University of Mumbai

Examination 2021 under Cluster 06

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

Examination for Direct Second Year Students Commencing from 10th April 2021

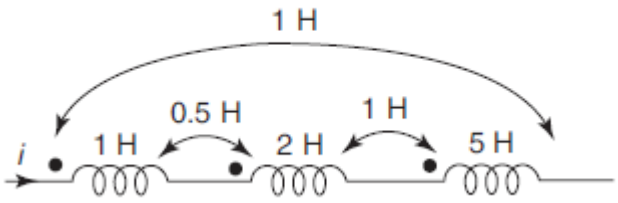
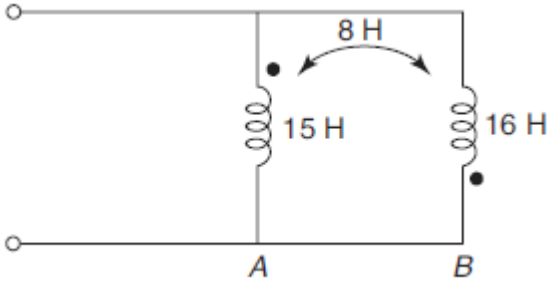
Program: **Electronics Engineering**

Curriculum Scheme: Rev 2019

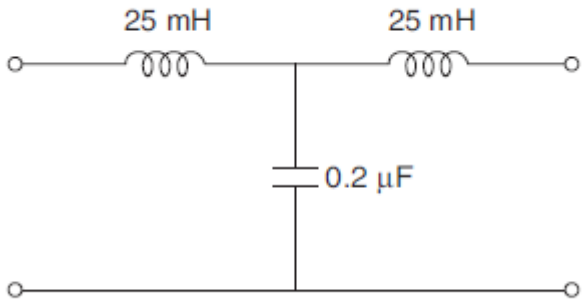
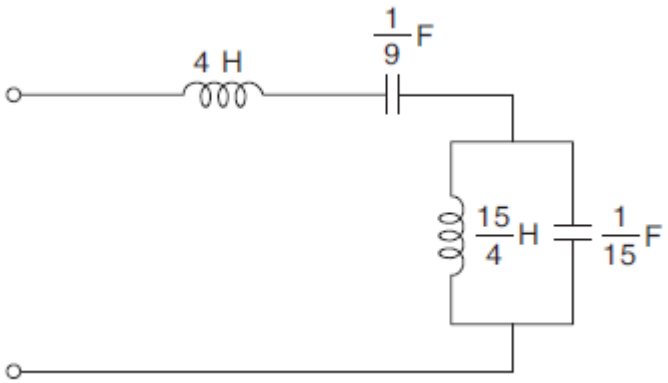
Examination: SE Semester III (For DSE Students)

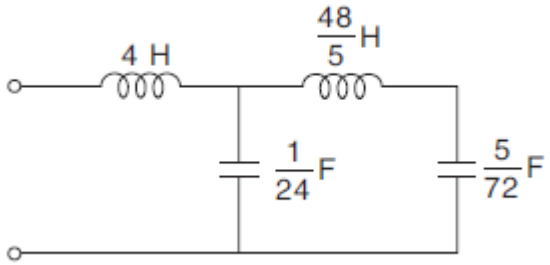
Course Code: ELC304 and Course Name: Electrical Network Analysis and Synthesis

Time: 2 hour Max. Marks: 80

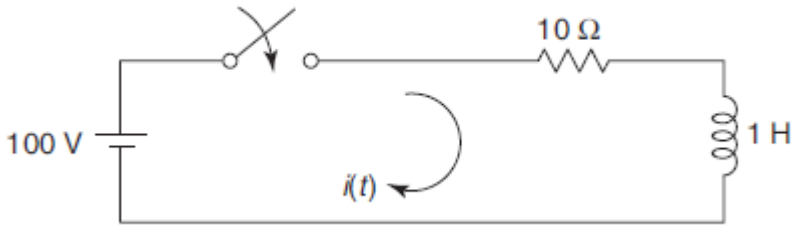
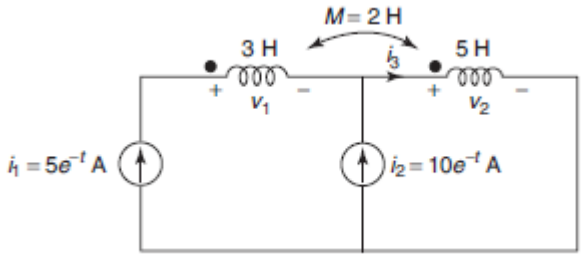
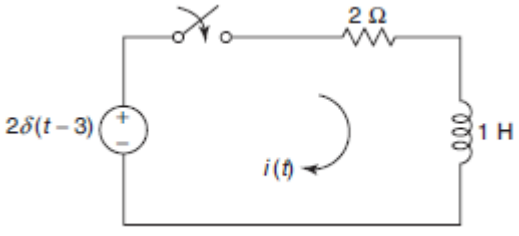
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	According to Kirchhoff's voltage law, the algebraic sum of all IR drops and e.m.fs. in any closed loop of a network is always
Option A:	Negative
Option B:	Positive
Option C:	Determined by battery e.m.fs.
Option D:	Zero
2.	For magnetically coupled circuits, M = K*√ (L1*L2), where K represents
Option A:	Inductance
Option B:	Coefficient of coupling
Option C:	Reluctance
Option D:	Constant
3.	Find the equivalent inductance of the network shown in Fig 
Option A:	13 H
Option B:	8 H
Option C:	10 H
Option D:	9 H
4.	Find the equivalent inductance of the network shown 

