Watumull Institute of Electronic Engg.& Computer Tech.

Sample paper for Examinations Commencing from 7th January 2021 to 20th January

Program: EXTC

Curriculum Scheme: Rev 2012/2016/2020

Examination: Second Year Semester III

Course Code: ECC301 and Course Name: Applied Mathematics-III

Time: 2 hour Max. Marks: 80

==========

All the Questions are compulsory and carry equal marks.

Q1.	Inverse Laplace transform of $f(s) = \frac{s}{s+1}$ is
Option A:	$\delta(t) - e^{-t}$
Option B:	$H(t) - e^{t}$
Option C:	$\delta(t) + e^{t}$
Option D:	$H(t) + e^{t}$
Q2.	Given $f(t) = \sin at$,then Laplace transform of $f'(t)$ is
Option A:	0
Option B:	$\frac{s}{s^2 + a^2}$
Option C:	$\frac{as}{s^2 + a^2}$
Option D:	$\frac{s}{(s^2 + a^2)^2}$
Q3.	Three non zero vectors $\bar{a}$, $\bar{b}$ & $\bar{c}$ are coplanar if $[\bar{a}, \bar{b}, \bar{c}]$ is
Option A:	0
Option B:	$\neq 0$
Option C:	1
Option D:	-1
Q4.	The coefficient a_0 in Fourier series expansion of $f(x) = x^2$, $(0,\ 2\pi)$ is
Option A:	0
Option B:	$\frac{4\pi^2}{3}$
Option C:	$\frac{\pi^2}{4}$
Option D:	$\frac{\pi}{2}$
Q5.	If imaginary part of $f(z) = u + iv$ is $e^x \sin y$, then $f(z)$ is
Option A:	e^{iz}
Option B:	e^{-iz}
Option C:	e^{-z}
Option D:	e^{z}

Q6.	Laplace transform of $f(t) = e^t \sin 2t$ is
Option A:	$\frac{2}{s^2 - 2s + 5}$
Option B:	$-\frac{2}{s^2 - 2s + 5}$
Option C:	$\frac{s}{s^2 + 2s + 5}$
Option D:	$\frac{s + 1}{s^2 + 2s + 5}$
Q7.	Fourier coefficient b_n in expansion of $f(x) = \lvert x \rvert \sin x$ in interval (-π, π) is
Option A:	$\frac{\pi(-1)^n}{n}$
Option B:	$\frac{\pi}{n}(-1)^{n+1}$
Option C:	0
Option D:	$\frac{\pi^2}{n}$
Q8.	If $f(z) = r^2 \cos 2\theta + i \sin p\theta$ is an analytic function ,then value of p is,
Option A:	1
Option B:	0
Option C:	2
Option D:	4
Q9.	Inverse Laplace transform of $f(s) = \frac{1}{s(s+4)}$ is
Option A:	$\frac{1 + e^{-4t}}{t}$
Option B:	$\frac{1 + e^{4t}}{t^2}$
Option C:	$\frac{1 - e^{-4t}}{4}$
Option D:	$\cos 4t$
Q10.	If $f(z) = u + iv$ is a harmonic function , then it will satisfy the differential equation
Option A:	$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$
Option B:	$\frac{\partial^2 u}{\partial x^2} - \frac{\partial^2 u}{\partial y^2} = 0$
Option C:	$\frac{\partial^2 u}{\partial z \partial \bar{z}} = 0$
Option D:	$\frac{\partial^2 v}{\partial x^2} - \frac{\partial^2 v}{\partial y^2} = 0$
Q11.	If $\emptyset = (x^2 + y^2 + z^2)$ then $grad\ \emptyset$ at (1,1,1,)
Option A:	0
Option B:	$2\hat{\imath} + 2\hat{\jmath} + 2\hat{k}$
Option C:	$\frac{2\hat{\imath} + 2\hat{\jmath} + 2\hat{k}}{\sqrt{8}}$
Option D:	$\sqrt{8}$

Q12.	If $f(x) = \cos x$ defined in $(-\pi, \pi)$then the value Fourier coefficient b_n is
Option A:	0
Option B:	π
Option C:	$\frac{\pi}{(n^2-1)}$
Option D:	$\frac{2\pi}{(n^2-1)}[(-1)^n - 1]$
Q13.	If a vector $\bar{F}$ is conservative then,
Option A:	$curl\ (\bar{F}) = 0$
Option B:	$grad\ \bar{F} = 0$
Option C:	$div\ \bar{F} = 0$
Option D:	$curl(grad\ \bar{F}) = 0$
Q14.	A vector field $\bar{F}$ is solenoidal then ,
Option A:	$curl\ \bar{F} = 0$
Option B:	$div\ \bar{F} = 0$
Option C:	$grad\ \bar{F} = 0$
Option D:	$curl(grad\ F) = 0$
Q15.	If $\bar{F} = x^2\hat{\imath} + xy\hat{\jmath}$ then $\int \bar{F}.d\bar{r}$, along x-axis from $x = 0$ $to\ x = 1$ is
Option A:	$\frac{2}{3}$
Option B:	$\frac{1}{3}$
Option C:	$\frac{1}{2}$
Option D:	$\frac{7}{12}$
Q16.	Complex form of Fourier series in interval (-1,1) is
Option A:	$\sum_{-\infty}^{\infty} c_n e^{\frac{in\pi x}{L}}$
Option B:	$\sum_{n=1}^{\infty} c_n e^{in\pi x}$
Option C:	$\sum_{-\infty}^{\infty} c_n e^{in\pi x}$
Option D:	$\sum_{-\infty}^{\infty} c_n e^{nx}$
Q17.	The value of integral $\int_0^{\infty} \frac{e^{-t}\sin t}{t} dt$ is
Option A:	$\frac{\pi}{2}$
Option B:	$\frac{\pi}{4}$
Option C:	π
Option D:	1
Q18.	If $\nabla.\bar{F} = 3$ then $\iint \bar{F}.Nds$, throughout the unit sphere

