K. J. Somaiya Institute of Engineering and Information Technology
Sion, Mumbai - 400022
NAAC Accredited Institute with 'A' Grade
NBA Accredited 3 Programs
(Computer Engineering, Electronics & Telecommunication Engineering and Electronics Engineering)
Permanently Affiliated to University of Mumbai

EXAMINATION TIME TABLE (JANUARY 2021)

PROGRAMME - S.E. (Electronics & Telecommunication) (REV. -2012) (CBSGS)

SEMESTER - III

Days and Dates	Time	Course Code	Paper
08 January 2021	12:30 p.m. to 02:30 p.m.	ETS301	APPLIED MATHEMATICS-III
11 January 2021	12:30 p.m. to 02:30 p.m.	ETS302	ANALOG ELECTRONICS - I
13 January 2021	12:30 p.m. to 02:30 p.m.	ETS303	DIGITAL ELECTRONICS
15 January 2021	12:30 p.m. to 02:30 p.m.	ETS304	CIRCUITS AND TRANSMISSION LINES
18 January 2021	12:30 p.m. to 02:30 p.m.	ETS305	ELECTRONIC INSTRUMENTS & MEASUREMENTS

Important Note: ● Change if any, in the time table shall be communicated on the college web site.

Mumbai
20th December, 2020.

Principal

University of Mumbai

Examination 2020 under cluster __ (Lead College: _____)

Program: SE Electronics and Telecommunication Engineering
Curriculum Scheme: Rev 2012 (CBSGS)
Examination: Second Year/ Semester III
Course Code: ETS301, Course Name: AM-III

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.	If $\varphi = x^2 + y^2 + z^2$, find $\nabla\varphi$.
Option A:	$\frac{-2\bar{r}}{r^2}$
Option B:	$\frac{\bar{r}}{r^2}$
Option C:	$2\bar{r}$
Option D:	$-2\bar{r}$
2.	Find 'p' if $f(z) = r^2\cos 3\theta + ir^2 \sin p\theta$ is analytic.
Option A:	3
Option B:	2
Option C:	4
Option D:	-2
3.	Find the value of a_n for $f(x) = 2$ in the interval $(-2,2)$.
Option A:	$\frac{4(-1)^n}{4-n^2\pi^2}\cosh 2$
Option B:	$\frac{4(-1)^n}{4+n^2\pi^2}\cosh 2$
Option C:	$\frac{4(-1)^n}{4-n^2\pi^2}\sinh 2$
Option D:	0

4.	Find $L^{-1}[\tan^{-1}(s)]$
Option A:	$\frac{-\sin t}{t}$
Option B:	$-\frac{e^{-4t}\cosh t}{t}$
Option C:	$\frac{e^{-4t}\,sint}{t}$
Option D:	$\frac{\sin t}{t}$
5.	The value of $J_{1/2}(x)$ is
Option A:	$\sqrt{\frac{2}{\pi x}}.\cos x$
Option B:	$-\sqrt{\frac{2}{\pi x}}.\cos x$
Option C:	$\sqrt{\frac{2}{\pi x}}.\sin x$
Option D:	$-\sqrt{\frac{2}{\pi x}}.\cos x$
6.	Find the fixed points of the bilinear transformation of $w=\frac{2z+6}{z+7}$
Option A:	1,-6
Option B:	-1,6
Option C:	-1,-2
Option D:	1,-2
7.	Find the maximum directional derivative of $\varphi=(4x-y+2z)^2$ at (1,2,1).
Option A:	$\sqrt{21}$

Option B:	$8\sqrt{21}$
Option C:	$-8\sqrt{21}$
Option D:	$-\sqrt{21}$
8.	Find $L[e^{-2t}\sin 3t]$.
Option A:	$\dfrac{3}{(s^2+4s+13)}$
Option B:	$\dfrac{3}{(s^2-4s+13)}$
Option C:	$\dfrac{3}{(s^2+4s-13)}$
Option D:	$\dfrac{3}{(s^2+4s-9)}$
9.	If $\overline{a}$ is a constant vector find $div(\overline{a})$
Option A:	0
Option B:	constant
Option C:	1
Option D:	$\overline{a}$
10.	Write the formula for C_n in the complex form of the Fourier Series of $f(x)$ in the interval $(0,2\pi)$.
Option A:	$C_n = \dfrac{1}{\pi}\int_0^{\pi} f(x)e^{-inx}dx$
Option B:	$C_n = \dfrac{1}{2\pi}\int_0^{2\pi} f(x)e^{inx}dx$
Option C:	$C_n = \dfrac{1}{2\pi}\int_0^{2\pi} f(x)e^{-inx}dx$

