University of Mumbai

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **BE Electronics and Telecommunication Engineering**

Curriculum Scheme: Rev 2019 'C' Scheme

Examination: SE Semester III

Course Code: **ECC301** and Course Name: **Engineering Mathematics III**

Time: 2 hour Max. Marks: 80

==========

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**
1.	Find Laplace transform of $f(t) = 1,\ 0 < t < 5; \quad f(t) = 0,\ t > 0$
Option A:	$\frac{1- e^{-5s}}{s}$
Option B:	$\frac{1}{s} e^{-5s}$
Option C:	$\frac{1}{s}$
Option D:	$\frac{1+ e^{-5s}}{s}$
2.	If $L[f(t)] = log\left(\frac{s+3}{s+1}\right)$, find $L[f(2t)]$
Option A:	$2\ log\left(\frac{s+3}{s+1}\right)$
Option B:	$2\ log\left(\frac{s+6}{s+2}\right)$
Option C:	$\frac{1}{2} log\left(\frac{s+3}{s+1}\right)$
Option D:	$\frac{1}{2} log\left(\frac{s+6}{s+1}\right)$
3.	Find $L[te^{-3t}sint]$
Option A:	$\frac{2s-6}{(s^2-6s+10)^2}$
Option B:	$\frac{2s+6}{(s^2+6s+10)^2}$
Option C:	$\frac{1}{(s+3)^2+1}$
Option D:	$\frac{1}{(s^2-6s+10)^2}$
4.	Find $L\left[\int_0^t u\ sin3u\ du\right]$
Option A:	$\frac{2}{(s^2+1)^2}$
Option B:	$\frac{2}{(s^2+3)^2}$
Option C:	$\frac{6}{(s^2+9)^2}$

Option D:	$\frac{2s}{(s^2+1)^2}$
5.	$L^{-1}\left[\frac{s+5}{s^2-25}\right]$ =?
Option A:	$cos5t + 5\ sin5t$
Option B:	$cosh5t + 5\ sinh5t$
Option C:	$cosh5t + sinh5t$
Option D:	$cosht + 5\ sinht$
6.	Find $L^{-1}\left[\frac{s-2}{s^2-4s+13}\right]$
Option A:	$e^{2t}\frac{sin3t}{3}$
Option B:	$e^{-2t}\frac{sin3t}{3}$
Option C:	$e^{2t}sin3t$
Option D:	$e^{2t}cos3t$
7.	In Fourier series of $f(x) = xcosx$ in $(-\pi, \pi)$. The value of a_n is
Option A:	0
Option B:	$\frac{-1}{2}$
Option C:	$\frac{(-1)^n}{n^2-1}$
Option D:	$\frac{1}{n^2-1}$
8.	$f(x) = \begin{cases} cosx, & -\pi < x < 0 \\ -cosx, & 0 < x < \pi \end{cases}$ is
Option A:	Both even and odd function
Option B:	neither even nor odd
Option C:	odd function
Option D:	Even function
9.	The Fourier series for f(x) in $(0,2\pi)$ is $f(x) = \frac{\pi}{2} - \frac{1}{\pi}\sum_{n=1}^{\infty}\frac{1}{n^2}cosnx$. Find the value of $\frac{1}{2\pi}\int_0^{2\pi}[f(x)]^2\ dx$
Option A:	$\frac{\pi^3}{4} + \frac{1}{\pi}\sum_{n=1}^{\infty}\frac{1}{n^4}$
Option B:	$\frac{\pi^2}{4} + \frac{1}{2\pi^2}\sum_{n=1}^{\infty}\frac{1}{n^4}$
Option C:	$\frac{\pi^3}{2} - \frac{1}{\pi}\sum_{n=1}^{\infty}\frac{1}{n^4}$
Option D:	0
10.	A function f(t) is periodic with period 2π if

Option A:	$f(t+2\pi)=0$
Option B:	$f(t+2\pi)=2\pi$
Option C:	$f(t+2\pi)=f(2\pi)$
Option D:	$f(t+2\pi)=f(t)$
11.	Which of the following functions is NOT analytic
Option A:	Sinhz
Option B:	Cosz
Option C:	$\bar{z}$
Option D:	z^2+z
12.	For f(z) = u + iv analytic, which of the following statement is correct
Option A:	f(z) may satisfy Cauchy-Riemann equation.
Option B:	f(z) is constant function
Option C:	f(z) =0
Option D:	u, v both are harmonic
13.	Find k such that $f(z)=\frac{1}{2}\log(x^2+y^2)+itan^{-1}\frac{kx}{y}$ is analytic
Option A:	K=1
Option B:	K=-1
Option C:	K=0
Option D:	K=2
14.	Find the characteristic roots of matrix A , Where $A=\begin{bmatrix}3 & -1 & 1\\ -1 & 5 & -1\\ 1 & -1 & 3\end{bmatrix}$
Option A:	$\lambda=1,\ 2,\ 3$
Option B:	$\lambda=1,\ 1,\ -2$
Option C:	$\lambda=2,\ 3,6$
Option D:	$\lambda=-2,-3,-6$
15.	$\lambda=5$ is one of the eigenvalues of $A=\begin{bmatrix}1 & 2 & 2\\ 2 & 1 & 2\\ 2 & 2 & 1\end{bmatrix}$. Find the eigenvector corresponding to eigenvalue $\lambda=5$ is
Option A:	[1 −1 0]’
Option B:	[1 1 1]’
Option C:	[1 −1 −1]’

