:	Output equation
Option C:	State equation and output equation
Option D:	Transfer Function
11.	The response of the system is as shown in the fig. The system is_____ 
Option A:	Stable
Option B:	Unstable
Option C:	Marginally stable
Option D:	Critically stable
12.	If number of open loop poles are greater than the number of open loop zeros than number of branches in root locus plot will be equal to
Option A:	Number of open loop poles
Option B:	Number of open loop zeros
Option C:	Open loop poles - Open loop zeros
Option D:	Open loop poles + Open loop zeros
13.	In Routh's stability criterion, the number of sign changes in the first column of Routh's array indicates
Option A:	Number of roots lying on the imaginary axis
Option B:	Number of roots lying in the left half of the s-plane

Option C:	Number of roots lying in the right half of the s-plane
Option D:	None of the Options
14.	Cut off frequency is the frequency at which the magnitude of the closed loop response is_____from its zero frequency value.
Option A:	-3dB
Option B:	+3dB
Option C:	-1dB
Option D:	+1dB
15.	To apply Nyquist stability criterion, polar plot of _____is used
Option A:	Characteristic equation
Option B:	Closed loop transfer function
Option C:	Open loop transfer function
Option D:	State model
16.	A system is said to be unstable when gain crossover frequency is _____ the phase crossover frequency
Option A:	Less than
Option B:	Greater than
Option C:	Equal to
Option D:	None of the Options
17.	Frequency response of a system is defined as
Option A:	Steady state response to step input
Option B:	Steady state response to sinusoidal input
Option C:	Steady state response to ramp input
Option D:	Steady state response to impulse function
18.	MRAC stands for
Option A:	Model Reference Advance Control

Option B:	Model Robust Adaptive Control
Option C:	Model Reference Adaptive Control
Option D:	Model Robust Advance Control
19.	Which of the following is an input to the controller?
Option A:	Servo signal
Option B:	Reference input
Option C:	Sensed signal
Option D:	Error signal
20.	Lead compensator_____ the bandwidth of the closed loop system.
Option A:	Increases
Option B:	Decreases
Option C:	Does not change
Option D:	None of the Options

Q2 **(20 Marks Each)**	
A	**Solve any Two** **5 marks each**
i.	State and prove the properties of state transition matrix.
ii.	Define the steady state error and derive its expression for a simple closed loop system.
iii.	Comment on the stability of the system with characteristic equation $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$ using Routh's criterion.
B	**Solve any One** **10 marks each**
i.	Sketch the root locus for the system with open loop transfer function as: G(s)H(s)=k/s(s+5)(s+10)
ii.	Check the controllability and observability for the system:

	$\dot{x} = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & 3 \\ 1 & 1 & 1 \end{bmatrix} x + \begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix} u, y = \begin{bmatrix} 1 & 3 & 0 \end{bmatrix} x$
Q3 **(20 Marks Each)**	
A	**Solve any Two** **5 marks each**
i.	Using Mason's gain formula, determine the transfer function C(s)/R(s) for the signal flow graph shown in fig. 
ii.	A second order system has peak overshoot of 50% and period of oscillations of 0.2 sec in step response. Determine i) Resonant peak and ii) Resonant frequency
iii.	Write a short note on PID controllers.
B	**Solve any One** **10 marks each**
i.	Sketch the polar plot for the system with open loop transfer function as G(s)H(s)=12/s(s+1)(s+2)
ii.	Determine the transfer function C(s)/R(s) using block diagram reduction technique for the block diagram shown in the fig. 