Option D:	$C_n = \frac{1}{2\pi}\int_0^{\pi} f(x)e^{-inx}dx$
11.	Find $L[t\cosh t]$
Option A:	$\frac{s^2+1}{(s^2-1)^2}$
Option B:	$\frac{s^2-1}{(s^2+1)^2}$
Option C:	$\frac{1}{(s^2-1)^2}$
Option D:	$\frac{s^2}{(s^2-1)^2}$
12.	Which one of the following function is Harmonic Function?
Option A:	$u = y^3 + 3x^2y$
Option B:	$u = y^3 - 3x^2y$
Option C:	$u = y^3 - x^2y$
Option D:	$u = y^3 - 3x^2$
13.	Use Stoke's theorem to equate $\int_C \overline{F}\cdot d\overline{r}$ is
Option A:	$\iint_S \overline{N}\times(\nabla\times\overline{F})ds$
Option B:	$\iint_S \overline{N}.\overline{F}ds$
Option C:	$\iint_S \overline{N}.(\nabla\times\overline{F})ds$
Option D:	$\iint_S \overline{N}(\nabla.\overline{F})ds$
14.	If $f(t) = \frac{\sin t}{t}$ then find $L[f'(t)]$.

Option A:	$s.\cot^{-1} s+1$
Option B:	$s.\cot^{-1} s-1$
Option C:	$\cot^{-1} s-1$
Option D:	$\cot^{-1} s+1$
15.	The value of $J_0^{'}(x)$ is
Option A:	$J_1(x)$
Option B:	0
Option C:	$-J_1(x)$
Option D:	$-J_1^{'}(x)$
16.	Find Laplace Transform of $e^{3t}H(t-2)$.
Option A:	$e^{2(s+3)}.\frac{1}{s+3}$
Option B:	$e^{-2(s-3)}.\frac{1}{s-3}$
Option C:	$e^{2(s-3)}.\frac{1}{s-3}$
Option D:	$e^{-2(s+3)}.\frac{1}{s+3}$
17.	Define Fourier Cosine Integral in the interval $(-\infty,\infty)$.
Option A:	$f(x)=\frac{2}{\pi}\int_0^\infty \cos\omega x\int_0^\infty f(s)\cos\omega s d\omega ds$
Option B:	$f(x)=\frac{2}{\pi}\int_0^\infty \sin\omega x\int_0^\infty f(s)\cos\omega s d\omega ds$
Option C:	$f(x)=\frac{2}{\pi}\int_0^\infty \cos\omega x\int_0^\infty f(s)\sin\omega s d\omega ds$
Option D:	$f(x)=\frac{2}{\pi}\int_0^\infty \sin\omega x\int_0^\infty f(s)\sin\omega s d\omega ds$

18.	If $curl\,\overline{F} = \overline{0}$ then the field $\overline{F}$ is
Option A:	Irrotational
Option B:	Orthogonal
Option C:	Solenoidal
Option D:	Scalar Potential
19.	Compute the constant 'a' if $f(z) = (x^2 + 2axy - y^2) + i(-x^2 + 2xy + y^2)$ is analytic.
Option A:	2
Option B:	-1
Option C:	1
Option D:	-2
20.	Find the value of b_n for $f(x) = 2x^2$ in the interval (-2,2).
Option A:	$\frac{\pi(-1)^n}{2}$
Option B:	0
Option C:	$\frac{\pi(-1)^{n+1}}{4}$
Option D:	$\frac{\pi(-1)^{n-1}}{2}$

Q2. (20 Marks)	Solve any Four out of Six 5 marks each
A	Evaluate $\int_0^\infty e^{-3t} t^5 dt$
B	Solve $\frac{d^2y}{dt^2} + 9y = 1$ given that y(0)=0, y'(0)=0.
C	Find the Fourier Series of $f(x) = 2x, (-\pi, \pi)$.

D	Prove that $J_{5/2}(x)=\sqrt{\frac{2}{\pi x}}.\left\{\frac{3-x^2}{x^2}\sin x-\frac{3}{x}\cos x\right\}$.
E	Show that the vector $\overline{F}=(x^2-yz)i+(y^2-zx)j+(z^2-xy)k$ is irrotational and hence, find its scalar potential.
F	Find the orthogonal trajectory of the family of curves given by $2x-x^3+3xy^2=a$.

Q3. (20 Marks)	**Solve any Four out of Six 5 marks each**
A	Using Convolution Theorem, find Inverse Laplace transforms of $\frac{1}{(s-2)(s+2)^2}$.
B	Find Complex form of Fourier Series for $f(x)=e^{-x}$ in the interval (-1,1).
C	Determine the constants a,b,c if $\overline{F}=(x+2y+az)i+(bx-3y-z)j+(4x+cy+2z)k$ is irrotational.
D	Evaluate by Green's Theorem $\int_C \overline{F}\cdot d\overline{r}$ where $\overline{F}=(xy+y^2)i+x^2j$, C is the closed curve of the region bounded by $y=x$ and $y=x^2$.
E	Find the Bilinear Transformation which maps the points $z = \infty, i, 0$ onto the points $w = 0, i, \infty$.
F	Verify Laplace's Equation for $u=\left(r+\frac{a^2}{r}\right)\cos\theta$. Also find v.