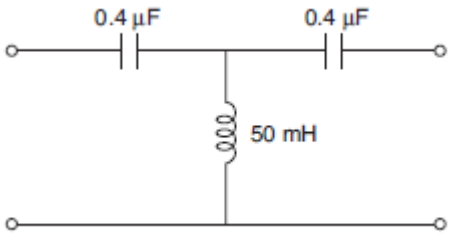
Option A:	31 H
Option B:	3.73 H
Option C:	56 H
Option D:	39 H
5.	A capacitor with initial voltage zero, what will be equivalent circuit at t=0+
Option A:	Open circuit
Option B:	Short Circuit
Option C:	Voltage source
Option D:	Current source
6.	The EMF induced in a coil due to the changing current in the neighboring coil is called
Option A:	Self Induced EMF
Option B:	Differentially Induced EMF
Option C:	Linearly Induced EMF
Option D:	Mutually Induced EMF
7.	If all the poles & zeros are lying on negative s-plane (LHS of s-plane) than, the transfer function is
Option A:	Perfectly Stable
Option B:	Unstable
Option C:	Marginally Stable
Option D:	Infinite
8.	A Inductor with zero initial current flowing, what will be equivalent circuit at t=0+
Option A:	Short Circuit
Option B:	Open Circuit
Option C:	Voltage Source
Option D:	Current Source
9.	The s-domain equivalent of voltage source 'V' is written as
Option A:	V/s
Option B:	V
Option C:	s/V
Option D:	Vs
10.	Which is the condition of symmetry for h parameters
Option A:	h12 = -h21
Option B:	h11h22-h12h21 = 1
Option C:	h11h21-h12h22 = 1
Option D:	h11 = h22
11.	Which is the condition of symmetry for ABCD parameters
Option A:	AD-BC = 1
Option B:	B = C
Option C:	AB – CD = 1
Option D:	A = D

12.	The relation between ZOT, Zoc, Zsc is?
Option A:	$Z_{OT}=\sqrt{Z_{oc}Z_{sc}}$
Option B:	$Z_{oc}=\sqrt{(Z_{OT}\ Z_{sc})}$
Option C:	$Z_{sc}=\sqrt{(Z_{OT}\ Z_{oc})}$
Option D:	$Z_{oc}=\sqrt{(Z_{OT}\ Z_{oc})}$
13.	Find the nominal impedance k 
Option A:	100 Ω
Option B:	250 Ω
Option C:	500 Ω
Option D:	125 Ω
14.	This is which form of synthesis 
Option A:	FOSTER I
Option B:	FOSTER II
Option C:	CAUER I
Option D:	CAUER II
15.	This is which form of synthesis

	
Option A:	FOSTER I
Option B:	FOSTER II
Option C:	CAUER I
Option D:	CAUER II
16.	This is which type of function $Z(s) = \frac{3(s+2)(s+4)}{s(s+3)}$
Option A:	RC
Option B:	RL
Option C:	LC
Option D:	RLC
17.	This is which type of function $Z(s) = \frac{(s^2+1)(s^2+3)}{s(s^2+2)}$
Option A:	RC
Option B:	RL
Option C:	LC
Option D:	RLC
18.	The number of roots of $s^3 + 5s^2 + 7s + 3 = 0$ in the right half of s-plane is
Option A:	Zero
Option B:	One
Option C:	Two
Option D:	Three
19.	Which are the ABCD Parameter equation
Option A:	$I_1 = AV_2 - BI_2$ $V_1 = CV_2 - DI_2$
Option B:	$I_1 = AV_2 - BI_1$ $V_1 = CV_2 - DI_1$
Option C:	$V_2 = AV_1 - BI_1$ $I_2 = CV_1 - DI_1$
Option D:	$V_1 = AV_2 - BI_2$ $I_1 = CV_2 - DI_2$
20.	For the network in time domain input is sin(t), then in frequency domain it will become