University of Mumbai
Examination 2020 under cluster Vidyavardhini's College of Engg & Tech

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016 (CBCGS)

Examination: Second Year Semester IV

Course Code: ELX405 **Course Name: Principles of Communication Engineering**

Time: 1 hour **Max. Marks: 50**

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Note:

1. All Questions are compulsory and carry equal marks.

2. Assume suitable data wherever necessary.

Q1.	In a communication system, where noise get added?
Option A:	During regeneration of signal
Option B:	At transmitting antenna
Option C:	At the receiving end
Option D:	In the channel
Q2.	Frequencies in the UHF range normally propagate by means of
Option A:	Surface waves
Option B:	Space waves
Option C:	Ground waves
Option D:	Sky waves
Q3.	In overmodulation, modulation index (m) is-
Option A:	1
Option B:	Less than 1
Option C:	Greater than 1
Option D:	In between 0 to 1
Q4.	The noise due to random behavior of charge carriers is called as-
Option A:	Flicker Noise
Option B:	Shot Noise
Option C:	Industrial Noise
Option D:	Partition Noise
Q5.	The most commonly used filters in SSB generation are-
Option A:	Mechanical
Option B:	RC
Option C:	LC
Option D:	Low-pass
Q6.	Vestigial sideband is most commonly used in-
Option A:	Radio transmission

Option B:	Radio Propagation
Option C:	Television transmission
Option D:	Telephony
Q7.	The peak voltage of an AM signal goes from Emax to Emin. The modulation index, m, is:
Option A:	(Emax – Emin) / (Emax + Emin)
Option B:	(Emax + Emin) / (Emax – Emin)
Option C:	Emax / Emin
Option D:	Emin / Emax
Q8.	The equation for full-carrier AM is:
Option A:	$(E_c \times E_m) \times \sin(\omega_m t) \times \sin(\omega_c t)$
Option B:	$(E_c + E_m) \times \sin(\omega_c t)$
Option C:	$(E_c + E_m) \times \sin(\omega_m t) + \sin(\omega_c t)$
Option D:	$(E_c + E_m \sin(\omega_m t)) \times \sin(\omega_c t)$
Q9.	The "envelope" of an AM signal is due to:
Option A:	The baseband signal
Option B:	The modulated signal
Option C:	The carrier signal
Option D:	The amplitude signal
Q10.	The relation between bandwidth B, modulating frequency fm and frequency deviation Δf for a sinusoidally modulated FM signal is
Option A:	B = fm – Δf/
Option B:	B = 2(fm – Δf)
Option C:	B = 2(Δf + fm)
Option D:	B = Δf + fm
Q11.	The FM broadcast band is from-
Option A:	550 to 1600 kHz
Option B:	88 to 108 MHz
Option C:	88 to 108 kHz
Option D:	1600 kHz to 59.75 MHz
Q12.	Indicate the false statement regarding the Armstrong modulation system-
Option A:	Equalization is unnecessary
Option B:	The system is basically phase, not frequency modulation,
Option C:	Frequency multiplication must be used
Option D:	AFC is not needed, as crystal oscillator is used.
Q13.	A pre-emphasis circuit provides extra noise immunity by-
Option A:	Boosting the bass frequencies
Option B:	Pre amplifying the whole audio band
Option C:	Converting the phase modulation to FM
Option D:	Amplifying the higher audio frequencies

Q14.	In a broadcast superheterodyne receiver, the
Option A:	Local oscillator frequency is normally double the IF
Option B:	Local oscillator operates below the signal frequency
Option C:	Mixer input must be tuned to the signal frequency
Option D:	RF amplifier normally works at 455 kHz above the carrier frequency
Q15.	One of the main functions of the RF amplifier in a superheterodyne receiver is to-
Option A:	Provide improved tracking
Option B:	Increase the tuning range of the receiver
Option C:	Improve the rejection of the image frequency
Option D:	Increase the tuning range of the receiver
Q16.	A superheterodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz. The image frequency is
Option A:	2100 kHz
Option B:	900 kHz
Option C:	800 kHz
Option D:	750 kHz
Q17.	Sensitivity is defined as-
Option A:	Ability to reject unwanted signals
Option B:	Ability to convert incoming signal into Image Frequency
Option C:	Ability to reject noise
Option D:	Ability of receiver to amplify weak signals
Q18.	A band-limited signal with a maximum frequency of 5 KHz to be sampled. According to the sampling theorem, the sampling frequency which is not valid is-
Option A:	12 KHz
Option B:	5 KHz
Option C:	15 KHz
Option D:	20 KHz
Q19.	Which of the following pulse modulation systems is analog?
Option A:	PWM
Option B:	Differential PCM
Option C:	PCM
Option D:	Delta
Q20.	A distorted signal of frequency fm is recovered from a sampled signal if the sampling frequency fs is-
Option A:	fs=2fm
Option B:	fs>2fm
Option C:	fs<2fm
Option D:	fs>=2fm