Option A:	3π
Option B:	5π
Option C:	4π
Option D:	6π
Q19.	Half range sine series of a function $f(x)$ in $(0,\ l)$ is given by
Option A:	$\sum_{n=1}^{\infty} b_n \sin\frac{n\pi x}{l}$
Option B:	$b_0 + \sum_{n=1}^{\infty} b_n \sin\frac{n\pi x}{l}$
Option C:	$a_0 + \sum_{n=1}^{\infty} b_n \sin\frac{n\pi x}{l}$
Option D:	$a_0 - \sum_{n=1}^{\infty} b_n \sin nx$
Q20.	Image of a circle $\lvert z\rvert = a$ under the transformation $w = z = 3 + 2i$ is a
Option A:	$Circle$
Option B:	$Ellipse$
Option C:	$Hyperbola$
Option D:	$Straight\ line$

Q2. **(20 Marks)**	**Solve any Four out of Six (5 marks each)**
A	*Find the inverse Laplace Transform of* $\frac{s^2}{(s^2+a^2)(s^2+b^2)}$
B	*Find the Fourier constant* a_n *for* $f(x) = x^2$, *where* $0 \le x \le a$.
C	*Find the analytic function* $f(z)$ *whose imaginary part is* $v = \frac{y}{x^2+y^2}$.
D	*Find the inverse Laplace Transform of* $\log(\frac{s+1}{s-1})$
E	Using Green's Theorem evaluate $\int_c (e^{x^2} - xy)dx - (y^2 - ax)dy$, where C is the circle $x^2 + y^2 = a^2$.
F	*Obtain the complex form of Fourier series for* $f(x) = e^{-ax}$ *in* $(-\pi, \pi)$.

Q3. **(20 Marks)**	**Solve any Four out of Six (5 marks each)**
A	*Evaluate* $\int_0^\infty \frac{Cosat - Cosbt}{t} dt$.
B	Find the total work done in moving a particle in the force field $\bar{F} = 3xy\hat{\imath} - 5z\hat{\jmath} + 10x\hat{k}$ *along x=*$t^2 + 1, y = 2t^2, z = t^3$ *from t=1 to t=2.*
C	*Find* $L\{e^{5t} + 4t^3\}$
D	Show that $\bar{f} = (2xyz^2)i + (x^2z^2 + z\cos yz)j + (2x^2yz + y\cos yz)k$, is conservative .Find scalar potential φ.
E	*Determine the constants a, b, c, d if* $f(z) = x^2 + 2axy + by^2 + i(cx^2 + 2dxy + y^2)$ *is analytic.*
F	Prove that $f_1(x) = 1$, $f_2(x) = x$, $f_3(x) = \frac{3x^2-1}{2}$ are orthogonal over (-1,1).

Watumull Institute of Electronic Engg.& Computer Tech.

Sample paper for Examinations Commencing from 7th January 2021 to 20th January

Program: **EXTC**

Curriculum Scheme: Rev2019

Examination: SE SemesterIII

Course Code: ECC302 and Course Name: Electronic Devices and Circuits

Time: 2 hours Max. Marks: 80

==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks 40 Marks**
1.	The diode current equation expresses the relationship between the current flowing through the diode as a function of .....
Option A:	Beta
Option B:	Reverse saturation current
Option C:	Voltage applied across it
Option D:	Temperature
2.	Zener breakdown occurs in diodes that are ..... doped
Option A:	Highly
Option B:	Low
Option C:	Moderate
Option D:	Lightly
3.	Silicon small-signal transistors typically have Beta in the range of .....
Option A:	0-50
Option B:	50-100
Option C:	100-300
Option D:	500-1000
4.	A 10-V Zener diode is used to regulate the voltage across a variable load resistor. The input voltage varies between 13 V and 16 V and the load current varies between 10 mA and 85 mA. The minimum Zener current is 15 mA. The value of series resistance R is.....
Option A:	1k
Option B:	30ohms
Option C:	500ohms
Option D:	30k
5.	If RC and RL represent the collector resistance & load resistance respectively in single stage transistor amplifier,then ac load is.....
Option A:	R_L+R_C
Option B:	$R_C \parallel R_L$
Option C:	R_L
Option D:	R_C
6.	In Early effect,current gain is affected by .....voltage.
Option A:	V_{BE}
Option B:	V_{CC}
Option C:	V_E
Option D:	V_{CE}

