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. -2016) (Choice Based)

SEMESTER - III

Days and Dates	Time	Course Code	Paper
08 January 2021	12:30 p.m. to 02:30 p.m.	ECC301	APPLIED MATHEMATICS-III
11 January 2021	12:30 p.m. to 02:30 p.m.	ECC302	ELECTRONIC DEVICES & CIRCUITS I
13 January 2021	12:30 p.m. to 02:30 p.m.	ECC303	DIGITAL SYSTEM DESIGN
15 January 2021	12:30 p.m. to 02:30 p.m.	ECC304	CIRCUIT THEORY AND NETWORKS
18 January 2021	12:30 p.m. to 02:30 p.m.	ECC305	ELECTRONIC INTSTRUMENTATION & CONTROL

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

Program: BE Electronics and Telecommunication Engineering
Curriculum Scheme: Revised 2016(CBCGS)
Examination: Second Year Semester III
Course Code: ECC301 and Course Name: Applied Mathematics-III

Time: 2 hour Max. Marks: 80

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Q1.	**All the Questions are compulsory and carry equal marks 2 marks each**
1.	$J_{\frac{1}{2}}{}^{2}(x)+J_{-\frac{1}{2}}{}^{2}(x)=---$
Option A:	$\frac{2}{\pi x}$
Option B:	$-\frac{2}{\pi x}$
Option C:	$\frac{2}{x}$
Option D:	$\frac{4}{\pi x}$
2.	The value of b_n for the function $f(x)=x^2 in(0,a)$ is given by
Option A:	$-\frac{a^2}{n\pi}$
Option B:	$\frac{a^2}{n\pi}$
Option C:	$-\frac{a^2}{\pi}$
Option D:	$-\frac{a^2}{2\pi}$
3.	The Laplace transform of e^{at} is
Option A:	$\frac{1}{(s+a)}$
Option B:	$\frac{1}{(s-a)}$
Option C:	$-\frac{1}{(s-a)}$
Option D:	$\frac{a}{(s-a)}$
4.	What is the Fourier series expansion of the function f(x) in the interval $(0,2l)$?

Option A:	$\sum_{n=1}^{\infty} a_n \cos(\frac{n\pi x}{l}) + \sum_{n=1}^{\infty} b_n \sin(\frac{n\pi x}{l})$
Option B:	$a_0 + \sum_{n=1}^{\infty} a_n \cos(\frac{n\pi x}{l})$
Option C:	$a_0 + \sum_{n=1}^{\infty} a_n \cos(\frac{n\pi x}{l}) + \sum_{n=1}^{\infty} b_n \sin(\frac{n\pi x}{l})$
Option D:	$a_0 + \sum_{n=1}^{\infty} b_n \sin(\frac{n\pi x}{l})$
5.	The value of $6J_3(x)$ is given by
Option A:	$xJ_2(x) - xJ_4(x)$
Option B:	$xJ_2(x) + xJ_4(x)$
Option C:	$-xJ_2(x) + xJ_4(x)$
Option D:	$xJ_2(x) + J_4(x)$
6.	The image of the circle $\lvert z-1\rvert = 1$ in the complex plane under the mapping $w = \frac{1}{z}$ is
Option A:	$u = \frac{1}{4}$
Option B:	$u = \frac{3}{2}$
Option C:	$u = -\frac{1}{2}$
Option D:	$u = \frac{1}{2}$
7.	If L[f(t)]= $\frac{s}{s^2+s+4}$ then $L[e^{-3t} f(2t)]$ is
Option A:	$\frac{s-3}{s^2+8s+31}$
Option B:	$\frac{s+3}{s^2+8s+3}$
Option C:	$\frac{s+9}{s^2+8s+31}$
Option D:	$\frac{s+3}{s^2+8s+31}$
8.	$\nabla \bullet r^{-} = ---$
Option A:	-3
Option B:	1
Option C:	0
Option D:	3

9.	The bilinear transformation which maps the points $z=\infty, i, 0$ onto the points $0, i, \infty$ by using cross-ratio property is
Option A:	$\frac{1}{z}$
Option B:	$-\frac{1}{z}$
Option C:	$-\frac{2}{z}$
Option D:	$-\frac{1}{2z}$
10.	The value of $\int_c F^- \bullet dr^-$ where $F^- = i\cos y - jx\sin y$ and C is the curve $y=\sqrt{1-x^2}$ in the xy-plane from(1,0) to (0,1) is
Option A:	2
Option B:	-1
Option C:	1
Option D:	-4
11.	The fixed points of the bilinear transformation $w=\frac{1+3iz}{i+z}$ is given by
Option A:	$z=1, i$
Option B:	$z=i, 2$
Option C:	$z=-i$
Option D:	$z=i$
12.	$L^{-1}[\frac{1}{(s+2)^2}]=---------$
Option A:	$e^{2t}t$
Option B:	$e^{-2t}t$
Option C:	$e^{-t}t$
Option D:	$-e^{-2t}t$
13.	The directional derivative of $\phi = xy^2 + yz^3$ at the point (2,-1,1) in the directional of $i+2j+2k$ is
Option A:	$\frac{11}{3}$
Option B:	$-\frac{11}{9}$
Option C:	$-\frac{11}{3}$
Option D:	$-\frac{1}{3}$
14.	If $f(z)=\frac{1}{2}\log(x^2+y^2)+i\tan^{-1}\frac{kx}{y}$ is an analytic then the value of k is