University of Mumbai
Examination 2020 under cluster __ (Lead College: _____)

Program: SE Electronics and Telecommunication Engineering
Curriculum Scheme: Rev 2012 (CBSGS)
Examination: Second Year/ Semester III
Course Code: ETS301, Course Name: AM-III

Time: 2 hour Max. Marks: 80

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

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: Rev 2012

Examination: SE Semester III

Course Code: ETC302 and Course Name: Analog Electronics-I

Time: 2 Hour Max. Marks: 80

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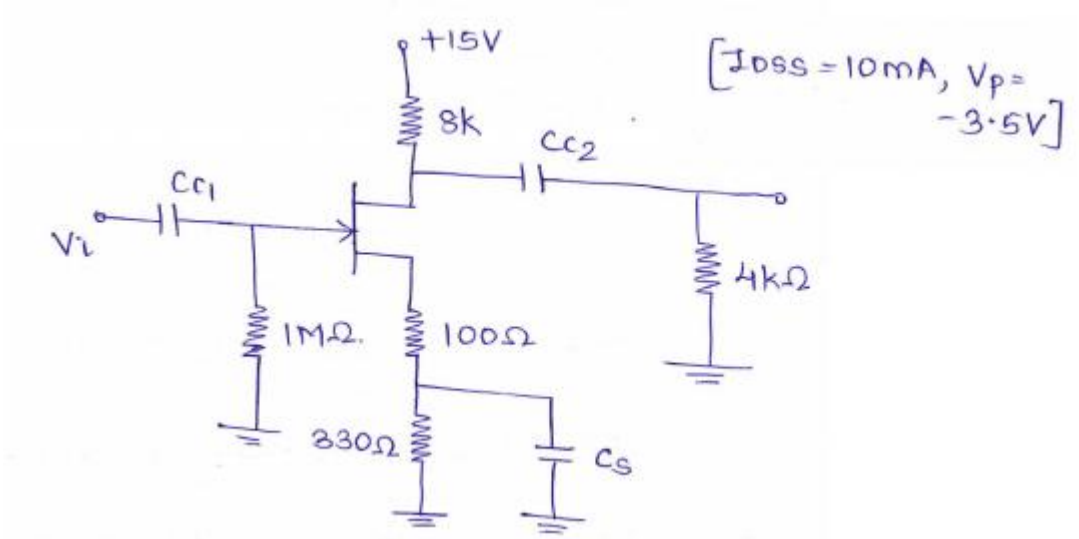
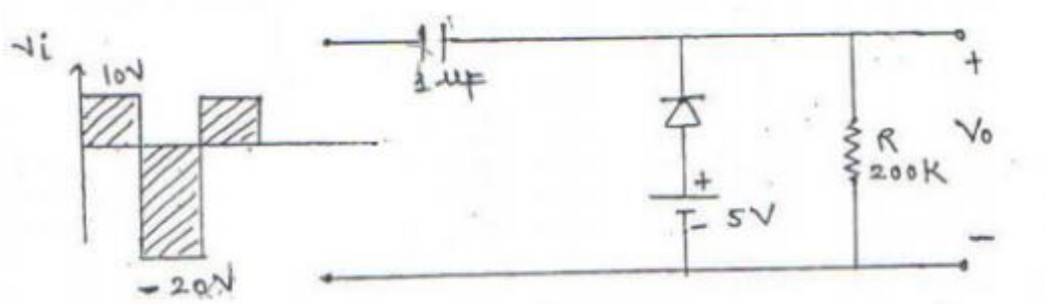
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Calculate the forward bias current of a Si diode when forward bias voltage of 0.4 V is applied, the reverse saturation current is 1.5×10^{-9}A, ideality factor is 1 and the thermal voltage is 26mV.
Option A:	7.2 mA
Option B:	12.4 mA
Option C:	1.256 mA
Option D:	5.689 mA
2.	A MOSFET is sometimes called ……. JFET.
Option A:	Many gate
Option B:	Open gate
Option C:	Insulated gate
Option D:	Shorted gate
3.	For the dc analysis the network can be isolated from the indicated ac levels by replacing the capacitor with _____.
Option A:	an open circuit equivalent
Option B:	a short circuit equivalent
Option C:	a source voltage
Option D:	A source current
4.	Varactor diode is a semiconductor diode in which the _____ can be varied as a function of reverse voltage of the diode.
Option A:	Junction resistance
Option B:	Junction conductance
Option C:	Junction inductance
Option D:	Junction capacitance
5.	In a small signal equivalent model of an FET, what does $g_m V_{GS}$ stand for?
Option A:	A pure resistor
Option B:	Voltage controlled current source
Option C:	Current controlled current source
Option D:	Voltage controlled voltage source