7.	What is the difference between JFET and MOSFET?
Option A:	High input impedance
Option B:	Insulated gate
Option C:	Four terminals
Option D:	Unipolar
8.	Alpha and Beta are .....
Option A:	Temperature dependent
Option B:	Current gains in CB and CE
Option C:	Current gains in CC and CB
Option D:	Dependent on each other
9.	Slope of ac load line is ..... that of dc load line.
Option A:	the same as
Option B:	less than
Option C:	half of
Option D:	more than
10.	The gate voltage in JFET at which drain current becomes zero is called ..... voltage.
Option A:	Saturation
Option B:	Pinch off
Option C:	Active
Option D:	Cut off
11.	The normalized gain expressed in dB for the cut-off frequencies?
Option A:	–3 dB
Option B:	+3 dB
Option C:	–6 dB
Option D:	–20 dB
12.	Which of the following elements is (are) important in determining the gain of the system in the high-frequency region?
Option A:	Interelectrode capacitances
Option B:	Wiring capacitances
Option C:	Miller effect capacitance
Option D:	All the above
13.	In the input RC circuit of a single-stage BJT or FET amplifier, as the frequency _____, the capacitive reactance _____ and _____ of the input voltage appears across the output terminals.
Option A:	increases, decreases, more
Option B:	increases, decreases, less
Option C:	increases, increases, more
Option D:	decreases, decreases, less
14.	The _____ region produces the maximum voltage gain in a single-stage BJT or FET amplifier.
Option A:	low frequency
Option B:	mid- frequency
Option C:	high frequency
Option D:	very low and very high frequency

15.	_____ suffers crossover distortion
Option A:	Class A amplifier
Option B:	Class B amplifier
Option C:	Class AB amplifier
Option D:	Class C amplifier
16.	A class B amplifier provides a peak output signal to a 10-ohm load. The system operates on a power supply of 20 V, the efficiency of the amplifier is
Option A:	78.57%
Option B:	58.87%
Option C:	25%
Option D:	50%
17.	A bypass capacitor causes _____ gain at lowfrequencies
Option A:	reduced.
Option B:	Increased
Option C:	no effect in
Option D:	Constant
18.	De-rating factor is usually expressed in _____
Option A:	W/°C
Option B:	°C/W
Option C:	W/s
Option D:	kW/K
19.	For which of the following frequency region(s) can the coupling and bypass capacitors no longer be replaced by the short-circuit approximation?
Option A:	Low frequency
Option B:	Mid-frequency
Option C:	High frequency
Option D:	All the above
20.	Class B amplifier is biased at _____ so that it operates in the linear region for 180 degrees of the input cycle.
Option A:	saturation region
Option B:	active region
Option C:	cut off
Option D:	forward bias condition

Q2 **(20 Marks Each)**	
A	**Solve any Two 5 marks each**
i.	Draw small signal model circuit diagram of diode and derive dynamic resistance $R_d$expression.Explain temperature dependence of diode characteristics
ii.	Draw circuit diagram of Zener regulator.Explain line and load regulation.
iii.	Draw thermal analogy of power transistor. Explain power derating curve.
B	**Solve any One 10 marks each**
i.	Draw low frequency equivalent circuit diagram of BJT. Write expression of f_{LS},f_{LC},f_{LE} (signalbypass, and bypass frequencies) respectively.
ii.	Explain the difference between small signal and large signal amplifier..

Q3. **(20 Marks Each)**	
A	**Solve any Two 5 marks each**
i.	For class B amplifier providing 20 v peak signal to 16-ohm load and power supply of V_{CC}=30V,determine input power,output power and circuit efficiency.
ii.	For EMOSvoltage divider arrangement with V_{GSTH}=3V,k=0.4mA/v, V_i=0.8mV, R_D=40k,V_{DD}=30V,R_2==10M,R_1=40M,R_D=3.3k,R_S(bypassed)=1.2k.Determine output voltage.
iii.	Draw BJT output characteristics clearly with all parameters. Draw load line. Show all the regions of operation
B	**Solve any One 10 marks each**
i.	Sketch transfer characteristics of FET. IDSS = 10 mA, V_{GSoff}= -4V
ii.	Explain importance of use of constant current source in EMOS differential amplifier.Draw thecircuit,justify the MOS in saturation.Write I_{DS} current equation

Watumull Institute of Electronic Engg. & Computer Tech.