Option A:	1
Option B:	-1
Option C:	2
Option D:	-4
15.	The Inverse Laplace transform of $\cot^{-1}(s+1)$ is
Option A:	$\frac{e^{-t}}{t}\sin t$
Option B:	$\frac{e^{t}}{t}\sin t$
Option C:	$\frac{e^{-t}}{2}\sin t$
Option D:	$-\frac{e^{-t}}{t}\sin t$
16.	The value of a_n for $f(x)=x, 0 \prec x \prec 2\pi$ is
Option A:	1
Option B:	-2
Option C:	0
Option D:	2
17.	In a Half Range cosine series of a function which of the following Fourier coefficient is/are zero
Option A:	a_n
Option B:	a_0
Option C:	b_n
Option D:	a_0, a_n
18.	An analytic function whose real part is $e^x \cos y$
Option A:	$f(z)=2e^z+c$
Option B:	$f(z)=e^{-z}+c$
Option C:	$f(z)=-e^z+c$
Option D:	$f(z)=e^z+c$
19.	A function f(x) is said to be an odd if
Option A:	f(-x)=f(x)
Option B:	f(-x)=-f(x)
Option C:	f(x + 2p) = f(x)
Option D:	f(x + 2) = f(x)
20.	The value of a_n for $f(x)=1-x^2 in(-1,1)$ is
Option A:	$\frac{4(-1)^n}{n^2\pi^2}$
Option B:	$-\frac{4(-1)^n}{n^2\pi^2}$

Option C:	$-\frac{4(-1)^n}{\pi^2}$
Option D:	$-\frac{2(-1)^n}{n^2\pi^2}$
Q2.	**Solve any Four out of Six** **5 marks each**
A	*Given that* $f(x) = x + x^2, -\pi \prec x \prec \pi$ *, find the Fourier expression of f(x).*
B	*Apply Stoke's theorem to find the value of* $\int_c (ydx + zdy + xdz)$ *where c is the curve of intersection of* $x^2 + y^2 + z^2 = a^2$ *and* $x + z = a$ *.*
C	*Evaluate* $\int_0^\infty \frac{t \sin 3t}{e^{2t}} dt$
D	Find the value of n for which the vector $r^n r^-$ is solenoidal, where $r^- = xi + yj + zk$
E	Let $f(z) = u(r,\theta) + iv(r,\theta)$ be an analytic function. If $u = -r^3 \sin 3\theta$, then construct the corresponding analytic f(z) in terms of z.
F	Find the inverse Laplace transform of $\frac{s}{(s^2 + 4s + 13)}$
Q3.	**Solve any Four out of Six** **5 marks each**
A	*Using Laplace transform technique, Solve the following initial value problem* $\frac{d^2y}{dt^2} + y = \sin 3t,\ y(0) = 0, y'(0) = 0$
B	*If f(z) is a regular function of z, Prove that* $(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2})\|f(z)\|^2 = 4\|f'(z)\|^2$
C	*Let* $r^- = xi + yj + zk$ *and* a^- *is a constant vector. Find the value of* $\nabla \times (\frac{a^- \times r^-}{r^n})$
D	*Find the inverse Laplace Transform of* $\frac{(s+4)}{s(s-1)(s^2+4)}$
E	*Using Green's theorem, Evaluate* $\int_c (x^2 ydx + x^2 dy)$ *where c is the boundary described counter clockwise of the triangle with vertices (0, 0), (1, 0), (1, 1).*
F	*Obtain the complex form of the Fourier series of the function* $f(x) = 0, -\pi \le x \le 0$ $= 1, 0 \le x \le \pi$

University of Mumbai
Examination 2020

Program: BE Electronics and Telecommunication Engineering
Curriculum Scheme: Revised 2016(CBCGS)
Examination: Second Year Semester III
Course Code: ECC301 and Course Name: Applied Mathematics-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.	A
Q2.	A
Q3.	B
Q4	C
Q5	B
Q6	D
Q7	D
Q8.	D
Q9.	B
Q10.	B
Q11.	D
Q12.	B
Q13.	C
Q14.	B
Q15.	A
Q16.	C
Q17.	C
Q18.	D
Q19.	B
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 and Telecommunication**

Curriculum Scheme: 2016

Examination: SE Semester III

Course Code: ECC302 and Course Name: Electronic Devices and Circuits 1

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.	_____ are majority carriers and _____ are minority carriers in a N type semiconductor.
Option A:	Holes, Electrons
Option B:	Electrons, Holes
Option C:	Electrons, Protons
Option D:	Protons, Neutrons
2.	Which of the following statements regarding a PN junction diode is true?
Option A:	Diode is a bipolar device
Option B:	Diode can be used as amplifier
Option C:	Diode is a rectifying device
Option D:	Diode conducts at 0 volts
3.	Which of the following is a passive device?
Option A:	Transistor
Option B:	Diode
Option C:	Vacuum Tube
Option D:	Capacitor
4.	Capacitor filter is used when the load resistance is ____ .
Option A:	high
Option B:	low
Option C:	does not matter
Option D:	purely resistive
5.	_____ indicates the change in load voltage due to change in load current in a voltage regulator.
Option A:	line regulation
Option B:	load regulation
Option C:	stabilization factor
Option D:	temperature coefficient
6.	In which of these filters is the ripple factor independent of the load impedance?
Option A:	Capacitor filter
Option B:	Inductor filter