6.	What type of diode circuit is used to clip off portions of signal voltages above or below certain levels?
Option A:	Clamper
Option B:	Clipper
Option C:	IC voltage regulator
Option D:	Comparator
7.	For a CE amplifier with voltage divider biasing with bypassed R_E, $R_1 = 40$ kΩ, $R_2 = 10$ kΩ, $r_\pi = 1.15$ kΩ the input impedance of the amplifier using the hybrid pi model is ____ .
Option A:	1.005 kΩ
Option B:	9.15 kΩ
Option C:	5.15 kΩ
Option D:	8.25 kΩ
8.	Frequency of oscillation of a Wein bridge oscillator is given by _____ .
Option A:	1/6πRC
Option B:	1/2πRC
Option C:	2πRC
Option D:	1/RC
9.	For base bias with emitter feedback if the value of $R_B = 10$ kΩ, $R_E = 2$ kΩ and β = 100, the value of stability factor is _____ .
Option A:	5.72
Option B:	2.94
Option C:	9.83
Option D:	0
10.	A transistor with ß = 120 is biased to operate at a dc collector current of 1.2 mA. Find the value of gm.
Option A:	12mA/V
Option B:	24 mA/V
Option C:	36 mA/V
Option D:	48 mA/V
11.	What is the typical value for the input impedance Zi for JFETs?
Option A:	100 kΩ
Option B:	1 MΩ
Option C:	10 MΩ
Option D:	1000 MΩ
12.	The _____ controls the _____ of an FET.
Option A:	ID, VGS
Option B:	VGS, ID
Option C:	IG, VDS
Option D:	IG, ID
13.	Calculate the frequency of Colpitts oscillator if $C_1 = 1$ nF, $C_2 = 15$ nF and L = 27 µH.

Option A:	1 MHz
Option B:	31.63 kHz
Option C:	1 GHz
Option D:	1 kHz
14.	The emitter-follower configuration has a _____ impedance at the input and a _____ impedance at the output.
Option A:	low, low
Option B:	low, high
Option C:	high, low
Option D:	high, high
15.	Which of the following is expected to have highest input impedance?
Option A:	MOSFET
Option B:	JFET amplifier
Option C:	CE bipolar transistor
Option D:	Common collector bipolar transistor
16.	_____ is a fixed frequency oscillator.
Option A:	Phase shift oscillator
Option B:	Hartley oscillator
Option C:	Colpitts oscillator
Option D:	Crystal oscillator
17.	Which FET amplifier has a phase inversion between input and output signals?
Option A:	Common gate
Option B:	Common source
Option C:	Common drain
Option D:	Source follower
18.	What is trans-conductance?
Option A:	Ratio of change in drain current to change in collector current
Option B:	Ratio of change in drain current to change in gate to source voltage
Option C:	Ratio of change in collector current to change in drain current
Option D:	Ratio of change in collector current to change in gate to source voltage
19.	Find the maximum value of gm for FET with I_{DSS} = 10mA, V_P= - 2V, V_{GS}= - 5V?
Option A:	10 mS
Option B:	20 mS
Option C:	1 mS
Option D:	0 mS
20.	Determine the value of transconductance for N-channel JFET with I_{DSS} = 9 mA, V_P = -2V, V_{GS} = -1 V.
Option A:	7.5 mS
Option B:	6.5 mS
Option C:	5.5 mS
Option D:	4.5 mS

Q2	**Solve any Two Questions out of Three**	**10 marks each**
A	Explain the basic operation and characteristics of n-channel enhancement type MOSFET.	
B	Derive the equations for voltage gain, input impedance and output impedance for a NPN transistor in CE mode voltage divider bias configuration with R_E unbypassed.	
C	For the amplifier shown below determine the Q point 	

Q3	**Solve any Two Questions out of Three**	**10 marks each**
A	Determine the output waveform V_0 for the circuit shown below if a) $V_r = 0$ V b) $V_r = 0.7$ V Where V_r is the diode cut in voltage 	
B	Draw a neat circuit diagram of Phase Shift Oscillator and derive an expression for its output frequency.	
C	Derive expression for voltage gain, input impedance and output impedance for a source follower circuit using n- channel MOSFET.	