Q21.	Calculate the minimum sampling rate to avoid aliasing when a continuous time signal is given by $x(t) = 5 \cos 400\pi t$
Option A:	100 Hz
Option B:	200 Hz
Option C:	300 Hz
Option D:	400 Hz
Q22.	Each signal in an FDM signal-
Option A:	Serves as a subcarrier
Option B:	Modulates the main carrier
Option C:	Is mixed with all the others before modulation
Option D:	Modulates the final carrier
Q23.	Quantizing noise occurs in-
Option A:	Pulse-width modulation
Option B:	Frequency division multiplex
Option C:	Pulse-code modulation
Option D:	Time-division multiplex
Q24.	The sharing of a medium and its link by two or devices is called _____.
Option A:	Modulation
Option B:	Encoding
Option C:	Line discipline
Option D:	Multiplexing
Q25.	To separate channels in an FDM receiver, it is necessary to use-
Option A:	Bandpass filters
Option B:	AND gates
Option C:	Differentiation
Option D:	Integration

University of Mumbai

Examinations Commencing from 23rd December 2020 to 6th January 2021

Program: Electronics Engineering

Curriculum Scheme: Rev2016 (CBCGS)

Examination: Second Year Semester IV

Course Code: ELX401 and Course Name: Applied Mathematics-IV

Time: 2 hour Max. Marks: 80

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Note : Q1 carrying 40 marks. Q2 and Q3 are carrying 20 equal marks.

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
Q1.	Brachistocrone Problem is
Option A:	Minimal Surface area Problem
Option B:	Shortest Time Problem
Option C:	Shortest Distance Problem
Option D:	Solid of revolutionProblem
Q2.	If $f(x,y,y')$ is independent of y then the Euler Lagrange equation becomes
Option A:	$\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y}\right)=0$
Option B:	$\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right)=0$
Option C:	$\frac{\partial f}{\partial y'}$=C
Option D:	$f - y' \frac{\partial f}{\partial y'} = C$
Q3.	If $u = (u_1, u_2, u_3, \ldots u_n)$ and $v = (v_1, v_2, v_3, \ldots v_n)$ are any two vectors in R^n then which of the following holds
Option A:	$\lvert u \cdot v \rvert \leq \lVert u \rVert \cdot \lVert v \rVert$
Option B:	$\lvert u \cdot v \rvert > \lVert u \rVert \cdot \lVert v \rVert$
Option C:	$\lvert u \cdot v \rvert \geq \lVert u \rVert \cdot \lVert v \rVert$
Option D:	$\lvert u \cdot v \rvert = \lVert u \rVert \cdot \lVert v \rVert$ for all u,v
Q4.	Find the value of k for which u=(2,1,3) and v=(1,7,k) are orthogonal
Option A:	k=-3
Option B:	k=3
Option C:	k=1
Option D:	k=2
Q5.	The set of matrices of order 2x2 of the form $\begin{bmatrix} a & 0 \\ 0 & b \end{bmatrix}$ with usual addition and scalar multiplication is a vector space. Then what will be the additive identity?
Option A:	$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
Option B:	$\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$
Option C:	$\begin{bmatrix} a & 0 \\ 0 & b \end{bmatrix}$