Option C:	L section filter
Option D:	Ripple factor does not depend on load impedance in any filter
7.	Which of the following configurations in a BJT has the current amplification factor of less than unity?
Option A:	Common base
Option B:	Common emitter
Option C:	Common source
Option D:	common drain
8.	For a FET determine the drain current given that V_{GS} = -1 V, I_{DSS} = 7 mA and V_P = -2.5 V
Option A:	15.75 mA
Option B:	4.2 mA
Option C:	2.52 A
Option D:	2.52 mA
9.	Find R_C for a fixed bias circuit, given that V_{CC} = 10 V, V_{CE} = 5 V, V_{BE} = 0.6 V and I_C = 2 mA.
Option A:	4.7 kΩ
Option B:	2.5 kΩ
Option C:	2.2 kΩ
Option D:	7.2 kΩ
10.	In a FET the drain current is reduced to zero at .
Option A:	V_{GS} = 0 V
Option B:	V_{GS} = V_P
Option C:	V_{DS} = V_{DSoff}
Option D:	V_{GS} = V_{DS}
11.	Determine the hybrid π parameter g_m given that β = 100 and I_C = 2mA at room temperature.
Option A:	0.076 S
Option B:	1300 S
Option C:	0.769 mS
Option D:	1.3 mS
12.	Which of the following h parameters can be determined from the output characteristics of common emitter configuration?
Option A:	h_{fe} and h_{oe}
Option B:	h_{ie} and h_{re}
Option C:	h_{fe} and h_{re}
Option D:	h_{ie} and h_{oe}
13.	The voltage gain for a common collector amplifier is ____ .
Option A:	very high
Option B:	greater than that of common emitter amplifier
Option C:	1
Option D:	1 + β

14.	Determine the transconductance of a FET given that V_{GS} = -1 V, I_{DSS} = 7mA and V_P = -2.5 V
Option A:	3.36 mS
Option B:	2.52 mS
Option C:	1.008 mS
Option D:	2.016 mS
15.	The effect of bypassing the emitter resistor in a common emitter amplifier is .
Option A:	voltage gain increases
Option B:	voltage gain decreases
Option C:	output impedance decreases
Option D:	input impedance remains unchanged
16.	Consider a BJT has parameters f_T = 500 MHz and β = 100. Determine f_β.
Option A:	5 MHz
Option B:	500 MHz
Option C:	50 GHz
Option D:	5 kHz
17.	In the high frequency region the capacitive elements of importance are .
Option A:	coupling capacitors
Option B:	bypass capacitors
Option C:	ceramic capacitors
Option D:	interelectrode capacitors
18.	For any inverting amplifier, the input capacitance will be _____ by a Miller effect capacitance.
Option A:	decreased
Option B:	increased
Option C:	open circuited
Option D:	short circuited
19.	For a JFET the gate source bias for zero temperature drift, determine the drain current, given that I_{DSS} = 7 mA and V_P = -2.5 V
Option A:	0.44 mA
Option B:	1.76 mA
Option C:	7 mA
Option D:	3.5 mA
20.	For a CE voltage divider biased single stage RC coupled amplifier given that $\|A_V\|$ = 160, h_{fe} = 330 and h_{ie} = 4.5 kΩ. Determine the value of R_C
Option A:	9.2 kΩ
Option B:	2.2 kΩ
Option C:	1 kΩ
Option D:	11.7 kΩ

Option 3

Q2	
A	**Solve any Two** **5 marks each**
i.	Draw the small signal hybrid parameter equivalent circuit for CE amplifier and define the parameters.
ii.	Explain the effect of bypass capacitors and coupling capacitors on frequency response of an amplifier.
iii.	Compare BJT CE Amplifier and JFET CS Amplifier.
B	**Solve any One** **10 marks each**
i.	Design full wave rectifier to supply load current of 100mA ± 25mA at 250 V with ripple voltage less than 10 V, use LC filter.
ii.	Derive the expressions for voltage gain, input impedance and output impedance for CE amplifier with voltage divider biasing with R_E unbypassed.

Q3.	
A	**Solve any Two** **5 marks each**
i.	Explain the fabrication steps of passive elements.
ii.	Explain Zener as a voltage regulator.
iii.	Prove that for a JFET the gate source bias for zero temperature drift of drain current is at $\|V_P\|$ - 0.63 volts
B	**Solve any One** **10 marks each**
i.	Design a common source FET using midpoint biasing for the given specifications, f_L = 15 Hz, $\|A_V\|$ = 7 and V_O = 3 V. Use FET BFW11 with parameters r_d = 50 kΩ, V_P = -2.5 V, I_{DSS} = 7 mA, g_{mo} = 5000μS
ii.	Define stability factor. Derive the equation for stability factor. State which biasing technique is more stable. Justify your answer.