Option A:	$\frac{1}{s+1}$
Option B:	$\frac{1}{s^2+1}$
Option C:	$\frac{s}{s+1}$
Option D:	$\frac{s}{s^2+1}$

Q2 (20 Marks)	**Solve any Four out of Six (5 marks each)**
A	In the given network of Fig. the switch is closed at t = 0. With zero current in the inductor, find i, di/dt, and d^2i/dt^2, at $t = 0^+$ 
B	Find the voltages V1 and V2 for the given fig. 
C	For the network shown in Fig. determine the current i (t) when the switch is closed at t = 0. Assume that initial current in the inductor is zero. 
D	Convert Hybrid parameters into ABCD parameters
E	Test whether the polynomial $P(s) = S^4+S^3+5s^2+3s+4$ is Hurwitz
F	Find the characteristic impedance, cut-off frequency and pass band for the network shown in fig.

Q3. (20 Marks)	
Q.3 A	**Solve any Two (5 marks each)**
i.	Write Short note on Filters
ii.	Write the Properties of Positive Real Functions
iii.	Determine the range of values of k so that the polynomial P(s) = $s^3 + 3s^2 + 2s + k$ is Hurwitz.
Q.3 B	**Solve any One (10 marks each)**
i.	$Test\ whether\ F(s) = \frac{2s^3 + 2s^2 + 3s + 2}{s^2 + 1}\ is\ positive\ real\ function.$
ii.	Realise the Foster I and Cauer I forms of the impedance function $Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$

University of Mumbai

Examination 2021 under Cluster 06

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

Examination for Direct Second Year Students Commencing from 10th April 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2019

Examination: SE Semester III (For DSE Students)

Course Code: ELC305 and Course Name: Electronics Instruments and Measurement

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.	Which of the following error can arise as a result of mistake in reading , parallax, improper instrument location and inadequate lighting
Option A:	Construction error
Option B:	Transmission Error
Option C:	Observation Error
Option D:	Translation Error
2.	Which of the following is static characteristic?
Option A:	Speed of response
Option B:	Fidelity
Option C:	Lag
Option D:	Resolution
3.	If output characteristics is proportional to Input it is called
Option A:	Sensitivity
Option B:	Drift
Option C:	Linearity
Option D:	Inverse sensitivity
4.	A simple bridge circuit consists of a network of _____
Option A:	2 resistance arms
Option B:	6 resistance arms
Option C:	4 resistance arms
Option D:	3 resistance arms
5.	Which principle operates a bridge circuit?
Option A:	Kirchhoff's laws
Option B:	ampere's rule
Option C:	partial indication
Option D:	null indication
6	The analog signal is digitized using _____
Option A:	D/A converter
Option B:	Oscillator

Option C:	A/D converter
Option D:	Rectifier
7	If there is defect in the manufacturing it is
Option A:	Systematic error
Option B:	Gross error
Option C:	Random error
Option D:	Instrument error
8	In a measurement, what is the term associated with magnetism
Option A:	Precision
Option B:	Accuracy
Option C:	Fidelity
Option D:	Hysteresis
9	In function generator, the output waveform of integrator is
Option A:	Sinusoidal
Option B:	Square
Option C:	Triangular
Option D:	Saw-tooth
10	What is not a type of Digital Voltmeter
Option A:	CRT
Option B:	Integrating
Option C:	Ramp Type
Option D:	Successive Approximation
11.	Kelvin's double bridge is used to measure low resistances because
Option A:	It has high sensitivity
Option B:	There is no thermoelectric emf
Option C:	Resistance variation due to temperature
Option D:	Effect of contact and lead resistances is eliminated
12	For very small value of resistances we use
Option A:	Maxwells Bridge
Option B:	Wheatstones bridge
Option C:	Kelvins double bridge
Option D:	Megger
13.	On what Principle does the Q meter operate
Option A:	Series Resonance
Option B:	Parallel Resonance
Option C:	Partial Indication
Option D:	Null Deflection
14.	Wheatstone bridge is a _____
Option A:	A.c. bridge
Option B:	D.c. bridge
Option C:	High voltage bridge
Option D:	Power dissipation bridge