Option D:	$\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$
Q6.	The characteristic equation of the matrix $\begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -5 & -2 \end{bmatrix}$ is
Option A:	$(x-1)(x-2)(x+2)=0$
Option B:	$(x+2)(x+2)(x+1)=0$
Option C:	$(x-2)(x-2)(x-1)=0$
Option D:	$(x-1)(x-1)(x-2)=0$
Q7.	The eigen values of matrix A are 1,-1,2, then the eigen values of A^2-3A+I are respectively
Option A:	-1,5,-1
ption B:	5,-1,11
Option C:	1,1,4
Option D:	-2,4,-2
Q8.	$\lambda=-3$ is the eigenvalue of $A=\begin{bmatrix} -2 & 5 & 4 \\ 5 & 7 & 5 \\ 4 & 5 & -2 \end{bmatrix}$. The eigenvector corresponding to eigenvalue $\lambda=-3$ is
Option A:	$[1\ -1\ 0]'$
Option B:	$[1\ 2\ 3]'$
Option C:	$[1\ 1\ 1]'$
Option D:	$[1\ -1\ 1]'$
Q9.	$\begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$ is similar to which of the following matrix?
Option A:	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{bmatrix}$
Option B:	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 5 \end{bmatrix}$
Option C:	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$
Option D:	$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$
Q10.	A continuous random variable has probability density function $f(x)=1-\frac{4}{x^2}$, $x\geq 2$, and $f(x)=0$ otherwise. Find mean
Option A:	2
Option B:	½
Option C:	4
Option D:	-1/2

Q11.	The r -th Moment of the probability distribution X about origin is
Option A:	$E(X^r)$
Option B:	$E(X)^3$
Option C:	$E(X^2)$
Option D:	$E(X)$
Q12.	If V(X)=5 Find V(3X+2)=?
Option A:	15
Option B:	17
Option C:	47
Option D:	45
Q13.	If mean is 2 and variance is 1 in Binomial distribution. Find number of trials in experiment.
Option A:	16
Option B:	6
Option C:	4
Option D:	3
Q14.	If coefficient of regression $b_{xy} > 1$ then
Option A:	$b_{yx} > 1$
Option B:	$b_{yx} < 1$
Option C:	$b_{yx} = 1$
Option D:	$b_{yx} = 0$
Q15.	What does it imply if coefficient of correlation is zero
Option A:	Perfect positive correlation
Option B:	positive correlation
Option C:	negative correlation
Option D:	No correlation
Q16.	Evaluate $\int_z 2z\,dz$, where C is upper half of the circle |z|=1
Option A:	1
Option B:	-1
Option C:	0
Option D:	$i\pi$
Q17.	Evaluate $\int_C \frac{z+6}{z^2-4}\,dz$, where C is the circle $\|z\| = 1$
Option A:	$i\pi$
Option B:	0
Option C:	$2\,i\pi$
Option D:	π
Q18.	Find the residue of $\frac{e^z}{(z-1)^3}$ at its pole
Option A:	e/2
Option B:	E
Option C:	e/6

Option D:	e/4
Q19.	The nature of singularity of $f(z) = z^{-2}e^{z}$ has
Option A:	essential singularity at z=0
Option B:	removable singularity at z=0
Option C:	z=0 is a pole of order 2
Option D:	z=0 is a pole of order -2
Q20.	If f(z) is analytic in and on closed counter C then $\int_C f(z)dz$=?
Option A:	1
Option B:	0
Option C:	$2\,i\pi$
Option D:	π

Q2. (20 Marks)	**Solve any Four out of Six** **5 marks each**
A	Use Rayleigh Ritz Method to solve boundary value problem $\int_0^1 \left(y^2 - y'^2 + 2xy\right) dx$ with y(0) =0 , y(1) = 0
B	Construct an orthonormal basis for the subspace of $R^3$by applying Gram-Schmidt process where S={(1,2,0),(0,3,1)}
C	Show that A=$\begin{bmatrix} 7 & 4 & -1 \\ 4 & 7 & -1 \\ -4 & -4 & 4 \end{bmatrix}$is derogatory.
D	A discrete random variable has the probability density function: X: -2, -1, 0, 1, 2, 3 P(X=x): 0.2, k, 0.1, 2k, 0.1, 2k Find k, mean and variance.
E	Calculate Spearman's rank correlation coefficient from the following data X: 18, 20, 34, 52, 12 Y: 39, 23, 35, 18, 46
F	Expand $f(z) = \frac{z-1}{z^2-2z-3}$ about z=0 for 1<|Z|<3