Option D:	[1 0 − 1]’
16.	If A = $\begin{bmatrix} 1 & 2 & 8 \\ 0 & -1 & 3 \\ 0 & 0 & 2 \end{bmatrix}$ Find Eigen Values of $A^2 + 3A + 2A^{-1} + I$
Option A:	7,-3,12
Option B:	6,-4,11
Option C:	1,-1,2
Option D:	7,-3,15
17.	If the matrix A has eigen value 1,1,5 then algebraic multiplicity of A for $\lambda = 1$ is
Option A:	-1
Option B:	0
Option C:	1
Option D:	2
18.	The divergence and curl of $\bar{a} = 2i - 3j + k$ is
Option A:	div $\bar{a}$=0 , curl $\bar{a}$=5
Option B:	div $\bar{a}$=2 , curl $\bar{a}$=0
Option C:	div $\bar{a}$=3 , curl $\bar{a}$=3
Option D:	div $\bar{a}$=0 , curl $\bar{a}$=0
19.	Find the value of a if $\bar{F} = (x - 2z)i + (y - 5x)j + (az + 2x)k$ is solenoidal
Option A:	$a = 2$
Option B:	$a = -2$
Option C:	$a = -4$
Option D:	$a = 4$
20.	Evaluate $\int_C ydx + x\,dy$ along $y = x^2$ from A(0,0) to B(1,1)
Option A:	0
Option B:	2xy
Option C:	-1
Option D:	1

Q2. **(20 Marks Each)**	**Solve any Four out of Six** **5 marks each**
A	*Find* $L\left[e^{-t}\int_0^t e^u \cosh u\, du\right]$
B	$L^{-1}\left[\log\left(1+\frac{4}{s^2}\right)\right] s$
C	*Obtain the Fourier series for* e^{-x} *in* $(0,2\pi)$
D	*Find the analytic function* $f(z)$*whose imaginary part is* $e^{-x}(y\sin y + x\cos y)$

E	*Show that* $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ *satisfies Cayley-Hamilton theorem. Hence find* A^{-1}
F	Evaluate by using Green's theorem $\int_C (x^2 - y)dx + (2y^2 + x)dy$, *w*here C is the closed region bounded *by* $y = 4$ and $y = x^2$

Q3. **(20 Marks Each)**	**Solve any Four out of Six** **5 marks each**
A	*Evaluate* $\int_0^\infty e^{-3t}\left(\frac{sinht\ sint}{t}\right)\ dt$
B	*Find* $L^{-1}\left[\frac{s}{(s^2+4s+13)^2}\right]$
C	*Obtain the half range Fourier sine series expansion for* $f(x) = (x - x^2)$ *in* $(0,2)$
D	*Obtain the orthogonal trajectories for the family of curves* $e^{-x}\ cosy = C$.
E	*Check whether the matrix* $A = \begin{bmatrix} 2 & 3 & 4 \\ 0 & 2 & -1 \\ 0 & 0 & 1 \end{bmatrix}$ *is diagonalizable*
F	Show that $\bar{F} = (y^2 - z^2 + 3yz - 2x)i + (3xz + 2xy)j + (3xy - 2xz + 2z)k$ is both irrotational and solenoidal.

University of Mumbai

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **BE Electronics and Telecommunication Engineering**

Curriculum Scheme: Rev 2019 'C' Scheme

Examination: SE Semester III

Course Code: **ECC301** and Course Name: **Engineering Mathematics III**

Time: 2 hour Max. Marks: 80

==========

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

University of Mumbai

Examination 2020 under cluster 5(Lead College: APSIT)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Rev 2019