15.	Kelvin's Double bridge works when
Option A:	Ratio of arms is equal
Option B:	Ratio of arms is double
Option C:	When Resistance to be measured is high
Option D:	Ratio of arms is half
16.	Sensitivity is defined as _____
Option A:	The smallest absolute amount of change that can be detected by a measurement.
Option B:	Amount of power detected by instrument
Option C:	Amount of heat generated by resistance
Option D:	Non linearity of Instrument
17.	The desirable static characteristics of a measuring system are
Option A:	Hysteresis
Option B:	Accuracy, sensitivity and reproducibility
Option C:	Drift and dead zone
Option D:	Static error
18.	Which of the following is the dynamic characteristics of an instrument?
Option A:	Reproducibility
Option B:	Sensitivity
Option C:	Dead zone
Option D:	Fidelity
19.	Digital multimeter is used for _____
Option A:	Measuring a.c. And d.c. Current, voltage and resistance
Option B:	Only Measuring a.c. Current and voltage
Option C:	Only Measuring d.c. Current and resistance
Option D:	Only Measuring a.c. Voltage and resistance
20.	Weins Bridge is used for measurement of
Option A:	Temperature
Option B:	Resistance
Option C:	Pressure
Option D:	Capacitance

Q2 **(20 Marks)**	
Q.2 A	**Solve any Two (5 marks each)**
i.	Explain the operation of spectrum analyzer.
ii.	Explain need of calibration with suitable example.
iii.	Define and Explain Static Characteristics
Q.2 B	**Solve any One (10 marks each)**

i.	With a neat diagram, explain the principle of digital Multimeter
ii.	Explain the operation of dual slope and successive approximation type dc voltmeters.

Q3 (20 Marks)	
Q.3 A	**Solve any Two (5 marks each)**
i.	What is a Super heterodyne wave Analyser
ii.	Explain the operation of peak responding AC voltmeter.
iii.	Explain the operation of Wheatstone bridge.
Q.3 B	**Solve any One (10 marks each)**
i.	Explain the working of Q meter
ii.	Explain static and dynamic characteristics of an instrument

University of Mumbai

Examinations Commencing from 10th April 2021 to 17th April 2021

Program: **BE Electronics Engineering**

Curriculum Scheme: Rev 2019 'C' Scheme

Examination: SE Semester III

Course Code: **ELC301** and Course Name: **Engineering Mathematics III**

Time: 2 hour Max. Marks: 80

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Note: All Questions are compulsory.

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks. 2 marks each**
1.	$L[e^{-2t}\cos 3t]$
Option A:	$\frac{s+2}{s^2+4s+13}$
Option B:	$\frac{3}{s^2+4s+13}$
Option C:	$\frac{s-2}{s^2-4s+13}$
Option D:	$\frac{3}{s^2-4s+13}$
2.	$f(x) = xcosx$ is
Option A:	Even function
Option B:	Odd function
Option C:	Neither even nor odd
Option D:	Both even and odd
3.	Find k such that $f(z) = (x^3 - kxy^2 + 3x^2 - 3y^2) + i(kx^2y - y^3 + 6xy)$ is analytic
Option A:	$K = 3$
Option B:	$K = -3$
Option C:	$K = 0$
Option D:	$K = 2$
4.	Find the characteristic roots of matrix A , Where $A = \begin{bmatrix} -2 & 5 & 4 \\ 5 & 7 & 5 \\ 4 & 5 & -2 \end{bmatrix}$
Option A:	$\lambda = 12,\ 3,\ 6$
Option B:	$\lambda = 1,\ 3, -6$
Option C:	$\lambda = 12,\ -3, -6$
Option D:	$\lambda = -2, -3, -6$
5.	The function f(x,y) is harmonic if
Option A:	$\frac{\partial^2 f}{\partial x^2} - \frac{\partial^2 f}{\partial y^2} = 0$

Option B:	$\frac{\partial^2 f}{\partial x^2} - \frac{\partial^2 f}{\partial y^2} = 1$
Option C:	$\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} = 1$
Option D:	$\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} = 0$
6.	Laplace Transform of $sin^2 t$ is
Option A:	$\frac{1}{2}\left[\frac{1}{s} + \frac{1}{s^2+4}\right]$
Option B:	$\frac{1}{2}\left[\frac{1}{s} - \frac{2}{s^2+4}\right]$
Option C:	$\frac{1}{2}\left[\frac{1}{s} + \frac{s}{s^2+4}\right]$
Option D:	$\frac{1}{2}\left[\frac{1}{s} - \frac{s}{s^2+4}\right]$
7.	The value of Fourier coefficient a_0 in the Fourier expansion of $f(x) = \frac{1}{2}(\pi - x)$ in (0, 2π) is
Option A:	0
Option B:	1
Option C:	$\frac{\pi}{4}$
Option D:	$\frac{1}{4\pi}$
8.	$\lambda = 4$ is one of the eigenvalue of $A = \begin{bmatrix} 1 & -3 & 3 \\ 3 & -5 & 3 \\ 6 & -6 & 4 \end{bmatrix}$. The eigenvector corresponding to eigenvalue $\lambda = 4$ is
Option A:	$[1\ -1\ 2]'$
Option B:	$[1\ 1\ 2]'$
Option C:	$[2\ -1\ -1]'$
Option D:	$[2\ 1\ -1]'$
9.	If $curl\ \bar{F} = 0$, then $\bar{F}$ is called
Option A:	Solenoidal
Option B:	irrotational
Option C:	constant
Option D:	Zero
10.	Find Laplace transform of $f(t) = 3,\ 0 < t < 1$ $= 0,\ t>1$
Option A:	$\frac{1-e^{-s}}{3s}$
Option B:	$\frac{e^{-s}-1}{3s}$
Option C:	$\frac{1}{s}$
Option D:	$\frac{3(1-e^{-s})}{s}$
11.	Function f(x) defined in the interval (a, b) can be expressed in Fourier series