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: Rev 2012

Examination: SE Semester III

Course Code: ETC302 and Course Name: Analog Electronics-I

Time: 2 Hour Max. Marks: 80

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Question Number	Correct Option
Q1.	A
Q2.	C
Q3.	A
Q4	D
Q5	B
Q6	B
Q7	A
Q8.	B
Q9.	A
Q10.	D
Q11.	D
Q12.	B
Q13.	A
Q14.	C
Q15.	A
Q16.	D
Q17.	B
Q18.	B
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 & Telecommunication Engineering

Curriculum Scheme: Rev2012

Examination: SESemesterIII

Course Code: ETC303and Course Name:Digital Electronics

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.	What will be the result in BCD form if two binary numbers 599 and 984 are added?
Option A:	8513
Option B:	1583
Option C:	8421
Option D:	1234
2.	The advantage of TTL with totem-pole output as compared to other TTL types are
Option A:	Higher fan in and higher fan out
Option B:	low power dissipation and Fast switching
Option C:	Low cost and high noise margin
Option D:	Slow switching and high power dissipation
3.	Which of the following correctly describes the distributive law?
Option A:	(A+B)(C+D)=AB+CD
Option B:	(A+B).C=AC+BC
Option C:	(AB)(A+B)=AB
Option D:	(A.B)C=AC.AB
4.	Each group of adjacent Minterms corresponds to a possible product term of the given .
Option A:	Function
Option B:	Value
Option C:	Set
Option D:	Word
5.	Which of the following flip flop is used as latch?
Option A:	J-K flip flop
Option B:	Master slave J-K flip flop
Option C:	D flip flop
Option D:	T flip flop
6.	Race condition occurs in
Option A:	Synchronous circuit

Option B:	Asynchronous circuit
Option C:	Combinational circuit
Option D:	All of the digital circuit
7.	Flash memory is a non-volatile storage device in which data
Option A:	Can be erased physically
Option B:	Can be erased magnetically
Option C:	Can be erased electrically
Option D:	Cannot be erased
8.	Which mechanism allocates the binary value to the states in order to reduce the cost of the combinational circuits?
Option A:	State Reduction
Option B:	State Minimization
Option C:	State Assignment
Option D:	State Evaluation
9.	Two states are said to be equal if they have the same
Option A:	Inputs
Option B:	Next state
Option C:	Output
Option D:	Mid state
10.	What is the principal advantage of using address multiplexing with DRAM memory?
Option A:	reduced pin count and decrease in package size
Option B:	reduced memory access time
Option C:	reduced requirement for constant refreshing of the memory contents
Option D:	It eliminates the requirement for a chip-select input line, thereby reducing the pin count.
11.	Demultiplexers facilitate which type of conversion?
Option A:	Decimal-to-hexadecimal
Option B:	Single input, multiple outputs
Option C:	AC to DC
Option D:	Odd parity to even parity
12.	When performing subtraction by addition in the 2's-complement system _____ .
Option A:	The minuend and the subtrahend are both changed to the 2's-complement
Option B:	The minuend is changed to 2's-complement and the subtrahend is left in its original form
Option C:	The minuend is left in its original form and the subtrahend is changed to its 2's-complement
Option D:	The minuend and subtrahend are both left in their original form.
13.	PROMs are available in _____ .
Option A:	Bipolar and MOSFET technologies
Option B:	MOSFET and FET technologies
Option C:	FET and bipolar technologies
Option D:	MOS and bipolar technologies

14.	A Karnaugh map (K-map) is an abstract form of _____ diagram organized as a matrix of squares.
Option A:	Cycle Diagram
Option B:	Block diagram
Option C:	Triangular Diagram
Option D:	Venn Diagram
15.	How many full adders are required to construct an m-bit parallel adder?
Option A:	m/2
Option B:	M
Option C:	m-1
Option D:	M+1
16.	What is the difference between a shift-right register and a shift-left register?
Option A:	There is no difference
Option B:	The direction of the shift
Option C:	Propagation delay
Option D:	The clock input
17.	In PLD, there are provisions to perform interconnections of the gates internally, because of
Option A:	High reliability
Option B:	High conductivity
Option C:	The desired logic implementation
Option D:	The desired output
18.	Which of the following is similar to the entity declaration in structural modeling in VHDL?
Option A:	Component instantiation
Option B:	Component declaration
Option C:	Port map
Option D:	Generic map
19.	Which of the following sequential statements can't be used in a function?
Option A:	WAIT
Option B:	IF
Option C:	CASE
Option D:	LOOP
20.	FPGA devices are ___.
Option A:	PLD type
Option B:	EPROM type
Option C:	SROM
Option D:	SLD

Q2 **(20 Marks Each)**	**Solve any Four out of Six** **5 marks each**
A	Design and implement 4-bit look ahead carry adder.
B	Design and implement BCD to Excess-3 code converter.
C	Explain XC4000 FPGA architecture block diagram.
D	Write VHDL code for Full Adder.
E	Explain interfacing between CMOS and TTL.
F	Write a short note on PAL and PLA.