Examination: SE, Semester: III

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

Time: 2 Hour Max. Marks: 80

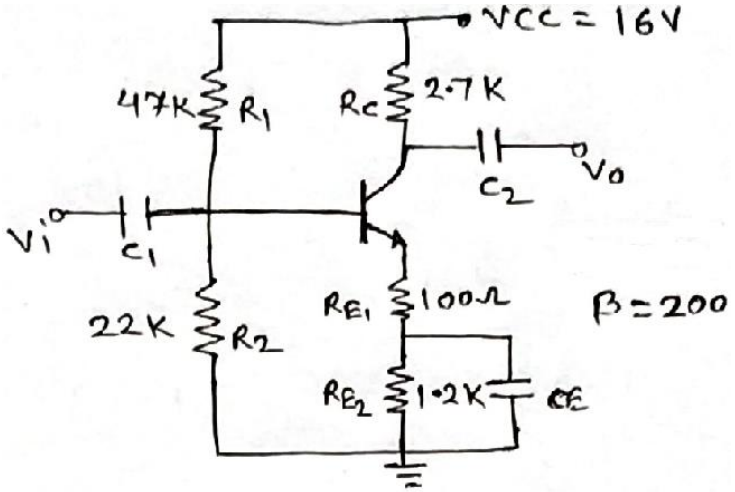
==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Cut in voltage for Si and Ge diode is _____ respectively
Option A:	0.7 V and 0.3 V
Option B:	0.3 V and 0.7 V
Option C:	0.5 V and 0.3 V
Option D:	0.7 V and 0.5 V
2.	In forward bias diode current increases _____
Option A:	linearly
Option B:	exponentially
Option C:	parabolic
Option D:	hyperbolic
3.	In reverse bias current suddenly increase after _____
Option A:	breakdown
Option B:	breakover
Option C:	cut in
Option D:	cut out
4.	If temperature increases VI characteristics sifts to _____ and if decreases it shifts to _____
Option A:	left, right
Option B:	right, left
Option C:	left, remains constant
Option D:	right, remains constant
5.	For Zener diode as a voltage regulator , line regulation means _____
Option A:	fixed input voltage and fixed load resistor
Option B:	variable input voltage and variable load resistor
Option C:	fixed input voltage and variable load resistor
Option D:	variable input voltage and fixed load resistor

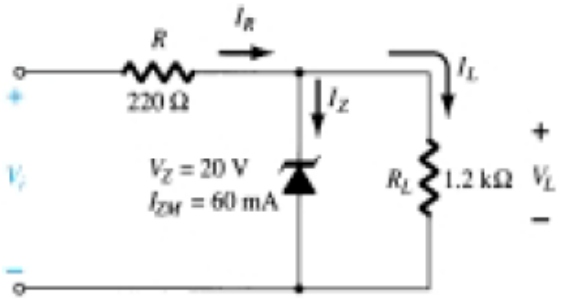
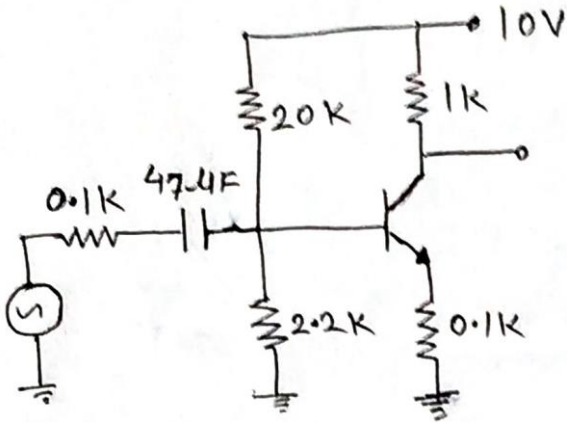
6.	The value of thermal voltage Vt at room temprature T=300K is calculated by _____ and it is _____.
Option A:	KT/q, 26mV
Option B:	KT/q, 28mV
Option C:	q/KT, 26mV
Option D:	q/KT, 28mV
7.	A silicon pn junction at T = 300 K has a reverse saturation current of IS = 2 × 10exp−14 A. Determine the required forward-bias voltage to produce a current of ID = 1 mA.
Option A:	641V
Option B:	6.41V
Option C:	64.1V
Option D:	0.641V
8.	A transistor with β = 120 is biased to operate at a dc collector current of 1.2 mA. Find the value of rπ.
Option A:	625 ohm
Option B:	1250 ohm
Option C:	2500 ohm
Option D:	5000 ohm
9.	The phase difference between the output and input voltages of a CE amplifier is
Option A:	180°
Option B:	0°
Option C:	90°
Option D:	270°
10.	When a transistor amplifier is operating, the current in any branch is _____
Option A:	Sum of AC and DC
Option B:	AC only
Option C:	DC only
Option D:	Difference of AC and DC
11.	The point of intersection of d.c. and a.c. load lines is called ……..
Option A:	Saturation point
Option B:	Cut off point
Option C:	Operating point
Option D:	Critical point
12.	To amplify low frequency signal, _____is used in multistage amplifiers.
Option A:	RC coupling
Option B:	transformer coupling