Option A:	If f(x) is of exponential order
Option B:	If f(x) is even function
Option C:	If f(x) satisfies Dirichlet's condition
Option D	If f(x) is odd function
12.	If $A = \begin{bmatrix} 1 & 2 & 0 \\ 0 & -1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$ Find Eigen Values of $A^2 + I$
Option A:	1,-1,1
Option B:	2,2,2
Option C:	1,1,1
Option D:	2,0,2
13.	The function $\frac{1}{z}$ is
Option A:	Analytic at zero
Option B:	Analytic at all points
Option C:	Not analytic at zero
Option D:	Not analytic at all points
14.	If $L\left[t^{3/2}\right] =?$
Option A:	$\frac{3}{2}\frac{\sqrt{\pi}}{s^{5/2}}$
Option B:	$\frac{3}{4}\frac{\sqrt{\pi}}{s^{5/2}}$
Option C:	$\frac{3}{4}\frac{\sqrt{\pi}}{s^{3/2}}$
Option D:	$\frac{3}{4}\frac{\sqrt{\pi}}{s^{3/2}}$
15.	If eigen values of matrix A are 2,-2,3 then the value of |A| is
:	12
Option B:	3
Option C:	-12
Option D:	0
16.	Find $L^{-1}\left[\frac{s^2+2s+2}{s^3}\right]$
Option A:	$1 + t + t^2$
Option B:	$1 + t + 2t^2$
Option C:	$1 + 2t + t^2$
Option D:	$1 + 2t + 2t^2$
17.	$L^{-1}\left[\frac{s+1}{(s+1)^2-1}\right]$ is
Option A:	$e^t cosht$
Option B:	$e^{-t} cosht$
Option C:	$e^t cost$
Option D:	$e^{-t} sinht$

18.	Orthogonal trajectories of the family of the curves $u=c_1$ is given by
Option A:	$v = c_2$
Option B:	$u + v = c$
Option C:	$u - v = c$
Option D:	$uv = c_2$
19.	$L\left[\int_0^t \int_0^t sinu\ du\ du\right] = ?$
Option A:	$\frac{1}{s^2+1}$
Option B:	$\frac{1}{s(s^2+1)}$
Option C:	$\frac{1}{s^2(s^2+1)}$
Option D:	$\frac{s}{s^2+1}$
20.	What is the divergence of the vector field $\bar{F} = x^2\mathrm{i} + 5y^2\mathrm{zj} + \mathrm{xyz}^2\mathrm{k}$ at the point (1, 0, -1)
Option A:	1
Option B:	2
Option C:	3
Option D:	4

Q2.	**Solve any Four out of Six** **5 marks each**
A	Use Laplace Transform to evaluate $\int_0^\infty \frac{e^{-2t}-e^{-3t}}{t}\ dt$
B	Find inverse laplace transform of $log\left(\frac{s+2}{s+3}\right)$
C	Obtain the fourier series for $f(x) = x^3$ in $(-\pi, \pi)$
D	Show that the matrix $A = \begin{bmatrix} 4 & 2 & 2 \\ 2 & 4 & 2 \\ 2 & 2 & 4 \end{bmatrix}$ is diagonalizable
E	Find the orthogonal trajectories of the family of the curves $2\mathrm{x} - \mathrm{x}^3 + 3\mathrm{xy}^2 = \mathrm{c}$
F	Using Green s theorem evaluate $\int_C x^2y\ dx + (y^3)dy$ where C is the boundary of the surface enclosed by $y = x, y = x^2$.