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: 2016

Examination: SE Semester III

Course Code: ECC302 and Course Name: Electronic Devices and Circuits 1

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.	C
Q3.	D
Q4	A
Q5	B
Q6	C
Q7	A
Q8.	D
Q9.	B
Q10.	B
Q11.	A
Q12.	A
Q13.	C
Q14.	A
Q15.	A
Q16.	A
Q17.	D
Q18.	B
Q19.	A
Q20.	B

University of Mumbai

Examination 2020 under cluster 05(Lead College: APSIT)

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

Program: BE Electronics and Telecommunication

Curriculum Scheme: Rev2016

Examination: SE Semester III

Course Code: ECC303and Course Name: Digital System Design

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.	The representation of octal number (531.2)8 in decimal is
Option A:	(346.25)10
Option B:	(532.864)10
Option C:	(345.25)10
Option D:	(531.668)10
2.	Gray code representation of 13 is
Option A:	1010
Option B:	1011
Option C:	1110
Option D:	1001
3.	3 bits full adder contains _____ combinational inputs.
Option A:	3
Option B:	4
Option C:	6
Option D:	8
4.	OR gate can be build by using
Option A:	One NAND gate
Option B:	Two NAND gates
Option C:	Three NAND gates
Option D:	Four NAND gates
5.	Don't care conditions can be used for simplifying Boolean expressions in ____
Option A:	k-map
Option B:	Terms
Option C:	Registers
Option D:	latches
6.	Which input values will cause an AND logic gate to produce a HIGH output?
Option A:	At least one input is HIGH
Option B:	At least one input is LOW
Option C:	All inputs are HIGH

Option D:	All inputs are LOW
7.	Exclusive-OR (XOR) logic gates can be constructed from what other logic gates?
Option A:	AND gates, OR gates, and NOT gates
Option B:	OR gates only
Option C:	OR gates and NOT gates
Option D:	AND gates and NOT gates
8.	Transistor-transistor logic (TTL) is a class of digital circuits built from _____ .
Option A:	JFET only
Option B:	Bipolar junction transistors (BJT)
Option C:	Resistors
Option D:	Bipolar junction transistors (BJT) and resistors
9.	TTL devices consume substantially _____ power than equivalent CMOS devices at rest.
Option A:	Less
Option B:	More
Option C:	Equal
Option D:	Very High
10.	CMOS technology is used in .
Option A:	Inverter
Option B:	Microprocessor
Option C:	Digital logic
Option D:	Both microprocessor and digital logic
11.	The storage element in DRAM is
Option A:	Inductor
Option B:	Capacitor
Option C:	Resistor
Option D:	MOSFET
12.	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
13.	If the input to T-flip flop is 100 Hz signal, the final output of the three T-flip flops in cascade is
Option A:	1000 Hz
Option B:	500 Hz
Option C:	12.5 Hz
Option D:	333 Hz
14.	In a JK Flip-Flop, toggle means
Option A:	Set Q = 1 and $\overline{Q}$ = 0.
Option B:	Set Q = 1 and $\overline{Q}$ = 1.
Option C:	Change the output to the opposite state

Option D:	No change in output.
15.	The serial-in serial-out and parallel-in parallel-out shift registers are used to produce ----------to digital circuits.
Option A:	time delay
Option B:	No Change
Option C:	Input
Option D:	output
16.	A shift register that will accept a parallel input or a bidirectional serial load and internal shift features is called as?
Option A:	Tristate
Option B:	End around
Option C:	Universal
Option D:	Conversion
17.	A 5-bit asynchronous binary counter is made up of five flip-flops, each with a 12 ns propagation delay. The total propagation delay (tp(tot)) is _____
Option A:	12 ms
Option B:	24 ns
Option C:	48 ns
Option D:	60 ns
18.	Which is not a type of shift register?
Option A:	Serial in/parallel in
Option B:	Serial in/parallel out
Option C:	Parallel in/serial out
Option D:	Parallel in/parallel out
19.	Which of the following is not a type of VHDL modeling?
Option A:	Behavioral modeling
Option B:	Dataflow modeling
Option C:	Structural modeling
Option D:	Component modeling
20.	The difference between a PAL & a PLA is
Option A:	PALs and PLAs are the same thing
Option B:	The PLA has a programmable OR plane and a programmable AND plane, while the PAL only has a programmable AND plane
Option C:	The PAL has a programmable OR plane and a programmable AND plane, while the PLA only has a programmable AND plane
Option D:	The PAL has more possible product terms than the PLA

Q2 **(Total 20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	Differentiate between PAL and PLA.
B	Explain Johnson's counter.
C	Distinguish between a multiplexer and a demultiplexer.
D	Explain Master-Slave (pulse-triggered) S-R flip-flop.
E	Explain Flash memories.
F	Differentiate between Moore and Mealy circuits.

Q3. **(Total 20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	Using Boolean Algebra Prove the following $AB+BC+\bar{A}C=AB+\bar{A}C$
B	Compare TTL and CMOS logic families.
C	Convert J-K flip flop to T flip flop.
D	Write a short note on Gray code.
E	Write a short note on VHDL.
F	Explain carry look ahead adder with necessary diagram.