Option C:	impedance coupling
Option D:	direct coupling
13.	Which of the following is the fastest switching device?
Option A:	MOSFET
Option B:	Triode
Option C:	JFET
Option D:	BJT
14.	Before the invention of power amplifiers for the amplification of audio signals generally device was used
Option A:	Diode
Option B:	OPAMP
Option C:	Vacuum tubes
Option D:	SCR
15.	Power amplifier directly amplifies _____
Option A:	Voltage of signal but not Current
Option B:	Current of the signal but not Voltage
Option C:	Power of the signal but not Voltage and Current
Option D:	Voltage, Current and Power of the signal
16.	In a multistage amplifier, generally the output stage is also called ……
Option A:	Mixer stage
Option B:	Power stage
Option C:	Detector stage
Option D:	Amplifier stage
17.	The maximum efficiency of resistance loaded class A power amplifier is ……..
Option A:	5 %
Option B:	50 %
Option C:	30 %
Option D:	25 %
18.	The Maximum and minimum output of the Differential amplifiers is defined as:
Option A:	$V_{max} = V_{DD}$, $V_{min} = -V_{DD}$
Option B:	$V_{max} = V_{DD}$, $V_{min} = R_D$ x Iss
Option C:	$V_{max} = V_{DD}$, $V_{min} = V_{DD} – R_D$ x Iss
Option D:	$V_{max} = -V_{DD}$, $V_{min} = -V_{DD}$
19.	In Common Mode Differential Amplifier, the outputs $Vout_1$ and $Vout_2$ are related as:
Option A:	$Vout_2$ is in out of phase with $Vout_1$ with same amplitude.
Option B:	$Vout_2$ and $Vout_1$ have same amplitude but the phase difference is 90 degrees

Option C:	$Vout_1$ and $Vout_2$ have same amplitude and are in phase with each other and their respective inputs.
Option D:	$Vout_1$ and $Vout_2$ have same amplitude and are in phase with each other but out of phase with their respective inputs.
20.	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:	Dual Input Balanced Output
Option B:	Dual Input Unbalanced Output
Option C:	Single Input Balanced Output
Option D:	Single Input Unbalanced Output

Q2.	**Solve any Two Questions out of Three 10 marks each**
A	Determine the following for the network given below Fig. 1 Voltage gain, Current gain, input impedance and output impedance  Fig. 1
B	With neat diagram derive the efficiency of transformer coupled class –A power amplifier? State its uses.
C	Explain construction and working of n-channel E-MOSFET with output characteristics

Q3.	
A	**Solve any Two 5 marks each**
i.	Compare BJT and JFET
ii.	Explain working of pn junction diode with the help of VI characteristics.
iii.	Determine the range of values of Vi that will maintain the Zener diode of Fig. 2 in the “on” state.

	 Fig. 2
B	**Solve any One 10 marks each**
i.	For the circuit shown in Fig. 3, the transistor parameter are V_{BE} (on) = 0.7 V, β = 200, VA = ∞, i. Derive the expression for lower cutoff frequency due to input coupling capacitor. ii. Determine lower cut-off frequency and voltage gain  Fig. 3
ii.	Explain the MOS differential pair amplifier with a common-mode input voltage v_{CM}.

University of Mumbai

Examination 2020 under cluster 5(Lead College: APSIT)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Rev 2019

Examination: SE, Semester: III

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

Time: 2 hour Max. Marks: 80

==========

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

University of Mumbai

Examination 2020 under cluster 5 (Lead College: APSIT)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Electronics and Telecommunication**

Curriculum Scheme: Rev2019

Examination: SE Semester III

Course Code: ECC303 and Course Name: Digital System Design

Time: 2 Hour Max. Marks: 80

==========

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	A full adder can be made out of ……
Option A:	two half adders
Option B:	two half adders and a OR gate
Option C:	two half adders and a NOT gate
Option D:	three half adders
2.	POS expressions can be implemented using ……logic circuit.
Option A:	2-level OR-AND
Option B:	2-level OR-AND and NOR
Option C:	2-level XOR
Option D:	2-level NOR
3.	To program basic logic functions which type of PLD should be used?
Option A:	PAL
Option B:	PLA
Option C:	CPLD
Option D:	SLD
4.	Sequential structure of VHDL
Option A:	Library Declaration; Configuration; Entity Declaration; Architecture Declaration
Option B:	Library Declaration; Entity Declaration; Configuration; Architecture Declaration
Option C:	Library Declaration; Configuration; Architecture Declaration; Entity Declaration
Option D:	Library Declaration; Entity Declaration; Architecture Declaration; Configuration
5.	VHDL is based on which programming language
Option A:	C
Option B:	PHP
Option C:	Assembly
Option D:	ADA
6.	TTL inputs are the emitters of a _____
Option A:	Transistor-transistor logic
Option B:	Multiple-emitter transistor
Option C:	Resistor-transistor logic
Option D:	Diode-transistor logic