Q3.	**Solve any Four out of Six** **5 marks each**
A	Find $L\left[\int_0^t \frac{e^{-u}sin2u}{u}du\right]$
B	Verify Cayley-Hamilton Theorem and hence find inverse of the matrix $\begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -5 & -2 \end{bmatrix}$
C	Find half range sine series for $f(x) = x - x^2$ in $(0,1)$
D	Using convolution theorem, Find $L^{-1}\left(\frac{s}{(s^2+4)^2}\right)$

E	Find the analytic function whose real part is $u = e^x cosy$
F	Evaluate $\int_C \vec{F}.\overrightarrow{dr}$ where, $\vec{F} = (3x^2 + 6y)i - 14yzj + 20xz^2k$ and c is the straight line joining (0,0,0) and (1,1,1)

University of Mumbai

Examination 2021 under Cluster 06

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

Examination for Direct Second Year Students Commencing from 10th April 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2019

Examination: SE Semester III (For DSE Students)

Course Code: ELC302 and Course Name: Electronic Devices and Circuits I

Time: 2 hour Max. Marks: 80

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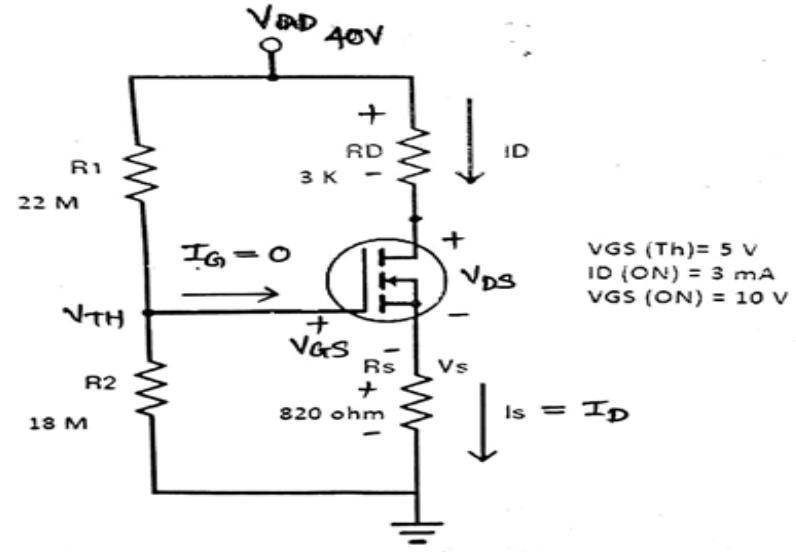
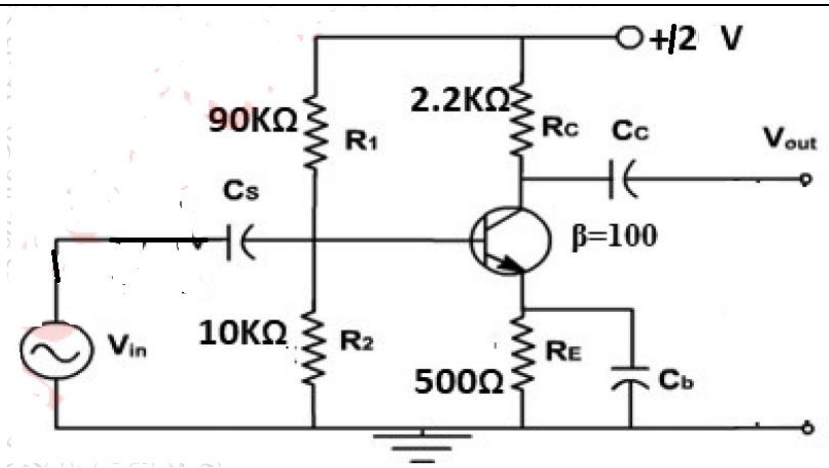
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Fermi energy level for n-type semiconductors lies ----------and P type semiconductor lies ----------
Option A:	Close to conduction band , Close to valence band
Option B:	Close to conduction band , Close to conduction band
Option C:	Close to valence band , Close to conduction band
Option D:	Close to valence band, Close to valence band
2.	In any semiconductor material, the drift current is proportional to
Option A:	Concentration gradient of charge carriers
Option B:	Square of applied electric field
Option C:	Applied electric field
Option D:	Cube of applied electric field
3.	In fixed bias circuit using an NPN transistor, if VCC =12V, VBE=0.7V, Base resistor RB= 240 k then I_B is
Option A:	80 µA
Option B:	47 µA
Option C:	50 µA
Option D:	130 mA
4.	H parameter model consists of components such as
Option A:	small signal resistance rpi and a dependent current source gmVpi
Option B:	input impedance, reverse voltage gain, current gain and output conductance
Option C:	small signal resistance re and a controlled current source
Option D:	small signal resistance rpi and an independent current source gmVpi
5.	Which Configuration has a high input impedance and low output impedance
Option A:	Common Collector Configuration
Option B:	Common Base Configuration
Option C:	Common Emitter Configuration
Option D:	Collector Base Configuration
6.	In a bipolar junction transistor (BJT) if β = 100 & collector current (IC) is 0.93 mA then what is the value of base current (IB) ?
Option A:	9.3 µA
Option B:	0.93 µA