University of Mumbai

Examination 2020 under cluster 05 (Lead College: APSIT)

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

Program: BE Electronics and Telecommunication

Curriculum Scheme: Rev2016

Examination: SE Semester III

Course Code: ECC303and Course Name: Digital System Design

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.	B
Q3.	D
Q4	C
Q5	A
Q6	C
Q7	A
Q8.	D
Q9.	B
Q10.	D
Q11.	B
Q12.	D
Q13.	C
Q14.	C
Q15.	A
Q16.	C
Q17.	D
Q18.	A
Q19.	D
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 and Telecommunication Engineering**

Curriculum Scheme: Rev-16

Examination: SE Semester III

Course Code: ECC304 and Course Name: Circuit Theory and Network

Time: 2 Hour Max. Marks: 80

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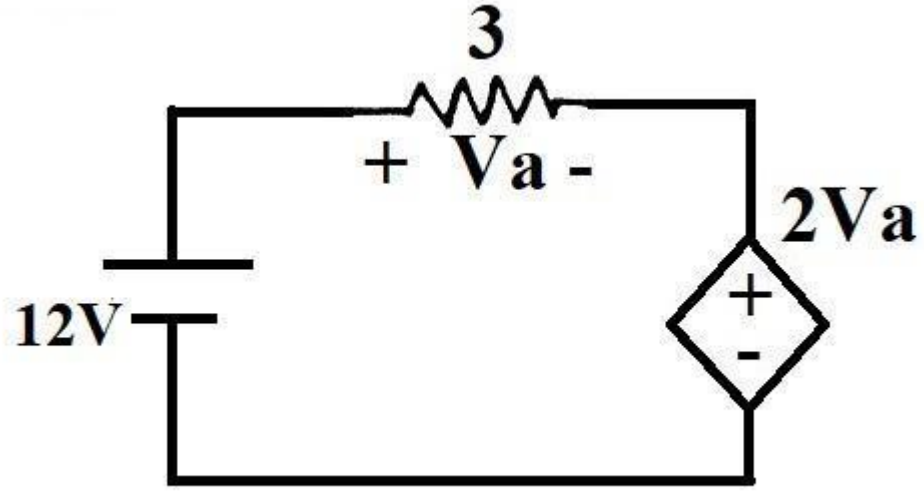
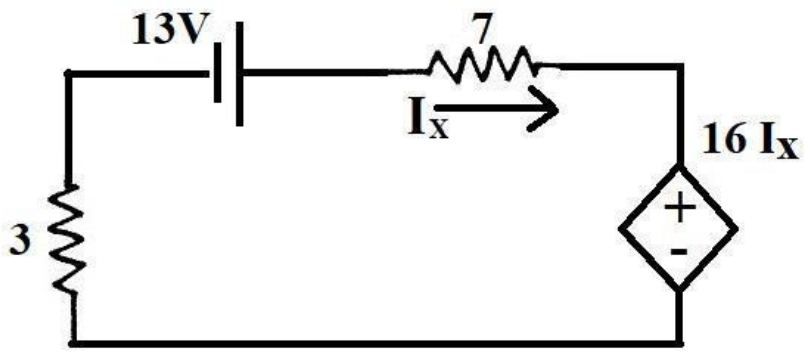
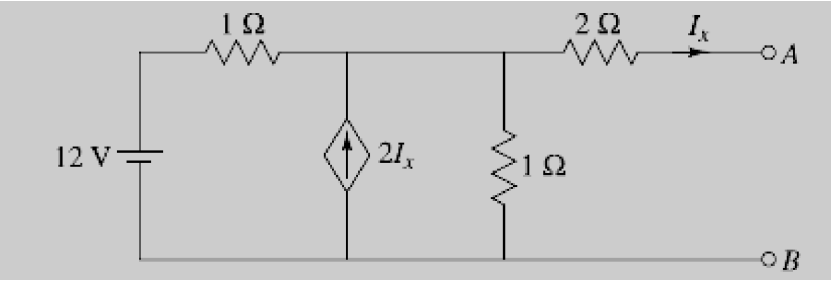
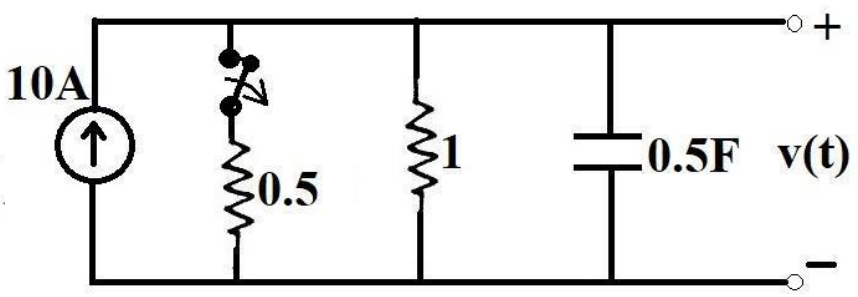
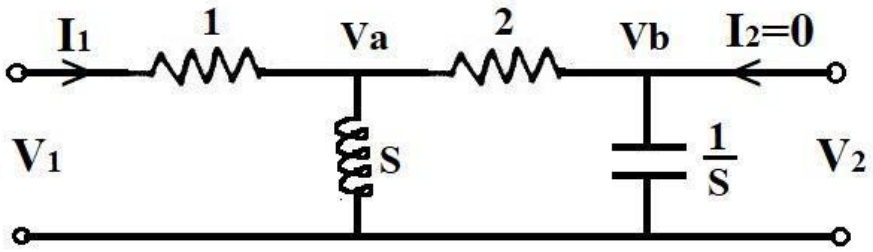
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	If dependent Current source having 4I, where I is current passing through resistor of a circuit, represent --------.
Option A:	Current controlled voltage source
Option B:	Voltage controlled voltage source
Option C:	Current controlled current source
Option D:	Voltage controlled current source
2.	Dot convention in inductively coupled coils is used to -----
Option A:	Delivered power to the other coil.
Option B:	Determine turning ratio of two coils
Option C:	Determine polarities of induced e.m.f.
Option D:	Types of dependent source to be introduced
3.	For the circuit shown in figure, determine value of Va. 
Option A:	1 V
Option B:	2 V
Option C:	3 V
Option D:	4 V
4.	Refer the following circuit to determine Ix.