Q3. **(20 Marks Each)**	**Solve any Two Questions out of Three** **10 marks each**
A	Write the difference between Moore and Mealy models with necessary block diagrams.
B	What is the significance of Edge triggering? Explain the working of positive edge triggered D flip-flop with their function table.
C	Implement the following Boolean function using 8:1 multiplexer: $Y=f(A,B,C,D)=\bar{A}B\bar{D}+ACD+BCD+\bar{A}\bar{C}D$

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 & Telecommunication Engineering

Curriculum Scheme: Rev2012

Examination: SE Semester III

Course Code: ETC303 and Course Name: Digital Electronics

Time: 2 hour Max. Marks: 80

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

Curriculum Scheme: Rev-2012

Examination: SE Semester III

Course Code: ETC304 and Course Name: Circuit and Transmission Lines

Time: 2 Hour Max. Marks: 80

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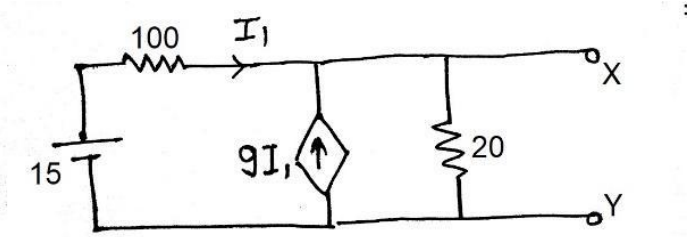
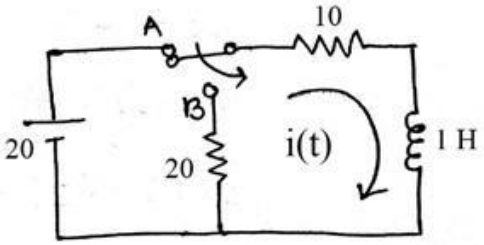
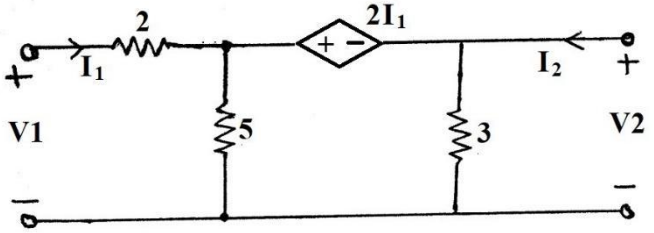
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Dependent voltage source must be ---------- while analyzing network using superposition theorem.
Option A:	Open circuited
Option B:	Short circuited
Option C:	Replaced by its equivalent resistor
Option D:	Active
2.	A network consist of dependent current source with value $5V_X$. Which type of dependent source it is?
Option A:	Voltage Controlled Current Source
Option B:	Current Controlled Current Source
Option C:	Voltage Controlled Voltage Source
Option D:	Current Controlled Voltage Source
3.	Dot convention in inductively coupled coils is used to -------.
Option A:	Determine power delivered to the other coil
Option B:	Determine turning ratio of two coils
Option C:	Determine polarities of induced E.M. F.
Option D:	Identify types of dependent source to be introduced
4.	Value of load resistor must be equal to ------ to delivered maximum power to the load
Option A:	$(I_{SC})^2 x R_{TH}$
Option B:	Thevenin's equivalent resistor (R_{TH})
Option C:	V_{TH} / R_{TH}
Option D:	$V_{TH} / 2xR_{TH}$
5.	If the voltage across capacitor (C) is Vc(t), then current in capacitor ic(t) is given by --------.
Option A:	$ic(t) = \frac{1}{C} \int_{-\infty}^{t} Vc(t).dt$
Option B:	ic(t) = Vc(t) / C
Option C:	$ic(t) = Vc(t) + Vc(0^-)$
Option D:	$ic(t) = C \frac{dVc(t)}{dt}$