Sample Paper for Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **EXTC**

Curriculum Scheme: Rev2019

Examination: SE Semester III

Course Code: ECC303 and Course Name: DSD

Time: 2 hour Max. Marks: 80

==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks 40 Marks**
1.	Hexadecimal to Decimal Code for 1F40
Option A:	8010
Option B:	8000
Option C:	7998
Option D:	8020
2.	The sum of the following by using 2's complement -1011 and -0101
Option A:	1010
Option B:	0011
Option C:	0110
Option D:	1100
3.	Minimisation of the Expression A.B.C + A'.B + A.B.C' will be
Option A:	C
Option B:	B
Option C:	A
Option D:	AC
4.	Number of States=_____ for 4 bit Jhonson's Ring counter
Option A:	3
Option B:	16
Option C:	8
Option D:	4
5.	SR flip flop can be converted to T flip flop by expression_____
Option A:	S=TQ' R=TQ
Option B:	S=T R=T
Option C:	S=TQ R=TQ'
Option D:	S=Q' R=Q
6.	Basic flip flop used for Frequency division by 2 ,4,etc is_____
Option A:	JK
Option B:	D
Option C:	T
Option D:	SR
7.	How many inputs are required for a 1-of-10 BCD decoder?
Option A:	1
Option B:	4
Option C:	8
Option D:	10

8.	When two or more inputs are active simultaneously, the process is called:
Option A:	ripple blanking
Option B:	priority decoding
Option C:	first-in, first-out processing
Option D:	priority encoding
9.	JK Master-Slave flip flop is preferred over JK Flip Flop for _____
Option A:	Toggling
Option B:	Forbidden Condition of j=1 k=1
Option C:	Race Around Condition
Option D:	Synchronising clock
10.	What type of register would have a complete binary number shifted in one bit at a time and have all the stored bits shifted out one at a time?
Option A:	Parallel-in Parallel-out
Option B:	Parallel-in Serial-out
Option C:	Serial-in Serial-out
Option D:	Serial-in Parallel-out
11.	The memory which is used for storing programs and data currently being processed by the CPU is called _____
Option A:	PROM
Option B:	Internal Memory
Option C:	Non-volatile memory
Option D:	Mass memory
12.	The DRAM stores its binary information on _____
Option A:	MOSFET
Option B:	Transistor
Option C:	Capacitor
Option D:	BJT
13.	For MOD 6 Counter number of flip flops required are _____
Option A:	4
Option B:	2
Option C:	3
Option D:	5
14.	Convert binary to octal: (110110001010)2 =____
Option A:	(5512)8
Option B:	(6612)8
Option C:	(4532)8
Option D:	(6745)8
15.	A product term containing all K variables of the function in either complemented or uncomplemented form is called a _____
Option A:	Minterm
Option B:	Maxterm
Option C:	Midterm
Option D:	∑ term
16.	The minimum number of NAND gates required to implement the Boolean

	function A+AB'+AB'C is equal to
Option A:	Zero
Option B:	1
Option C:	4
Option D:	7
17.	Which code is used for labeling the cells of K-map?
Option A:	ASCII
Option B:	BCD
Option C:	GRAY
Option D:	BINARY
18.	Which adder plays a crucial role in eliminating the problem associated with the inter-stage carry delay?
Option A:	Half Adder
Option B:	Full Adder
Option C:	Ripple Carry Adder
Option D:	Look Ahead Carry Adder
19.	For a binary half-sub-tractor having two inputs A and B, the correct set of logical expressions for the outputs D (=A minus B) and X (=borrow) are
Option A:	D=AB + A'B ,X=A'B
Option B:	D=A'B + AB' ,X=AB'
Option C:	D=A'B + AB' ,X=A'B
Option D:	D=AB + A'B' ,X=AB'
20.	Number of 4:1 Mux Required for 64:1 Mux are
Option A:	20
Option B:	21
Option C:	22
Option D:	23

Q2. **(20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	Write the VHDL Code for Full Adder.
B	Compare PLA and PAL.
C	Convert SR Flip Flop to JK Flip Flop
D	If $F(A,B,C) = \sum m(0,3,5,7)$ with its truth table and express F in SOP and POS form
E	a) Implement following Boolean function using 8:1 multiplexer $F(A,B,C,D) = A'BD' + ACD + B'CD + A'C'D$
F	Design and Develop MOD 8 Asynchronous Up Counter.

Q3. **(20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	Compare SRAM & DRAM.
B	Compare Moore and Mealy Machine.
C	Explain 4 bit BCD Adder.
D	Using Universal Gate NOR design circuit for EXOR,AND & NOT
E	Minimise the following function in SOP minimal form using K-Maps: F(A, B, C, D) = m(1, 2, 6, 7, 8, 13, 14, 15) + d(3, 5, 12)
F	Explain Different Characteritics used to compare perofrmances for Logic Families.

Watumull Institute of Electronics Engineering and Computer Technology

Program: **EXTC**

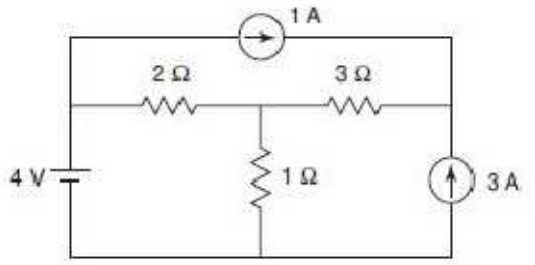
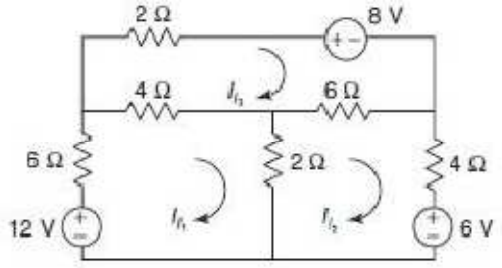
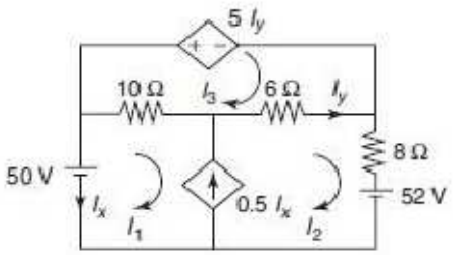
Curriculum Scheme: Rev2019

