

University of Mumbai
Examination 2020 under cluster 5 (APSIT)

Program: Electronics & Telecommunication Engineering

Curriculum Scheme: Rev2016

Examination: Second Year Semester III

Course Code: ECC302 and Course Name: Electronic Devices & Circuits-I

Time: 1 hour

Max. Marks: 50

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	A silicon pn junction at a temperature of 20°C has a reverse saturation current of 10 pA. The reverse saturation current at 40°C for the same bias is approximately
Option A:	30 pA
Option B:	40 pA
Option C:	50 pA
Option D:	60 pA
Q2.	A zener diode is used as _____
Option A:	An amplifier
Option B:	A voltage regulator
Option C:	A rectifier
Option D:	A multivibrator
Q3.	A BJT is a _____-controlled device. The JFET is a _____ – controlled device
Option A:	voltage, voltage
Option B:	voltage, current
Option C:	current, voltage
Option D:	current, current
Q4.	If the emitter resistance in a common emitter voltage amplifier is not bypassed, it will
Option A:	Reduce both the voltage gain and the input impedance
Option B:	Reduce the voltage gain and increase the input impedance
Option C:	Increase the voltage gain and reduce the input impedance
Option D:	Increase both the voltage gain and the input impedance
Q5.	Which of the following term is not associated with a pn junction
Option A:	Junction capacitance
Option B:	Charge storage capacitance
Option C:	Depletion capacitance
Option D:	Channel length modulation
Q6.	Which of the following equations gives the relation between I_D and V_{gs} ?
Option A:	$I_D = I_{DSS} (1 - V_{gs}/V_p)^2$
Option B:	$I_D = I_{DSS} (1 - V_{gs}/V_p)^1$
Option C:	$I_D = I_{DSS} (1 - V_{gs}/V_p)^3$
Option D:	$I_D = I_{DSS} (1 - V_{gs}/V_p)^4$

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Q7.	Line regulation is
Option A:	The process of keeping Zener diode voltage constant inspite of changes in AC supply
Option B:	The process of keeping load voltage constant irrespective of the fluctuation in AC supply or the line voltage
Option C:	The process of keeping load voltage constant irrespective of fluctuation in load current
Option D:	The process of keeping Zener current constant irrespective of fluctuation in AC supply
Q8.	The _____ region produces the maximum voltage gain in a single-stage BJT or FET amplifier.
Option A:	low-frequency
Option B:	mid-frequency
Option C:	high-frequency
Option D:	Very high frequency
Q9.	Which of the following is the correct relationship between base and emitter current of a BJT?
Option A:	$I_B = \beta I_E$
Option B:	$I_B = I_E$
Option C:	$I_B = (\beta + 1) I_E$
Option D:	$I_E = (\beta + 1) I_B$
Q10.	The most stable biasing technique used is the
Option A:	voltage-divider bias.
Option B:	base bias.
Option C:	emitter bias.
Option D:	collector bias
Q11.	The gate voltage in a JFET at which drain current becomes zero is called voltage
Option A:	saturation
Option B:	Pinch off
Option C:	Active
Option D:	cutoff
Q12.	A transistor with $\beta = 120$ is biased to operate at a dc collector current of 1.2 mA. Find the value of g_m .
Option A:	12mA/V
Option B:	24 mA/V
Option C:	36 mA/V
Option D:	48 mA/V
Q13.	What is the typical value for the input impedance Z_i for JFETs?
Option A:	100 k Ω
Option B:	1 M Ω
Option C:	10 M Ω

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Option D:	1000 M Ω
Q14.	The _____ controls the _____ of an FET.
Option A:	ID, VGS
Option B:	VGS, ID
Option C:	IG, VDS
Option D:	IG, ID
Q15.	Transconductance is the ratio of changes in _____.
Option A:	ID to VGS
Option B:	ID to VDS
Option C:	VGS to IG
Option D:	VGS to VDS
Q16.	Determine the value of transconductance for N-channel JFET with IDSS = 9 mA, Vp = -2V, VGS = -1 V.
Option A:	7.5 mS
Option B:	6.5 mS
Option C:	4.5 mS
Option D:	5.5 mS
Q17.	A transistor with $\beta = 120$ is biased to operate at a dc collector current of 1.2 mA. Find the value of r_{π}
Option A:	625 Ω
Option B:	1250 Ω
Option C:	2500 Ω
Option D:	5000 Ω
Q18.	A transistor operating with nominal gm of 60 mA/V has a β that ranges from 50 to 200. Also, the bias circuit, being less than ideal, allows a 20% variation in Ic. What is the largest value found of the resistance looking into the base?
Option A:	694 Ω
Option B:	2100 Ω
Option C:	3150 Ω
Option D:	4200 Ω
Q19.	The input capacitor in an amplifier is the _____ capacitor
Option A:	Parasitic
Option B:	Bypass
Option C:	Leakage
Option D:	Coupling
Q20.	General representation of the frequency response curve is called
Option A:	Bode plot
Option B:	Root locus
Option C:	Miller plot