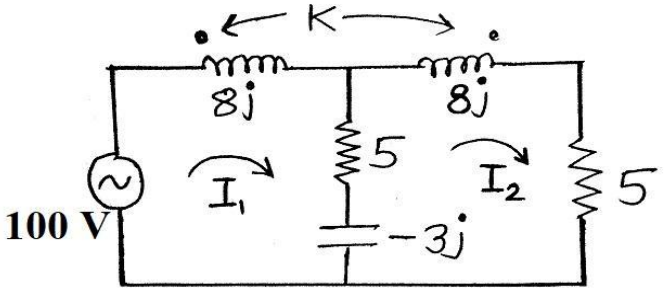
6.	If u(t) signal is applied to the R-C network where R = 1000 ohm and C = 1 uF connected in series. Determine time constant (τ) of a given network.
Option A:	10 mSec
Option B:	0.1 mSec
Option C:	1 mSec
Option D:	5 mSec
7.	For R-L network with zero initial conditions ($i_L(0^-) = 0$), at $t = 0^+$, inductor behaves as ---
Option A:	Voltage source
Option B:	Produces non-zero current
Option C:	Short circuit
Option D:	Open circuit
8.	Laplace transform of unit step function starting at t = a is ------
Option A:	$\frac{e^{-at}}{S}$
Option B:	$\frac{1}{S}$
Option C:	$\frac{a}{S}$
Option D:	$\frac{a}{S^2}$
9.	Voltage source with function u(t) is applied to series connected R and C network. Equation of voltage across capacitor is -------
Option A:	u(t)
Option B:	$(1 - e^{-t})$ u(t)
Option C:	$(1 - e^{-RC})$ u(t)
Option D:	$e^{-\frac{t}{RC}}$ u(t)
10.	The number of roots of $P(S) = S^2+8S+15$ in left half of the S-plane are ----
Option A:	One
Option B:	Two
Option C:	Three
Option D:	Zero
11.	Driving point impedance function $Z(S) = \frac{7}{S+2}$ is ----
Option A:	Series combination of two resistors
Option B:	Parallel combination of Resistor and inductor
Option C:	Parallel combination of resistor and Capacitor
Option D:	Series combination of two inductors
12.	Function $F(S) = \frac{4(S+3)}{(S+2)(S-4)}$ is not positive real function, because ------
Option A:	All poles lie in left half of the S-Plane
Option B:	All zeros lie in left half of the S-Plane
Option C:	Poles and zeros are not interlaced
Option D:	One of the pole is right half of S-Plane

13.	Realization of RC impedance function using Cauer-I can be obtained by -----
Option A:	Partial fraction expansion
Option B:	2^{nd} order Non-homogeneous equation
Option C:	Removal of pole from impedance function at origin
Option D:	Continued fraction expansion about pole at infinity
14.	Which of the following is valid equations of transmission parameters?
Option A:	$V_1 = T_{11} V_2 – T_{12} I_2$
Option B:	$V_1 = A V_2 – B I_2$
Option C:	$I_2 = CV_2 – D V_1$
Option D:	$I_1 = CV_1 – D V_2$
15.	One of the conditions for two port network to be symmetrical is ------
Option A:	$h_{11} h_{22} – h_{21} h_{12} = 1$
Option B:	AD – BC = 1
Option C:	$h_{21} = - h_{12}$
Option D:	$h_{11} = h_{22}$
16.	If I_1 = 0.1 A, V_1 = 5.2 V, V_2 = 4.1 V with port-2 open circuited. Open circuit impedance parameters Z_{21} = ---ohm.
Option A:	4.1
Option B:	41
Option C:	5.1
Option D:	51
17.	A certain transmission line operating at radio frequencies has L = 9µH/m and C = 16pF/m. If the line is terminated with a resistive load of 1kΩ. Determine characteristic impedance.
Option A:	750 ohm
Option B:	13.33 ohm
Option C:	14.4 ohm
Option D:	1.77 ohm
18.	For a matched line, load impedance is equal to ----- .
Option A:	Input impedance
Option B:	Output impedance
Option C:	Zero
Option D:	Characteristic impedance.
19.	Which of the following are the primary constants of a transmission line?
Option A:	VSWR and reflection coefficient
Option B:	propagation constant and characteristic impedance
Option C:	R, L, G, C
Option D:	R and L
20.	How to calculate reflection coefficient of transmission line?
Option A:	RLC
Option B:	LC
Option C:	L / C

Option D:	$\frac{Z_R - Z_0}{Z_R + Z_0}$

Q2	Solve any Two Questions out of Three 10 marks each
A	A lossless transmission line with operating frequency of 10 MHz is characterized by R = 0.006 Ω/m, L = 2.5μH/m and C = 4.45 pF/m. Find – (i) Characteristic impedance (ii) propagation constant.
B	Refer following figure to determine Thevenin's equivalent across X-Y terminal 
C	In given figure, if steady state condition reached before switching the position. Find the value of i(t), $\frac{di(t)}{dt}$, $\frac{d^2i(t)}{dt^2}$ at t= 0^+. 

Q3	Solve any Two Questions out of Three 10 marks each
A	Realize following function in Foster-I and Foster-II form $Z(S) = \frac{4(S^2+1)(S^2+9)}{S(S^2+4)}$
B	For the network shown in figure, determine Z parameters of the network. 
C	For following figure, K=0.75, determine mesh current I_2.