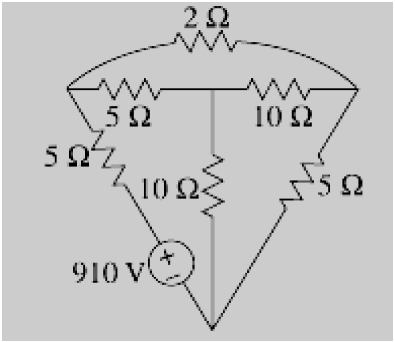
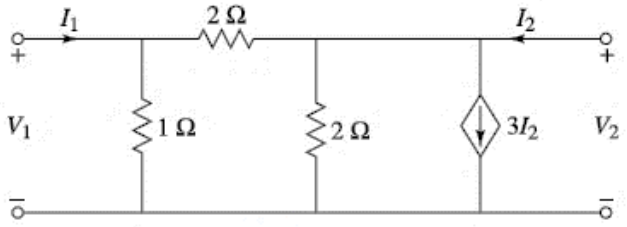
	
Option A:	2 A
Option B:	0.5 A
Option C:	1 A
Option D:	0.1 A
5.	If two branches do not intersect or crosses at a point which is other than node, a graph drawn on two dimensioned plane is said to be ------
Option A:	Non-planner graph
Option B:	Planner graph
Option C:	Tree of a graph
Option D:	Sub-graph
6.	A network consist of 4 nodes and 7 branches, then number of twigs are ----.
Option A:	7
Option B:	3
Option C:	2
Option D:	5
7.	Which of the following is correct generalized KVL equation in graph theory?
Option A:	$B.Z_b.I_l = B.Z_bI_S$
Option B:	$Z_b.B.B^TI_l = B(Z_bI_S - V_S)$
Option C:	$B.Z_b.B^TI_l = B.Vs - B.Z_bI_S$
Option D:	$Y.V_t = Q\ I_S - Q\ Y_b\ Vs$
8.	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 $\frac{dVc(t)}{dt}$
9.	Convert R, L and C to S domain.
Option A:	R, LS and 1/CS
Option B:	RS, LS and CS
Option C:	R, L and C
Option D:	R, 1/LS and CS

10.	Initially voltage across capacitor is zero. At time t = 0^+ capacitor behaves as ------.
Option A:	Short circuit
Option B:	Open circuit
Option C:	Voltage Source
Option D:	Resistor
11.	If Laplace transform of voltage across capacitor is Vc(S) = $\frac{1}{S^2+1}$ then time domain voltage is -----.
Option A:	1
Option B:	Cos(t)
Option C:	Sin(t)
Option D:	t^2
12.	For transfer function $(s) = \frac{S+1}{S+7}$, which of the following is correct statement?
Option A:	All the poles are at right half of the S plane.
Option B:	There is a pole at s = -7
Option C:	System has two zeros.
Option D:	There is a zero at right half of the S plane
13.	If R and C are connected in series then equivalent impedance is given by ---.
Option A:	$R + \frac{1}{CS}$
Option B:	$\frac{CS}{RCS+1}$
Option C:	$\frac{S}{RS+1}$
Option D:	R + CS
14.	If Laplace transform of {f(t)} = F(S) then L{f '(t) } = ---------
Option A:	dF(S) / dS
Option B:	F'(S)
Option C:	dF(S) / dt
Option D:	S F(S) – f(0)
15.	Two port equations of a networks are $V_1 = 3\ I_1 + 5\ I_2$ $V2 = 8\ I_1 + 7\ I_2$ Determine Z parameters.
Option A:	$Z_{11} = 3,\ Z_{12} = 8, Z_{21} = 5, Z_{22} = 7$
Option B:	$Z_{11} = 7,\ Z_{12} = 5, Z_{21} = 8, Z_{22} = 3$
Option C:	$Z_{11} = 3, Z_{12} = 5, Z_{21} = 8, Z_{22} = 7$
Option D:	$Z_{11} = 5,\ Z_{12} = 3, Z_{21} = 7, Z_{22} = 8$
16.	Two port network are connected in cascade. The combination is to be represented as a single two-port network. The parameters obtained by multiplying individual are ----
Option A:	Z-parameter matrix
Option B:	Y-parameter matrix
Option C:	h-parameter matrix