Option C:	93 µA
Option D:	93 mA
7.	To operate transistor in its forward active / linear mode of operation base emitter junction is ---------- and the collector base junction is ----------
Option A:	reverse biased, forward biased
.Option B:	reverse biased, reverse biased
Option C:	forward biased ,reverse biased
Option D:	forward biased, forward biased
8.	The voltage gain of a common base amplifier is
Option A:	Zero
Option B:	Less than unity
Option C:	Unity
Option D:	Greater than unity
9.	The relation between α and β is _____
Option A:	α =(1+β)/ β
Option B:	α =β/(1+β)
Option C:	α =β/(1- β)
Option D:	α =(1-β)/ β
10.	In case of DMOSFET drain current I_D depends upon
Option A:	Vdd
Option B:	I_G
Option C:	V_{GS}
Option D:	I_S
11.	For E-MOSFETs, the relationship between output current and controlling voltage is defined by----------.
Option A:	ID= 〖(VGS-VGS(Th))〗^2
Option B:	ID=k 〖(VGS-VSB)〗^2
Option C:	ID=k 〖(VGS-VDS)〗^2
Option D:	ID=k 〖(VGS-VGS(Th))〗^2
12.	The N channel connecting two N regions is absent in
Option A:	N channel DMOSFET
Option B:	N channel EMOSFET
Option C:	P channel DMOSFET
Option D:	P channel EMOSFET
13.	The biasing method used for EMOSFET are voltage divider biasing circuit and---
Option A:	self bias circuit
Option B:	fixed bias
Option C:	collector to base bias circuit
Option D:	feedback biasing circuit
14.	The input impedance of the MOSFET is very high .Give reason

Option A:	The Sio_2 layer is present between gate terminal and channel.
Option B:	Metallic contacts are used for connecting the Drain, gate and source terminals
Option C:	A P type semiconductor is used as a substrate.
Option D:	A N type semiconductor is used as a substrate.
15.	A common drain amplifier has voltage gain ___
Option A:	Slightly less than 1.
Option B:	Greater than 1
Option C:	Infinite
Option D:	Zero
16.	Input signal of common source amplifier is applied to __
Option A:	Source terminal
Option B:	Gate terminal
Option C:	Drain terminal
Option D:	Substrate terminal
17.	Phase difference between input and output of a source follower circuit is
Option A:	0 degree
Option B:	90 degrees
Option C:	180 degrees
Option D:	45 degrees
18.	For the CS amplifier circuit calculate voltage gain Av if $g_{m=}$ 200 micro A/V and RD= 14KΩ
Option A:	-2.8
Option B:	2.8
Option C:	4.8
Option D:	-4.8
19.	Reactance of capacitor is given by
Option A:	Xc= 1/2 π f C
Option B:	Xc= 1/2 π R C
Option C:	Xc= 1 / 2 π L C
Option D:	Xc= 1/ 2 π R L
20.	In the design steps for RC coupled CE amplifiers, the voltage drop across emitter resistor R_E should be ---------- as compared to base emitter voltage of transistor
Option A:	lower
Option B:	higher
Option C:	same
Option D:	Zero

Q2. (20 Marks)	
Q.2 A)	**Solve any two out of three (5 marks each)**
i.	Draw Energy band diagram of PN junction diode under Forward biased, Reverse biased and Zero biased.
ii.	Compare CE, CB, CC Configurations of BJT.
iii.	Explain hybrid π model of BJT.
Q2. B)	**Solve any One Question out of two. (10 marks each)**
i.	Design a single stage RC Coupled CE amplifier using transistor with given specifications as $\|Av\|$=70, Vo rms=4.5V, F_L=10 Hz , $V_{CE(SAT)}$=1V , hfe= 180, hie=2.7KΩ and S< 8.
ii.	Draw the neat diagram of voltage divider biased CS MOSFET amplifier and source resistance bypass and derive the expression for the voltage gain.

Q3). (20 Marks)	**Solve any Two Questions out of Three (10 marks each)**
A	 . Fig.1 For the voltage divider bias circuit shown in Fig. 1 using N-channel E-MOSFET, VDD=40V, $V_{GS(TH)}$=5V, I_D(ON)= 3 mA and $V_{GS(ON)}$=10V. Calculate Q - point where Q = [V_{DSQ}, I_{DQ}].