K
8j
8j
5
I1
I2
5
100 V
-3j

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-2012

Examination: SE Semester III

Course Code: ETC304 and Course Name: Circuit and Transmission Lines

Time: 2 hour Max. Marks: 80

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

Curriculum Scheme: Rev 2012

Examination: SE Semester: III

Course Code: ETC305 and Course Name: Electronic Instruments and Measurements

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.	Potentiometric transducers are used for the measurement of
Option A:	Pressure but not Displacement
Option B:	Displacement but not Pressure
Option C:	Humidity
Option D:	Both Pressure and Displacement
2.	What is the principle of operation of LVDT?
Option A:	Self inductance
Option B:	Mutual inductance
Option C:	Permanence
Option D:	Reluctance
3.	Which of the following is not a piezo-electric sensor?
Option A:	PZT
Option B:	Rochelle salt
Option C:	Quartz
Option D:	RTD
4.	Strain gauge is a - - - -
Option A:	Active device and converts mechanical displacement into a change of resistance
Option B:	Passive device and converts electrical displacement into a change of resistance
Option C:	Passive device and converts mechanical displacement into a change of resistance
Option D:	Active device and converts electrical displacement into a change of resistance
5.	Bourdon tube is used for the measurement of gauge pressure of
Option A:	Gas but not liquid
Option B:	Liquid but not gas
Option C:	Solid
Option D:	Gas and liquid
6.	The process of measurement
Option A:	Always disturbs the system being measured
Option B:	It may or may not disturb the system being measured
Option C:	Never disturbs the system being measured
Option D:	Repeats the measurements

7.	Function of transducer is to convert
Option A:	Electrical signal into non electrical quantity
Option B:	Non electrical quantity into electrical signal
Option C:	Electrical signal into mechanical quantity
Option D:	Mechanical signal into mechanical quantity
8.	Schering bridge is used for
Option A:	low voltages only
Option B:	low and high voltages
Option C:	high voltages only
Option D:	intermediate voltages only
9.	The balance condition of a Wheatstone bridge depends on the
Option A:	ratio of arms R1 and R2
Option B:	ratio of arms R3 and R4
Option C:	emf source and null detector
Option D:	current source and power source
10.	What is the main part of a CRO?
Option A:	Amplifier
Option B:	Sweep generator
Option C:	Trigger circuit
Option D:	CRT
11.	The range of input voltages of an electronic voltmeter can be extended by using - -- -
Option A:	Functional switch
Option B:	Bridge circuit
Option C:	Input attenuator
Option D:	Rectifier
12.	In a 6-bit ladder DAC output varies from 0-10 volts. If input applied is 101001, then the output is - - - -
Option A:	4.22
Option B:	6.51
Option C:	2.98
Option D:	5.62
13.	The advantage of using a dual slope ADC in a digital voltmeter is that
Option A:	Its conversion time is small
Option B:	It gives ouput in BCD format
Option C:	It does not need a comparator
Option D:	Its accuracy is high
14.	The number of comparators in a 4-bit flash ADC is
Option A:	4
Option B:	6
Option C:	15
Option D:	10

15.	Which among these is the example of photo emissive cell?
Option A:	LDR
Option B:	Photodiode
Option C:	Photomultiplier tube
Option D:	Photo transistor
16.	What is a data acquisition system?
Option A:	system used for data processing, conversion and transmission
Option B:	accepts data as an input
Option C:	removes noise
Option D:	boosts the signal
17.	Transient signals can be observed using
Option A:	Storage oscilloscope
Option B:	Sampling oscilloscope
Option C:	Wave analyzer
Option D:	Spectrum analyzer
18.	Which of the following is not present in the spectrum analyzer?
Option A:	RF amplifier
Option B:	Swept local Oscillator
Option C:	Slotted line
Option D:	Sweep voltage generator
19.	Which analyzer measures capacitance vs voltage & capacitance vs time characteristics of semiconductor devices?
Option A:	Spectrum analyzer
Option B:	Distortion analyzer
Option C:	Capacitance-Voltage analyzer
Option D:	Network analyzer
20.	Maxwell bridge is used for measurement of inductance of which type of coil?
Option A:	Low Q coil
Option B:	Medium Q coil
Option C:	High Q coil
Option D:	Very High Q coil

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	Explain basic principle and working of flash ADC with a neat diagram.
B	Explain working of Energy meter.
C	Explain Kelvin's double bridge and how it is used for resistance measurement?

Q3. A	**Solve any Two** **5 marks each**
i.	What are the different types of telemetry systems? Explain any one.

ii.	Explain construction and working of Bourdon tube gauge.
iii.	What is the significance of 3-1/2 digit display?
Q3. B	**Solve any One** **10 marks each**
i.	Draw and explain block diagram of Digital storage oscilloscope and list its operational modes.
ii.	Explain FFT analyzer with a complete block diagram.

University of Mumbai

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Program: EXTC

Curriculum Scheme: Rev2012

Examination: SE Semester: III

Course Code: ETC305 and Course Name: Electronic Instruments and Measurements

Time: 2 hour Max. Marks: 80

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