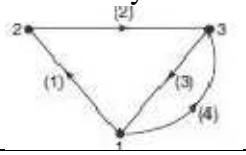
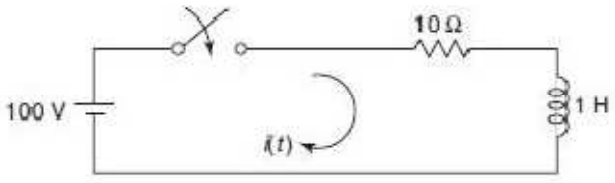
Examination: SE Semester III

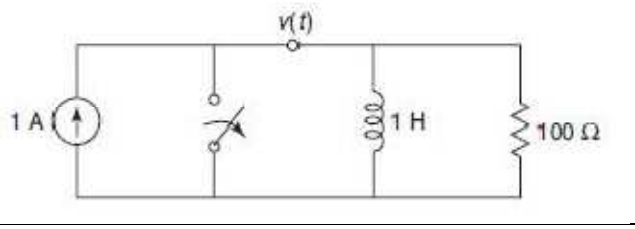
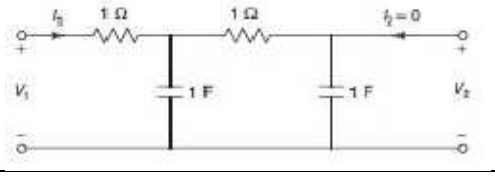
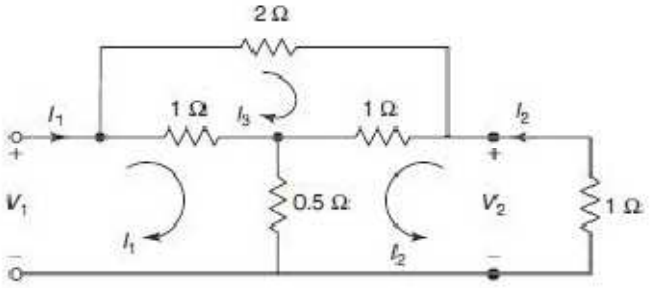
Course Code: ECC304 and Course Name: NT

Time: 2 hour Max. Marks: 80

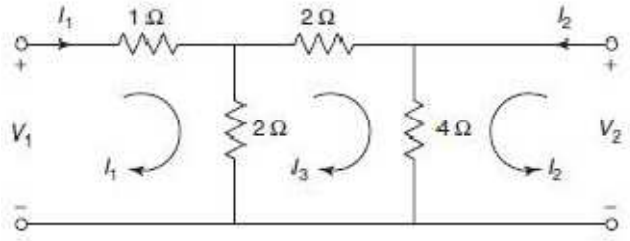
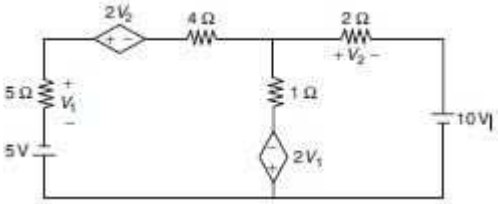
==========

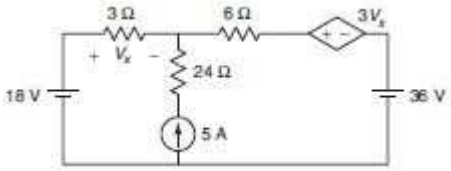
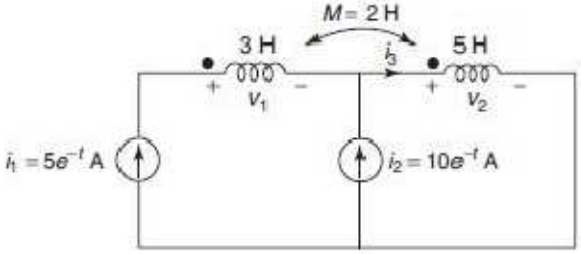
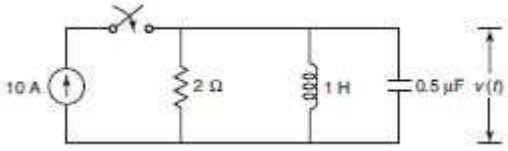
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks 40 Marks**
1.	Meshes that share a current source with other meshes, none of which contains a current source in the outer loop, form
Option A:	power sources
Option B:	a supermesh
Option C:	a supernode
Option D:	Norton networks
2.	Current in the 1 Ω resistor is 
Option A:	4A
Option B:	1A
Option C:	3A
Option D:	7A
3.	The loop currents for the network are: 
Option A:	0.55 A, -0.866 A and -0.916 A
Option B:	0 A,-1.866 A and -1.916 A
Option C:	0.55 A,0 A and 0 A
Option D:	0 A, 1.866 A and 2.916 A
4.	The current equation for supermesh for the network is 