Option D:	ABCD-parameter matrix
17.	Short circuit admittance parameter of two port network are Y_{11} = 0.45 mho, Y_{12} = - 0.18 mho, Y_{21} = - 0.18 mho and Y_{22} = 0.27 mho. Two port network is ----.
Option A:	Not reciprocal
Option B:	Reciprocal
Option C:	Symmetrical
Option D:	Symmetrical and reciprocal
18.	For given Driving point impedance, find values of C. $Z(S) = \frac{0.5\,S}{S^2+1}$ is -----
Option A:	C = 1 F
Option B:	C = 0.5 F
Option C:	C = 0 F
Option D:	C = 2 F
19.	Driving point impedance function Z(S) = 9 + 3s is ----
Option A:	Parallel combination of resistors and inductor.
Option B:	Series combination of resistor and inductor
Option C:	Parallel combination of Capacitor and inductor.
Option D:	Series combination of two inductors
20.	For RC driving point impedance function, the poles and zeros ----
Option A:	Must be right half of the S-Plane
Option B:	Should be alternate and should lie on negative real axis.
Option C:	Can lie anywhere on S-Plane
Option D:	Should be alternate on imaginary axis

Q2	**Solve any Two Questions out of Three** **10 marks each**
A	In following figure, find Vth and Rth across A and B. 
B	For the network shown in Figure, Initially Switch was closed for long time and then it is opened at t=0, find v(t) for t > 0.

	
C	For the ladder network find V1 / V2 and V2 / I1 

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Determine Loop current using graph theory. 
B	For the network shown in below, determine z parameter. 
C	Realize following function using Foster-I and Foster-II form. $Z(S) = \frac{(S+1)(S+4)}{S(S+2)}$

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-16

Examination: SE Semester III

Course Code: ECC304 and Course Name: Circuit Theory and Network

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.	C
Q3.	D
Q4	B
Q5	B
Q6	B
Q7	C
Q8.	D
Q9.	A
Q10.	A
Q11.	C
Q12.	B
Q13.	A
Q14.	D
Q15.	C
Q16.	D
Q17.	B
Q18.	D
Q19.	B
Q20.	B

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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: Rev2016

Examination: SE Semester III

Course Code: ECC 305 and Course Name: Electronic Instrumentation and Control

Time: 2 hour Max. Marks: 80

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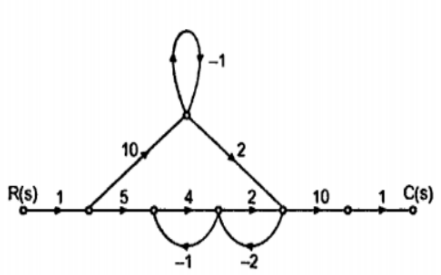
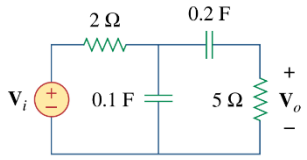
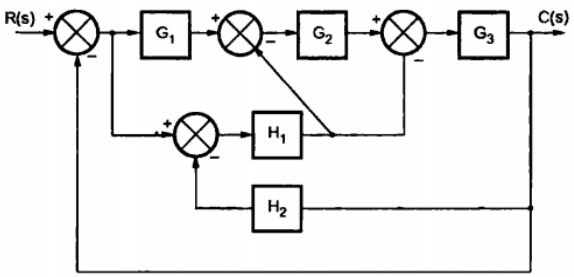
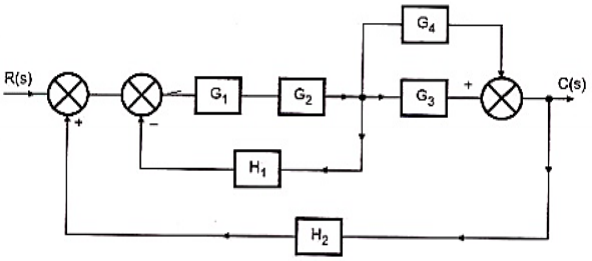
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks.**
1.	LVDT which is an instrument for the measurement of displacement, works on the principle of
Option A:	Linear inductance
Option B:	Non - linear inductance
Option C:	Mutual inductance
Option D:	Linear capacitance
2.	If the displacement is measured with strain gauge then the number of strain gauge normally required are
Option A:	1
Option B:	2
Option C:	3
Option D:	4
3.	A voltmeter is connected in a _____with the circuit component across which potential difference is to be measured.
Option A:	Parallel
Option B:	Series
Option C:	Series or parallel
Option D:	Series and parallel
4.	For display of signal pattern _____ voltage is applied to the horizontal plates of a CRO
Option A:	Sinusoidal
Option B:	Rectangular
Option C:	Sawtooth
Option D:	Exponential
5.	FETs are widely applicable in oscilloscopes and voltmeters as an input amplifier as compared to bipolar transistors due to _____.
Option A:	ability of minimizing the loading effect with high input resistance
Option B:	ability of maximizing the loading effect with high input resistance
Option C:	ability of minimizing the loading effect with low input resistance