B	 Fig. 2 R1=90KΩ, R2=10KΩ, Vcc=12V, β=100, V_{BE}=0.7V, Rc=2.2KΩ, RE=500Ω Find out voltage gain Av, input impedance Ri and output impedance Ro for the given circuit in Fig. 2
C	Design a single stage RC Coupled CE amplifier using transistor with following specifications. hfe=220, hie=2.7KΩ, |Av|=180, S=10, Vo=3V, Vcc=18V, F_L=20Hz, $V_{CE(SAT)}$=1V

University of Mumbai

Examination 2021 under Cluster 06

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

Examination for Direct Second Year Students Commencing from 10th April 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2019

Examination: SE Semester III (For DSE Students)

Course Code: ELC303 and Course Name: Digital Logic 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.	Convert Decimal$(105)_{10}$ to Binary
Option A:	$(101001)_2$
Option B:	$(1101001)_2$
Option C:	$(1110101)_2$
Option D:	$(1001011)_2$
2.	In Hamming code, which expression will help you to find out the number of parity bits.
Option A:	$2^P>=P+M+1$
Option B:	$2^P<=P+M+1$
Option C:	$2^P=P+M-1$
Option D:	$2^P<=P+M-1$
3.	What is the reflected binary code of $(100101)_2$.
Option A:	111000
Option B:	101010
Option C:	101111
Option D:	110111
4.	A multiplexer with 3 select lines is a
Option A:	4:1 multiplexer
Option B:	8:1 multiplexer
Option C:	16:1 multiplexer
Option D:	32:1 multiplexer
5.	IC 74138 is a
Option A:	3:8 line decoder
Option B:	1:8 line decoder
Option C:	4:8 line decoder
Option D:	any lines to 8 line decoder
6.	Which of the following ICs can be used as a comparator?
Option A:	IC7408
Option B:	IC7400

Option C:	IC7485
Option D:	IC7420
7.	In which type of machine the output depends on the present state and external input.
Option A:	Mealy machine
Option B:	Sequential asynchronous machine
Option C:	Asynchronous machine
Option D:	Moore machine
8.	IC 7492 is a
Option A:	MOD 12 Asynchronous counter
Option B:	MOD 12 Synchronous counter
Option C:	MOD 16 Asynchronous counter
Option D:	MOD 16 Synchronous counter
9.	Which of the following is a decade counter?
Option A:	IC 7493
Option B:	IC 7490
Option C:	IC 7491
Option D:	IC 7492
10.	Which one of the following methods can be used for state reduction?
Option A:	K-Maps
Option B:	Implication Chart method
Option C:	Truth Table
Option D:	Quine Mcclusky method
11.	Which of the given logic family dissipates minimum power
Option A:	TTL
Option B:	CMOS
Option C:	DTL
Option D:	ECL
12.	IC 74194 is a
Option A:	Ring counter
Option B:	4-bit bidirectional universal shift register
Option C:	Unidirectional shift register
Option D:	4-bit register
13.	What does FPGA stand for
Option A:	Field Programming Gate Array
Option B:	Field Programmable Gate Array
Option C:	First Program Gate Array
Option D:	First Programmable Gate Array
14.	Programmable Array Logic has
Option A:	a programmable AND and fixed OR array
Option B:	a programmable AND and a programmable OR array

Option C:	only a programmable AND array
Option D:	only a programmable OR array
15.	The number of similar gates which can be driven by a gate is called as_____
Option A:	Power dissipation
Option B:	Noise margin
Option C:	Fan-out
Option D:	Speed
16.	A CPLD device consist of
Option A:	PAL-Like Blocks, I/O blocks, and a set of interconnection wires
Option B:	PLA-Like Blocks and I/O blocks
Option C:	FPGAs
Option D:	Only interconnecting wires
17.	Which type of modeling style is not used in verilog hardware description language
Option A:	Structural
Option B:	Datatype
Option C:	Behavioral
Option D:	Data Flow
18.	_____ is a net data type used in Verilog.
Option A:	reg
Option B:	integer
Option C:	real
Option D:	wire
19.	Register data type in Verilog HDL is denoted as
Option A:	reg
Option B:	register
Option C:	RG
Option D:	wire
20.	Comment lines in Verilog HDL is denoted by
Option A:	//
Option B:	\
Option C:	\\
Option D:	*

Q2 **(20 Marks)**	
A	**Solve any Two 5 marks each**
i.	Explain with neat diagrams working of IC7483
ii.	State the differences between mealy and moore machine.
iii.	Write a short note on Complex Programmable Logic Devices.
B	**Solve any One 10 marks each**

i.	Design a MOD-6 counter using IC7490.
ii.	Write a program using Verilog HDL to implement a 8:1 multiplexer.
Q3 **(20 Marks)**	
A	**Solve any Two 5 marks each**
i.	Explain with suitable diagrams working of IC74163.
ii.	Write a program using Verilog HDL for implementing a half adder.
iii.	Explain in brief about the interfacing of CMOS to TTL ICs.
B	**Solve any One 10 marks each**
i.	Write a short note on carry look ahead adder.
ii.	Analyze the given state machine and draw the state diagram.