Q3.(20 Marks)	**Solve any Four out of Six** **5 marks each**
A	Find the extremal of $\int_0^1 (xy + y^2 - 2y^2y')\,dx$
B	Show that the set of vectors of the form (a,b,c) where b=a+c form a subspace of R^3under the usual addition and scalar multiplication.
C	Find A^{-1} by using Cayley-Hamilton theorem if $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$
D	A manufacturer known from his experience that the resistance of resistors he produces is normal with $\mu = 100$ ohms and standard deviation σ=2 ohms. What percentage of resistors will have resistance between 98 ohms and 102 ohams?
E	The equations of regression lines are 3x+2y=26 and 6x+y=31. Find mean $\bar{x}, \bar{y}$ and coefficient of correlation r.
F	Evaluate $\int_C \frac{2z-1}{2(2z+1)(z+3)}$dz using residue theorem, where C is |Z|=1.

University of Mumbai
Examination 2020 under cluster Vidyavardhini's College of Engg & Tech

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016 (CBCGS)

Examination: Second Year Semester IV

Course Code: ELX406 Course Name: LINEAR CONTROL SYSTEMS

Time: 1hour **Max. Marks: 50**

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Note:

1. All Questions are compulsory and carry equal marks.

2. Assume suitable data wherever necessary.

Q1.	For an open loop system, which of the following is incorrect
Option A:	It is cheap
Option B:	Errors are large
Option C:	Systems are accurate
Option D:	output is independent of control input
Q2.	A control system in which control action issome how dependent on the output is called
Option A:	Open loop system
Option B:	Closed loop system
Option C:	Semi-closed loop system
Option D:	Semi-open loop system
Q3.	In a positive feedback system, overall gain will be
Option A:	Decreased
Option B:	Increased
Option C:	Zero
Option D:	unaffected
Q4.	In force current analogy, spring is analogous to
Option A:	C
Option B:	1/C
Option C:	L
Option D:	1/L
Q5.	The transfer function of the circuit

Option A:	R+RCs
Option B:	1/(1+RCs)
Option C:	R+ 1/Cs
Option D:	R+Cs
Q6.	What is the overall transfer function of a positive unity feedback system with forward gain as G
Option A:	G/(1+GH)
Option B:	G/(1+G)
Option C:	GH/(1+G)
Option D:	G/(1-G)
Q7.	The overall transfer function of the block diagram is
Option A:	(G1-G2)/(1+H)
Option B:	(G1+G2)/(1+H)
Option C:	G1G2/(1+G1G2H)
Option D:	G1G2/(1-G1G2H)
Q8.	Which of the following is not a rule of root locus plot
Option A:	The root locus starts from open loop pole
Option B:	The number of separate branches is equal to number of open loop poles or zeroes
Option C:	Root locus is symmetrical about the imaginary axis
Option D:	The root locus branches are finally parallel to the asymptotes.
Q9.	In root locus plots, the angle of asymptotes is calculated by_____, where P= no of poles, Z = no of zeros, k=0,1,2…..
Option A:	(2k+1)180/(P+Z)
Option B:	(2k+1)180/(P-Z)
Option C:	(k+1)180/(P-Z)
Option D:	(k+1)180/(P+Z)
Q10.	The Bode plot for a numerator term (1+5s), will have a corner frequency of _____ and change of slope at the corner frequency will be _____
Option A:	5, 20db/d