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Option D:	Thevenin plot
Q21.	A coupling capacitor is
Option A:	A DC short
Option B:	An AC open
Option C:	A DC open and an AC short
Option D:	A DC short and an AC open
Q22.	Internal transistor junction capacitances affect the high-frequency response of amplifiers by
Option A:	Reducing the amplifiers gain
Option B:	Introducing phase shift as the signal frequency increases
Option C:	Having no effect
Option D:	Reducing the amplifiers gain and introducing phase shift as the signal frequency increases
Q23.	Addition of a bypass capacitor to a circuit
Option A:	Increases the voltage gain
Option B:	Decreases the voltage gain
Option C:	Voltage gain remains unchanged
Option D:	Nothing can be predicted
Q24.	A BJT is said to be operating in the saturation Region if
Option A:	Both the junction are reverse biased.
Option B:	Base-emitter junction is reverse biased and base-collector junction is forward biased.
Option C:	Base-emitter junction is forward biased and base-collector junction is reverse-biased
Option D:	Both the junction are forward biased.
Q25.	Which of the following statements are correct for basic transistor amplifier configurations
Option A:	CB amplifier has low input impedance and low current gain.
Option B:	CC amplifier has low output impedance and low current gain
Option C:	CE amplifier has very poor voltage gain but very high input impedance
Option D:	The current gain of CB amplifier is higher than the current gain of CC

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Question Number	Correct Option
Q1.	B
Q2.	B
Q3.	C
Q4	B
Q5	D
Q6	A
Q7	B
Q8.	B
Q9.	D
Q10.	A
Q11.	B
Q12.	D
Q13.	D
Q14.	B
Q15.	A
Q16.	C
Q17.	C
Q18.	D
Q19.	D
Q20.	A
Q21.	C
Q22.	D
Q23.	A
Q24.	D
Q25.	A

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Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Rev2016

Examination: Second Year Semester III

Course Code: ECC303 and Course Name: Digital System Design

Time: 1 hour

Max. Marks: 50

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	What is the base of hexadecimal number system?
Option A:	15
Option B:	16
Option C:	10
Option D:	2
Q2.	Two's complement of Binary 10010 is
Option A:	01110
Option B:	10100
Option C:	01101
Option D:	10010
Q3.	The output of two input AND logic gate is
Option A:	A.B
Option B:	A+B
Option C:	A-B
Option D:	1
Q4.	Minimum number of NOR logic gates required to implement EX-NOR gate.
Option A:	5
Option B:	3
Option C:	6
Option D:	4
Q5.	A LED bulb in a building has two switches, one switch being at the ground floor and the other one at the first floor. The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch. The logic of switching of the bulb is.
Option A:	an AND gate
Option B:	an OR gate
Option C:	an XOR gate
Option D:	a NAND gate
Q6.	The output of a logic gate is '1' when all its inputs are at logic 0. The gate is either
Option A:	NAND or an EX OR gate
Option B:	NOR or an EX-NOR gate
Option C:	An OR or an EX NOR gate
Option D:	An AND or an EX-OR gate

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Q7.	The Boolean function $Y = AB + CD$ is to be realized using only 2 input NAND gates .The minimum number of gates required is
Option A:	2
Option B:	3
Option C:	4
Option D:	5
Q8.	In four variable K map if all minterm are present then the output is
Option A:	0
Option B:	1
Option C:	2
Option D:	Equal to input
Q9.	The strobe input is also known as_____
Option A:	decoder
Option B:	Sink
Option C:	enable
Option D:	select input
Q10.	In a combinational circuit, the output depends on
Option A:	Input values
Option B:	Clock pulses
Option C:	Voltage value
Option D:	Past value
Q11.	Conversion of decimal to BCD can be done by
Option A:	Decoder
Option B:	Encoder
Option C:	Demux
Option D:	Mux
Q12.	Example of universal gate_____
Option A:	NAND & NOR
Option B:	OR & AND
Option C:	Only NAND
Option D:	Only OR
Q13.	Which of the following is non-saturating
Option A:	NMOS
Option B:	TTL
Option C:	CMOS
Option D:	ECL
Q14.	The minimum number of 2 to 1 multiplexers required to realize a 4 to 1 multiplexer is
Option A:	1
Option B:	3