Option A:	I1 + I2 = 0
Option B:	10I1 +6 I2 = 0
Option C:	I1- I2 = 0
Option D:	-0.5 I1 + I2 = 0
5.	A node is defined as a point at which
Option A:	No elements have a common connection
Option B:	Two or more elements have a common connection
Option C:	There is only one voltage source
Option D:	There is only one current source
6.	For a graph with n nodes and b branches, the complete incidence matrix is
Option A:	a square matrix of order 2 X 2
Option B:	a rectangular matrix of order n X b
Option C:	a rectangular matrix of order 2 X 4
Option D:	a square matrix of order 4 X 4
7.	How many trees are possible for this graph 
Option A:	7
Option B:	8
Option C:	5
Option D:	4
8.	The coefficient of coupling (k) between coils is given by:
Option A:	k = k1 + k2
Option B:	k = k1 * k2
Option C:	k = k1/k2
Option D:	k = √ (k1*k2)
9.	If there is no voltage across the capacitor at t = 0-,
Option A:	The capacitor will act as a short circuit at t = 0+
Option B:	The capacitor will act as an open circuit at t = 0+
Option C:	The capacitor will act as a voltage source at t = 0+
Option D:	The capacitor will act as a current source at t = 0+
10.	Find i at t = 0+ for the network given below. The switch is closed at t = 0. 
Option A:	10A
Option B:	0A
Option C:	100A
Option D:	1A
11.	in the network shown below ,the switch is opened at t = 0.The value of V at t = 0+ is

	
Option A:	0V
Option B:	1V
Option C:	100V
Option D:	10V
12.	Transfer admittance function is defined as the ratio of:
Option A:	the voltage transform at one port to the current transform at another port.
Option B:	the current transform at one port to the voltage transform at another port.
Option C:	the current transform at one port to the voltage transform at the same port.
Option D:	the current transform at one port to the current transform at another port
13.	Q4) The network function V2 / V1 for the network shown below is 
Option A:	s / (s2+3s+1)
Option B:	2s / (s2+3s+1)
Option C:	3s / (s2+3s+1)
Option D:	1 / (s2+3s+1)
14.	For the resistive bridged T network shown below values of V2 / V1 and I2 / I1 are 
Option A:	2Ω and 3
Option B:	3 and 1
Option C:	1/3 and -1/3
Option D:	1 and 1
15.	Condition for symmetry of ABCD parameters is
Option A:	A = B
Option B:	A = D
Option C:	B = C
Option D:	C = D
16.	The Z parameters of a two-port network are Z11 = 20 Ω, Z22 = 30 Ω, Z12 = Z21= 10Ω.Y parameters are
Option A:	Y11 = 50, Y12 = Y21 = -50, Y22 = 2
Option B:	Y11 = 3, Y12 = Y21 = -1, Y22 = 50

Option C:	Y11 = 3, Y12 = Y21 = 0, Y22 = 2/50
Option D:	Y11 = 3/50, Y12 = Y21 = -1/50, Y22 = 2/50
17.	The function F(s) is a positive real function if
Option A:	Re $F(j\omega) \geq 0$ for all ω
Option B:	Re $F(j\omega) = 0$ for all ω
Option C:	Re $F(j\omega) \leq 0$ for all ω
Option D:	Re $F(j\omega) \approx 0$ for all ω
18.	For a LC driving point immittance function
Option A:	The poles and zeroes are simple and lie on right half of s plane
Option B:	The poles and zeroes are not interlaced
Option C:	The poles and zeroes are simple and lie on the $j\omega$ axis
Option D:	There are no poles and zeroes at the origin
19.	A network is said to be stable
Option A:	When all the poles lie in the right half of the s-plane
Option B:	When all the zeroes lie in the right half of the s-plane
Option C:	When all the poles lie in the left half of the s-plane
Option D:	When all the poles and zeroes lie in the right half of the s-plane
20.	For a RL function
Option A:	The poles and zeroes are not interlaced
Option B:	The poles and zeroes are interlaced
Option C:	The poles and zeroes are on the imaginary axis.
Option D:	The poles and zeroes are on the right half of the s plane

Q2)	***Solve any two questions out of three*10 marks each**
A	Find theFoster I, Foster II,Cauer I and Cauer II forms of the LC impedance function given below is $$Z(s)=\frac{(s^2+1)(s^2+3)}{s(s^2+2)}$$
B	Find the hybrid parameters for the network shown below : 
C	Find the mesh currents in the network shown 

Q3.	**Solve any Two Questions out of Three 10 marks each**
A	.Find the voltage Vx in the figure shown below 
B	In the network shown below, values of voltages V1 and V2 are 
C	For the network shown in the figure, the switch is closed at t = 0, determine v dv\dt,andd^2v\$dt^2$at t = 0□. 

Watumull Institute of Electronic Engg.& Computer Tech.