7.	In case of XOR/XNOR simplification we have to look for the following_____
Option A:	Both Diagonal and Straight Adjacencies
Option B:	Only Offset Adjacencies
Option C:	Both Offset and Straight Adjacencies
Option D:	Both Diagonal and Offset Adjacencies
8.	On addition of 28 and 18 using 2's complement, we get _____
Option A:	00101110
Option B:	0101110
Option C:	00101111
Option D:	1001111
9.	One example of the use of an S-R flip-flop is as _____
Option A:	Transition pulse generator
Option B:	Racer
Option C:	Switch debouncer
Option D:	Astable oscillator
10.	Being a universal gate, it is possible for NOR gate to get converted into AND gate by inverting the inputs _____.
Option A:	before getting applied to NOR gate
Option B:	after getting applied to NOR gate
Option C:	before getting applied to AND gate
Option D:	after getting applied to AND gate
11.	On subtracting (01010)2 from (11110)2 using 1's complement, we get _____
Option A:	01001
Option B:	11010
Option C:	10101
Option D:	10100
12.	Which of the following is the most widely employed logic family?
Option A:	Emitter-coupled logic
Option B:	Transistor-transistor logic
Option C:	CMOS logic family
Option D:	NMOS logic
13.	The time required for a gate or inverter to change its state is called
Option A:	Rise time
Option B:	Decay time
Option C:	Propagation time
Option D:	Charging time
14.	Internal propagation delay of asynchronous counter is removed by _____
Option A:	Ripple counter
Option B:	Ring counter
Option C:	Modulus counter
Option D:	Synchronous counter

15.	One of the major drawbacks to the use of asynchronous counters is that _____
Option A:	Low-frequency applications are limited because of internal propagation delays
Option B:	High-frequency applications are limited because of internal propagation delays
Option C:	Asynchronous counters do not have major drawbacks and are suitable for use in high- and low-frequency counting applications
Option D:	Asynchronous counters do not have propagation delays, which limits their use in high-frequency applications
16.	What is the preset condition for a ring shift counter?
Option A:	All FFs set to 1
Option B:	All FFs cleared to 0
Option C:	A single 0, the rest 1
Option D:	A single 1, the rest 0
17.	In a positive edge triggered JK flip flop, a low J and low K produces?
Option A:	High state
Option B:	Low state
Option C:	Toggle state
Option D:	No Change State
18.	Which is the major functioning responsibility of the multiplexing combinational circuit?
Option A:	Decoding the binary information
Option B:	Generation of all minterms in an output function with OR-gate
Option C:	Generation of selected path between multiple sources and a single destination
Option D:	Encoding of binary information
19.	The octal number (651.124)8 is equivalent to _____
Option A:	(1A9.2A)16
Option B:	(1B0.10)16
Option C:	(1A8.A3)16
Option D:	(1B0.B0)16
20.	The addition of +19 and +43 results as _____ in 2's complement system.
Option A:	11001010
Option B:	101011010
Option C:	00101010
Option D:	0111110

Subjective/Descriptive Questions

Option 1

Q2 **(Total 20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	Compare SRAM with DRAM.
B	Design full adder using 3:8 decoder.
C	Convert (532.125) base 8, into decimal, binary and hexadecimal.
D	VHDL Code for full Adder.
E	Convert JK Flip Flop to T Flip Flop.
F	Compare TTL and CMOS Logic Families.

Option 2

Q3. **(Total 20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	Design 3 bit gray to binary converter.
B	Minimize the following expression using Quine Mc-cluskey technique. $F(A,B,C,D)=\sum M(0,1,2,3,5,7,9,11)$
C	Design Synchronous counter using T-type flip flops for getting the following sequence 0-2-4-6-0.take care of lockout condition.

University of Mumbai

Examination 2020 under cluster 5 (Lead College: APSIT)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Electronics & Telecommunication**

Curriculum Scheme: Rev2019

Examination: SE Semester III

Course Code: ECC303 and Course Name: Digital System Design

Time: 2-hour Max. Marks: 80

==========

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

University of Mumbai

Examination 2020 under cluster 5 (Lead College: APSIT)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Electronics and Telecommunication Engineering**

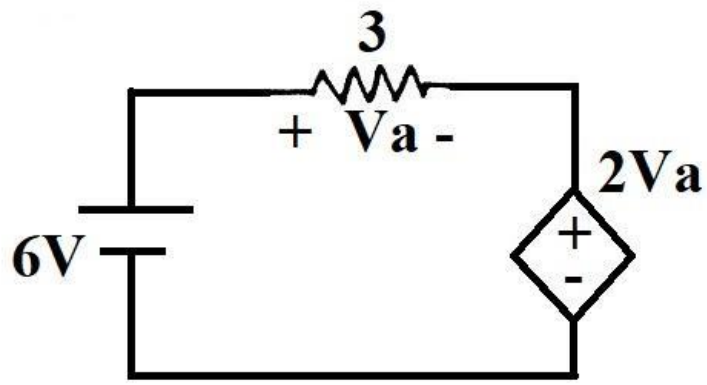
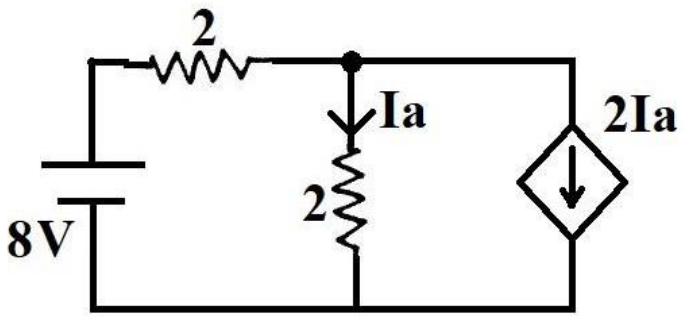
Curriculum Scheme: Rev-2019