Option B:	1/5, 20db/d
Option C:	5, -20db/d
Option D:	1/5, -20db/d
Q11.	In Bode plot, there is a corner frequency of 0.5 and at that frequency ther change f slope is -40db/d, this indicates presence of term_____ in _____
Option A:	$(4+s^2)$, numerator
Option B:	(1+4s), denominator
Option C:	$(4+s^2)$, numerator
Option D:	$(1+4s^2)$, denominator
Q12.	The open loop transfer function of a unity feedback system is $G(s) = \frac{50}{(1+0.1s)(s+10)}$, Find Kp.
Option A:	2
Option B:	0
Option C:	5
Option D:	0.2
Q13.	What is the type of system for a unity feedback $G(s) = \frac{10(s+1)}{s^2(s+2)(s+10)}$
Option A:	2
Option B:	5
Option C:	10
Option D:	4
Q14.	For a phase lead network,
Option A:	Pole is nearer to the origin
Option B:	Pole is in the right half of s-plane
Option C:	Zero is nearer to the origin
Option D:	Zero is in the right half of s-plane
Q15.	Which of the following is not true for a phase lead network
Option A:	Band width reduces
Option B:	Speed of response increases
Option C:	Overshoot reduces
Option D:	Steady state error does not show improvement.
Q16.	When a zero is added in the forward path, which of the following is not true
Option A:	Band width increases
Option B:	Time rise reduces
Option C:	Settling time reduces
Option D:	System becomes more stable
Q17.	According to the property of state transition method, e^0 is equal to
Option A:	I

Option B:	A
Option C:	e^{-At}
Option D:	$-e^{-At}$
Q18.	The state model for G(s)= $1/(s^2+5s+6)$ can be
Option A:	$A = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix}$; B=$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$
Option B:	$A = \begin{bmatrix} 0 & 1 \\ 6 & -5 \end{bmatrix}$; B=$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$
Option C:	$A = \begin{bmatrix} 0 & 1 \\ -6 & 5 \end{bmatrix}$; B=$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$
Option D:	$A = \begin{bmatrix} 0 & 1 \\ 6 & 5 \end{bmatrix}$; B=$\begin{bmatrix} 0 \\ 1 \end{bmatrix}$
Q19.	Which of the following will be a stable system, according to Nyquist criteria
Option A:	Gain margin= positive, phase margin= negative
Option B:	Gain margin= negative, phase margin= negative
Option C:	Gain margin= positive, phase margin= positive
Option D:	Gain margin= negative, phase margin= positive
Q20.	The closing of Nyquist plot from $\omega = -j0 \; to \; \omega = j0$ depends on
Option A:	Type of system
Option B:	Number of poles
Option C:	Number of zeros
Option D:	Difference between nom of poles and zeros.
Q21.	Transfer function is defined as the laplace transform of output divided by the laplace transform of input with initial conditions as
Option A:	0
Option B:	1
Option C:	10
Option D:	infinite
Q22.	For given characteristics equation which having roots on right hand side
Option A:	$s^2 + 4s + 1$
Option B:	$s^2 - 4s + 1$
Option C:	$s^3 + 4s^2 + 3s + 1$
Option D:	6s+1
Q23.	In root locus plots, the breakaway points are calculated by equating
Option A:	dK/ds=1
Option B:	dK/ds=180
Option C:	dK/ds=infinite

Option D:	dK/ds=0
Q24.	What are the error coefficients for $G(S) = \frac{40(S+2)}{S(S+1)(S+4)}$
Option A:	Kp = ∞ , Kv =20 , Ka = 0
Option B:	Kp = 20 ,Kv = ∞ , Ka = 0
Option C:	Kp = 0 ,Kv =20 , Ka =∞
Option D:	Kp = ∞ , Kv = 0, Ka = 20
Q25.	which is not the static error coefficient
Option A:	$K\,p = \lim_{s\to 0} G(S)H(S)$
Option B:	$K\,v = \lim_{s\to 0} S\,G(S)H(S)$
Option C:	$K\,a = \lim_{s\to 0} S2\,G(S)H(S)$
Option D:	$K\,r = \lim_{s\to 0} S3\,G(S)H(S)$