Sample paper for Examinations Commencing from 7th January 2021 to 20th January

Program: **EXTC**

Curriculum Scheme: Rev2019

Examination: SE Semester III

Course Code: ECC305 and Course Name: EICS

Time: 2 hours Max. Marks: 80

==========

Q.1 All questions are compulsory (20x2=40)

1. The closeness of values indicated byan instrument to the actual value isdefined as

(a) repeatability (b) reliability(c) uncertainty (d) accuracy.

2. Precision is defined as

(a) Repeatability(b) reliability(c) uncertainty (d) accuracy

3. The ratio of change in output to the change in the input is called

(a) Precision (b) resolution(c) sensitivity (d) repeatability

4. The deviation of the measured value to the desired value is defined as

(a) Error (b) repeatability(c) hysteresis (d) resolution

) instrumental error(c) environmental error(d) random error

5. Static errors are caused due to

(a) Measuring devices(b) human error(c) environmental error(d) observational error

6. Maxwell's bridge is used to measureQ factor in the range

(a) 1-10 (b) 30-50(c) 50-75 (d) 75-100

7. Hay's bridge is used to measure aninductance of

(a) low Q b. medium Q (c) high Q d. very high Q

8. Schering bridge is used to measureunknown

(a) inductance (b) capacitance(c) resistance (d) frequency

Q9. During a test, the strain gauge with resistance of 200 ohm undergoes a change of 0.120 ohm and the strain of the gauge is 1.2 $X10^{-4}$. Then the gauge factor will be

A. 4
B. 5
C. 4.5
D. 6

10. Which of the following is an analog transducer?
a) Encoders

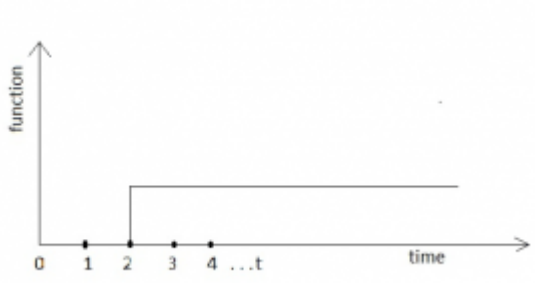
b) Strain gauge
c) Digital tachometers
d) Limit switches

11. What is the principle of operation of LVDT?
a) Mutual inductance
b) Self-inductance
c) Permanence
d) Reluctance

12. Which of the following can be measured using Piezo-electric transducer?
a) Velocity
b) Displacement
c) Force
d) Sound

13. Which of the following represents Laplace transform of ramp signal?
a) $1/S^3$
b) $1/S^2$
c) $1/S$
d) 1

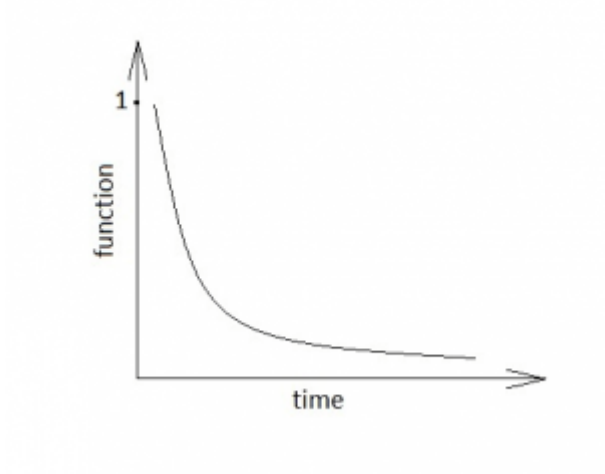
14. What does this function represents?



a) u (t)
b) u (t-2)
c) u (t+2)
d) u (-t)

15. Laplace transform function f (t) is F(S), then how will you represent Laplace transform for differential of f (t)?
a) $S/F(S)$
b) F(S)
c) S.F(S)
d) F'(S)

16. How will you represent given function?



a) u (t)
b) $e^{at}.u(t)$
c) $e^{-at}.u(t)$
d) $e^{at}.r(t)$

17. Which of the following function is represented using a given condition?

f (t) = 1 for t=0 0 otherwise

a) Step function
b) Sine function
c) Ramp function
d) Impulse function

18. Which of the given statement is true for a zero-order system?
a) Varying transfer function with time
b) Constant transfer function
c) Transfer function = 1/S
d) Transfer function = $1/s^2$

19. Which of the given factor determines the order of a system?
a) Maximum power of 'S' in the characteristic equation
b) Minimum power of 'S' in the characteristic equation
c) Value of constant value
d) None of the mentioned