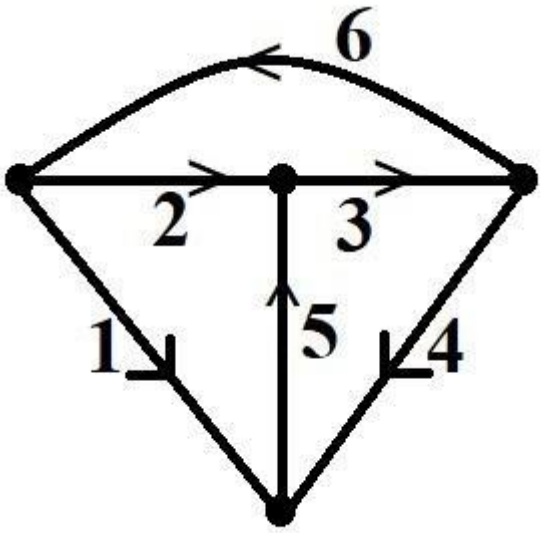
Examination: SE Semester III

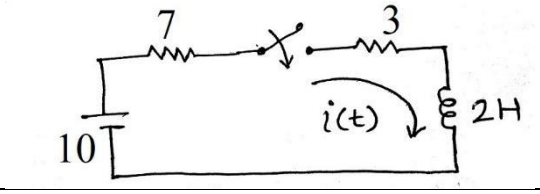
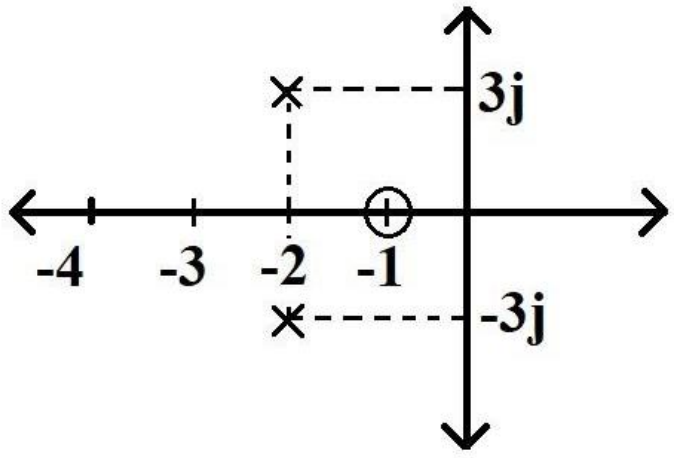
Course Code: ECC304 and Course Name: Network Theory

Time: 2 Hour Max. Marks: 80

==========

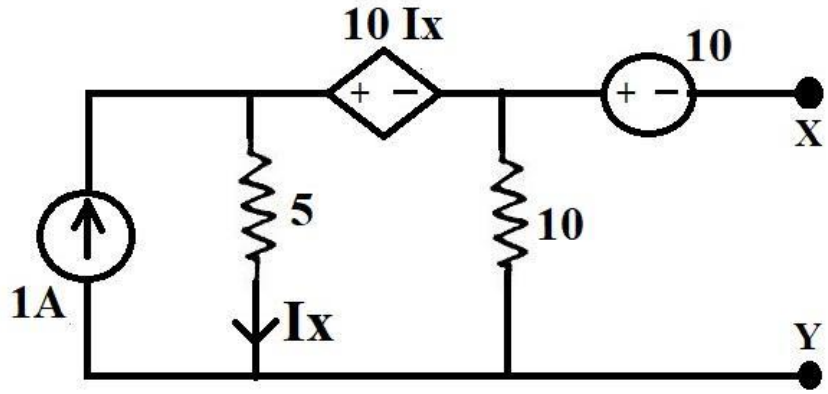
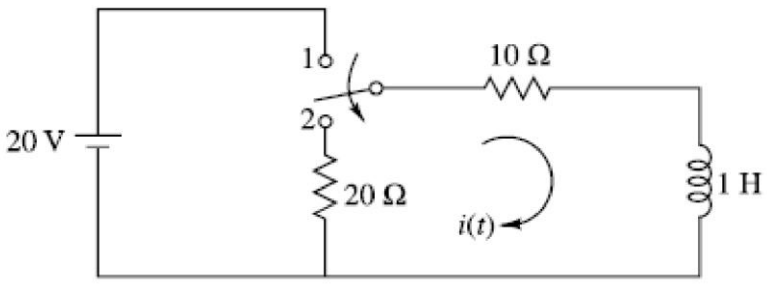
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following conditions delivers maximum power to the load?
Option A:	$R_L > R_{TH}$
Option B:	$R_L = R_{TH}$
Option C:	$R_L < R_{TH}$
Option D:	Depends upon source.
2.	Determine value of Va shown in the following figure. 
Option A:	1 V
Option B:	2 V
Option C:	3 V
Option D:	4 V
3.	Refer the following figure to find current Ia. 
Option A:	4 A
Option B:	3 A