Option D:	ability of maximizing the loading effect with low input resistance
6.	The characteristic equation of a system is given as s3+25s2+10s+50=0. What is the number of the roots in the right half s-plane and the imaginary axis respectively?
Option A:	1,1
Option B:	0,0
Option C:	2,1
Option D:	1,2
7.	The roots of the characteristic equation of the second order system in which real and imaginary part represents the :
Option A:	Damped frequency and damping
Option B:	Damping and damped frequency
Option C:	Natural frequency and damping ratio
Option D:	Damping ratio and natural frequency
8.	TF of following SFG is 
Option A:	200
Option B:	100
Option C:	50
Option D:	150
9.	Find the ramp response for a system whose transfer function is G(s)=s/(s+4)(s+8)
Option A:	$[1/32]-[(1/16)\ e^{-4t}]+[(1/32)\ e^{-8t}]$
Option B:	$[1/32]+[(1/16)\ e^{4t}]-[(1/32)\ e^{8t}]$
Option C:	$[1/16]-[(1/32)\ e^{-4t}]+[(1/16)\ e^{-8t}]$
Option D:	$[1/32]-[(1/16)\ e^{-4t}]-[(1/32)\ e^{8t}]$
10.	A linear system at rest is subject to an input signal $r(t)=1-e^{(-t)}$. The response of the system for t>0 is given by $c(t)=1-e^{(-2t)}$. The transfer function of the system is:
Option A:	(s+2)/(s+1)
Option B:	(s+1)/(s+2)
Option C:	2(s+1)/(s+2)
Option D:	(s+1)/2(s+2)
11.	A LTI system is said to be initially relaxed system only if
Option A:	Zero input produces zero output
Option B:	Zero input produces non-zero output
Option C:	Zero input produces an output equal to unity
Option D:	impulse input produces zero output

12.	The output of a feedback control system must be a function of
Option A:	reference and output
Option B:	reference and input
Option C:	input and feedback signal
Option D:	output and feedback signal
13.	The band width, in a feedback amplifier
Option A:	remains unaffected
Option B:	decreases by the same amount as the gain increase
Option C:	increases by the same amount as the gain decrease
Option D:	decreases by the same amount as the gain decrease
14.	The characteristic equation of Transfer function of following Circuit Diagram 
Option A:	$s^2+8s+5=0$
Option B:	$s^2-8s-5=0$
Option C:	$s^2+5s+8=0$
Option D:	$s^2+8s-5=0$
15.	The characteristic equation of a system is given as s^6 +3 s^5 + 5 s^4 + 9 s^3 + 8 s^2 + 6 s + 4 = 0 This system is having:
Option A:	Poles on RHS of S-plane and one pair of Complex conjugate pole on imaginary axis
Option B:	Poles on LHS of S-plane and multiple pairs of Complex conjugate pole on imaginary axis
Option C:	Poles on RHS of S-plane and multiple repeated pairs of Complex conjugate pole on imaginary axis
Option D:	Pole/s at origin and multiple repeated pairs of Complex conjugate pole on imaginary axis
16.	Following type of instrument is used to measure very small currents of high frequency
Option A:	Induction type instrument
Option B:	Dynamometer type instrument
Option C:	Permanent magnet moving coil type ammeter
Option D:	Thermocouple type instrument
17.	Q meter works on the principle of
Option A:	barkhausen criterion
Option B:	piezoelectric effect
Option C:	parallel resonance
Option D:	series resonance
18.	Eddy currents are not used for the measure of which of the following properties?

Option A:	Electrical conductivity
Option B:	Magnetic resistivity
Option C:	Hardness
Option D:	Grain size
19.	Which of the following is not true for telemeter?
Option A:	Designed for all variable
Option B:	Designed for specific range
Option C:	Designed for data transmission
Option D:	Wireless data transmission possible
20.	Digital acquisition systems are used when _____.
Option A:	bandwidth is high
Option B:	bandwidth is medium
Option C:	bandwidth is zero
Option D:	bandwidth is low

Q2	**Solve any Four out of Six** **5 marks each**
A	Find the Transfer Function of following System using BDR method 
B	Find the Transfer Function of the following System using SFG method. 
C	What are the advantages of Polar Plot? Draw the Polar Plot of the given Transfer Function, $G(s) = \frac{10}{(s+2)}$
D	Explain the working of Electrodynamometer Wattmeter.
E	Explain advantages and disadvantages of LVDT. Explain the working of LVDT with help of a neat diagram.
F	Compare Analog and Digital Data Acquisition System.

Q3. **(20 Marks Each)**	**Solve any Two Questions out of Three** **10 marks each**
A	Draw the Bode Plot for the given transfer function with the unity feedback $$G(s) = \frac{(0.75(1+0.2s)}{s(1+0.5s)(1+0.1s)}$$ Calculate the Gain Margin, Phase Margin and comment of the Stability.
B	Derive an expression for the resistance using Wheatstone Bridge for balanced condition and compare Wheatstone Bridge with Kelvin's double bridge and Mega Ohm bridge in short.
C	The characteristic of a feedback control system is: $$s^4 + 3s^3 + 12s^2 + (K - 16)s + K = 0$$ Sketch the root locus plot for $0 < K < \infty$ and show that the system is conditionally stable (stable only for a range of given K). Determine the range of K for which the system is stable.

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: Rev2016

Examination: SE Semester III

Course Code: ECC 305 and Course Name: Electronic Instrumentation and Control

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.	D
Q3.	A
Q4	C
Q5	A
Q6	B
Q7	B
Q8.	B
Q9.	A
Q10.	C
Q11.	A
Q12.	A
Q13.	C
Q14.	A
Q15.	B
Q16.	D
Q17.	D
Q18.	B
Q19.	A
Q20.	D