20. What is the Laplace transform of the component inductor?
a) sL
b) L
c) L/s
d) s^2L

Q.2. Attempt any four (4x5=20)

a. Check whether the givens ystem is stable

$s^5+s^4+2s^3+2s^2+3s+15=0$

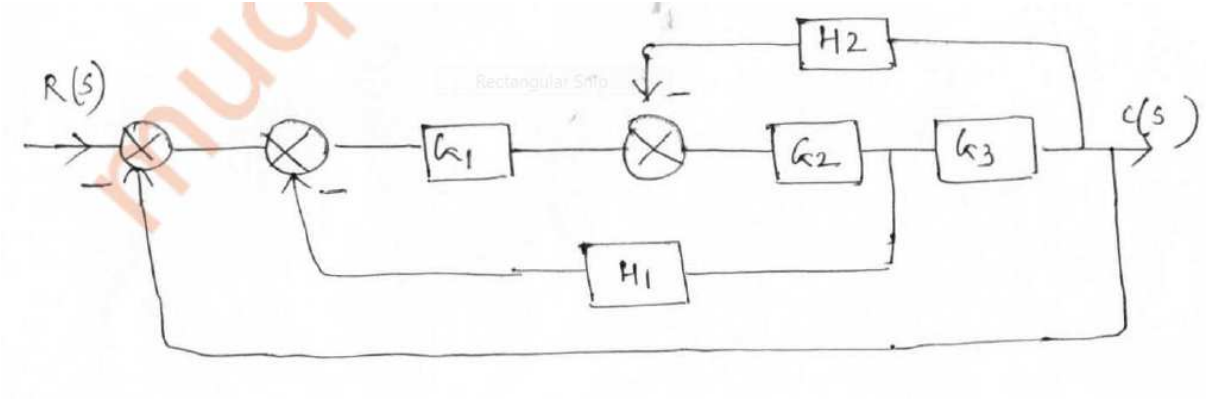
b. $^3-4s^2+s+6=0$ is the characteristic equation of a certain control system.

Determine its stability by Hurwitz method

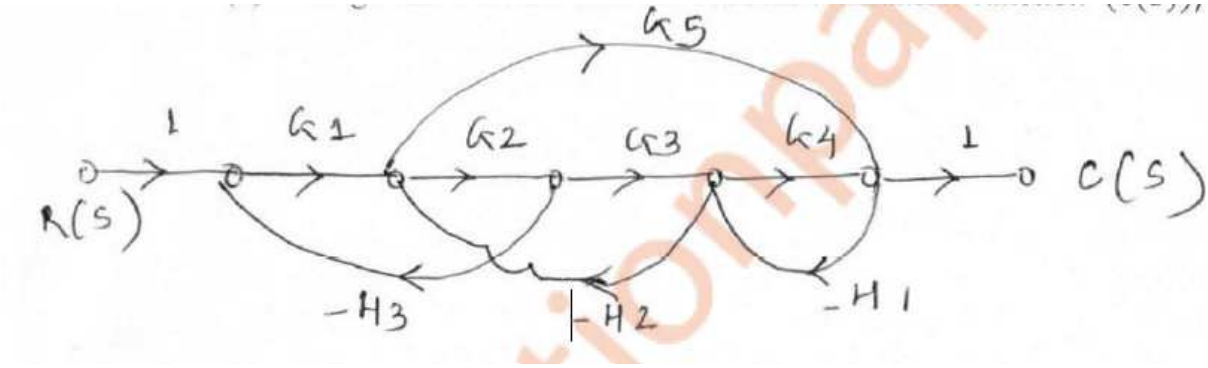
c. For a unity feedback system having open loop transfer function : $K(\mathbf{s+2})/(S^3+\mathbf{7S^2+12S})$

Find the type of system and all error coefficients.

d.. Using Block diagram reduction techniques.Find closed loop transfer function



e.Using Mason's Gain formula evaluate the transfer function C(s)/R(s)

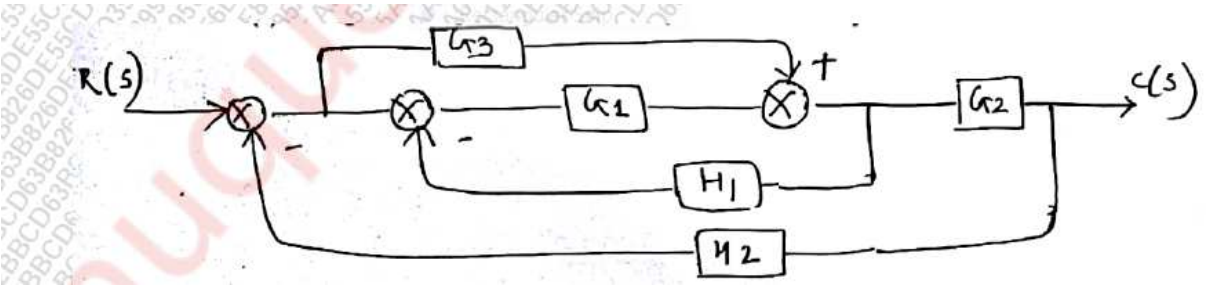


f. A unity feedback system has open loop transfer function as

Obtain Unit step Response, Rise Time and Peak Overshoot.

Q.3 Attempt any four.(4x5=20)

a..Using Block diagram reduction techniques, find closed loop transfer function.



b.Explain concept of stability,absolute stability and conditional stability.

c. Derive an expression for the resistance using Wheatstone bridge for balanced condition.

d. Explain measurement of inductance using Maxwell bridge .Also list the applications of it

e. Explain Kelvin’s double Bridge and its application for measurement of low resistance and derive expression for unknown resistance.

f. List steps to draw root locus of CLTF.