Option C:	2 A
Option D:	1 A
4.	Two inductively coupled coils are connected in series with the Aiding method, where L1=6mH, L2=6mH and M=1mH. Determine Total inductance of combination.
Option A:	12 mH
Option B:	13 mH
Option C:	14 mH
Option D:	10 mH
5.	Number of fundamental cutsets in following oriented graphs are --------. 
Option A:	3
Option B:	4
Option C:	5
Option D:	6
6.	Which of the following is the correct generalized KCL equation in graph theory?
Option A:	$B.Z_b.B^T I_l = B.Vs - B.Z_b I_S$
Option B:	$QY_b\ Q^T.V_t = Q\ I_S - Q\ Y_b\ Vs$
Option C:	$Y = QY_b\ Q^T$
Option D:	$QY_b\ Q^T.V_t = Q\ (1 - Q\ Y_b\ Vs)$
7.	Reduced Incidence matrix can be obtained by -----
Option A:	Eliminating a row of complete incidence matrix
Option B:	Multiplying complete incidence matrix with its transpose
Option C:	$\| A\ A^T \|$
Option D:	Obtaining tree
8.	Laplace transform of $\int_0^t f(t).dt$ is equal to --------.
Option A:	d F(S) / dS
Option B:	S F(S) – f(0)
Option C:	F(S) / S
Option D:	F(S+a)

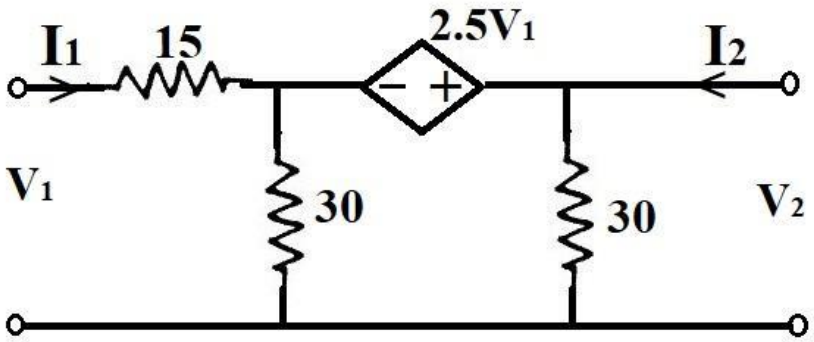
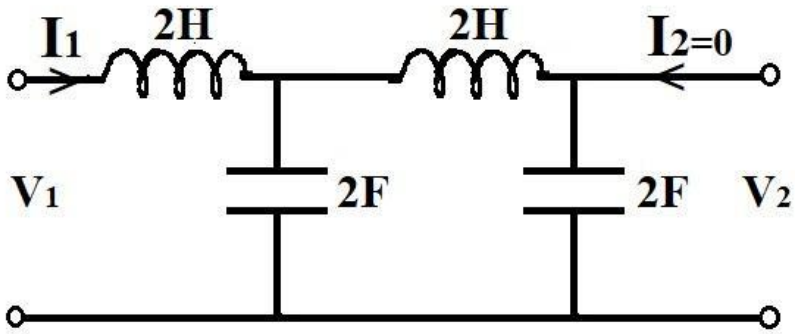
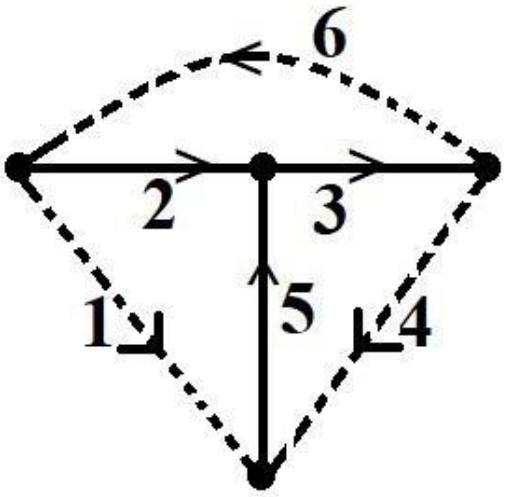
9.	Voltage source V is applied to series connected R and L networks. Equation of the current in the inductor is -------.
Option A:	$i(t) = V(1 - e^{-\frac{Lt}{R}}) / R$
Option B:	0
Option C:	$i(t) = V(1 - e^{-\frac{Rt}{L}}) / R$
Option D:	$i(t) = (e^{-\frac{Rt}{L}})$
10.	In the following figure, a switch was opened for a long time and then closed at t = 0. Determine i(t) at $t = 0^+$. 
Option A:	1 A
Option B:	0.3 A
Option C:	0.7 A
Option D:	0 A
11.	For a series connected R-C network where R = 100 ohm and C = 0.1 uF connected in series. Time constant (τ) of a given circuit is --------.
Option A:	10 uSec
Option B:	1 / 100 Sec
Option C:	100 uSec
Option D:	1 uSec
12.	The driving point impedance function Z(S) of a network has pole-zero location shown in figure, then Z(S) is given by --------. 
Option A:	$\frac{H\ (S+2-3j)(S+2+3j)}{(S+1)}$
Option B:	$\frac{H\ (S-1)}{(S-2-3j)(S-2+3j)}$

Option C:	$\frac{H\ (S+1)}{(S+2-3j)(S+2+3j)}$
Option D:	$\frac{H\ (S+1)}{(S-2-3j)(S-2+3j)}$
13.	Polynomial P(S) = $3S^3 + 4S^2 + 2S + 1$ is to be tested for Hurwitz. Elements in the first column of Routh's array are --------.
Option A:	3, 4, 2, 1
Option B:	3, 4, -1.25, 1
Option C:	3, 4, -2, 1
Option D:	3, 4, 1.25, 1
14.	If inductor and capacitor are connected in series then equivalent impedance is ---
Option A:	L+ C
Option B:	LS + 1 / CS
Option C:	$\frac{LC+1}{CS}$
Option D:	(S + L) C
15.	Two two port networks are connected in parallel. The combination is to be represented as a single two-port network. The parameters obtained by adding individuals are ----.
Option A:	Z-parameter matrix
Option B:	h-parameter matrix
Option C:	ABCD-parameter matrix
Option D:	Y-parameter matrix
16.	A Two port network has the following equations. $I2 = 10\ I_1 + 2\ V_2$ and $V_1 = 5\ I_1 + 6\ V_2$ and Hybrid parameters are h_{11}= ------- and h_{12} = -------- respectively.
Option A:	6 and 5
Option B:	10 and 2
Option C:	5 and 6
Option D:	2 and 10
17.	A two port network is said to be symmetrical if ----
Option A:	Voltage to current ratio at one port is the same as the voltage to current ratio at another port with one port open circuited.
Option B:	Voltage gain and current gain are the same.
Option C:	Ratio of excitation at one port to response at another port is the same if excitation and response is interchanged.
Option D:	Current gain is same if ports are interchanged
18.	Driving point impedance function Z(S) = $\frac{3}{S+4}$ is -----
Option A:	Series combination of two inductors
Option B:	Parallel combination of Inductor and Resistor
Option C:	Parallel combination of resistor and capacitor

Option D:	Series combination of two capacitors
19.	Realization of function using Cauer-II can be obtained by -----.
Option A:	Partial fraction expansion on Y(S)
Option B:	Partial fraction expansion on Z(S)
Option C:	Division operation on Z(S)
Option D:	Continued fraction expansion
20.	Function F(S) = $\frac{(S-3)}{S^2+9S+20}$ is not positive real function because ---
Option A:	A zero is right half of S-Plane
Option B:	Poles are lies on left side of S plane
Option C:	A zero is at left half of S plane
Option D:	All poles lie on left half of S-Plane

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	Find Thevenin's equivalent across X and Y terminals for a given network. 
B	Realize the following function using Cauer-I and Cauer-II form Z(S) = $\frac{S^2+4S+3}{S^2+2S}$
C	The switch is changed from position-1 to position-2 at t=0. Steady state condition was reached before switching. Determine i(t), $\frac{di(t)}{dt}$ and $\frac{d^2i(t)}{dt^2}$ at t=0+. 

Q3	**Solve any Two Questions out of Three** **10 marks each**

A	Find ABCD parameters of a given network. 
B	Find network function $\frac{V1}{I1}, \frac{V2}{I1}, \frac{V2}{V1}$ 
C	The graph of the network shown in below. Obtain f-tieset, f-cutset and Incidence matrix. 

University of Mumbai

Examination 2020 under cluster 5 (Lead College: APSIT)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Electronics and Telecommunication Engineering**

Curriculum Scheme: Rev-2019

Examination: SE Semester III

Course Code: ECC304 and Course Name: Network Theory

Time: 2 hour Max. Marks: 80

==========

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