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Option C:	2
Option D:	4
Q15.	Number of selection lines required in 3 line to 8line decoder.
Option A:	3
Option B:	4
Option C:	0
Option D:	2
Q16.	Number of T flip flops required in 4 bit shift register
Option A:	4
Option B:	3
Option C:	2
Option D:	0
Q17.	The minimum number of flip flops required for BCD counter is
Option A:	2
Option B:	3
Option C:	4
Option D:	5
Q18.	In an SR flip flop $S=R=1$ is known as
Option A:	Race condition
Option B:	Race around condition
Option C:	Toggle
Option D:	Past state
Q19.	The minimum number of logic gates required for a 1 bit memory cell is
Option A:	2
Option B:	4
Option C:	6
Option D:	5
Q20.	Number of clock pulses required in 4 bit SISO shift register.
Option A:	4
Option B:	2
Option C:	3
Option D:	1
Q21.	Asynchronous counter is also known as
Option A:	Ripple counter
Option B:	Synchronous
Option C:	SSI counter
Option D:	Down counter
Q22.	If the number of flip flops are increased then the propagation delay of ____
Option A:	Both ripple and synchronous counter decreases
Option B:	Ripple counter increases

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Option C:	Synchronous counter increases
Option D:	Both ripple and synchronous counter increases
Q23.	The full form of PLD is
Option A:	Programmable logic device
Option B:	Programmable large device
Option C:	Programmable long device
Option D:	Programmable length device
Q24.	ROM is made up of _____
Option A:	Nor and decoder
Option B:	Nand and decoder
Option C:	Decoder and OR
Option D:	Nand and OR
Q25.	Where do we declare the loop index of a for loop.
Option A:	Entity
Option B:	Library
Option C:	Syntax
Option D:	It does not have to be declared

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Time: 1 hour

Max. Marks: 50

Question Number	Correct Option
Q1.	B
Q2.	A
Q3.	A
Q4	D
Q5	C
Q6	B
Q7	B
Q8.	B
Q9.	C
Q10.	A
Q11.	B
Q12.	A
Q13.	D
Q14.	B
Q15.	C
Q16.	D
Q17.	C
Q18.	A
Q19.	A
Q20.	A
Q21.	A
Q22.	B
Q23.	A
Q24.	C
Q25.	D

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Program: Electronics and Telecommunication Engineering

Curriculum Scheme: Rev-2016

Examination: Second Year Semester III

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

Time: 1 hour

Max. Marks: 50

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	A network consists of an independent current source and resistors. If value of all resistors are doubled, the value of node voltage will be -----.
Option A:	Become double
Option B:	Remains unchanged
Option C:	Become half
Option D:	Became $1/4^{\text{th}}$
Q2.	Superposition theorem is not applicable to network containing -----
Option A:	Dependent current source
Option B:	Linear element
Option C:	Depended voltage source
Option D:	Non-linear elements
Q3.	Value of load resistor must be equal to ----- to delivered maximum power to the load
Option A:	$(I_{SC})^2 \times R_{TH}$
Option B:	Thevenin's equivalent resistor (R_{TH})
Option C:	V_{TH} / R_{TH}
Option D:	$V_{TH} / 2 \times R_{TH}$
Q4.	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
Q5.	If graph is consist of 5 nodes and 7 branches then number of twigs and number of links are ----- and ----- respectively.
Option A:	3, 4
Option B:	5, 2
Option C:	2, 5
Option D:	4, 3
Q6.	Which of the following is correct generalized KVL equation in graph theory?
Option A:	$B \cdot Z_b \cdot I_l = B \cdot Z_b I_s$
Option B:	$Z_b \cdot B \cdot B^T I_l = B(Z_b I_s - V_s)$
Option C:	$B \cdot Z_b \cdot B^T I_l = B \cdot V_s - B \cdot Z_b I_s$
Option D:	$Y \cdot V_t = Q I_s - Q Y_b V_s$
Q7.	Reduced Incidence matrix can be obtained by -----

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Option A:	Eliminating a row of complete incidence matrix
Option B:	Multiplying complete incidence matrix with its transpose
Option C:	$ A A^T $
Option D:	Obtaining tree
Q8.	If tree consists of 4 twigs and 3 links, the number of rows in fundamental cutset matrix are -----
Option A:	5
Option B:	4
Option C:	3
Option D:	7
Q9.	If the voltage across capacitor (C) is $V_c(t)$ then current in capacitor $i_c(t)$ is given by ----
Option A:	$i_c(t) = \frac{1}{C} \int_{-\infty}^t V_c(t) \cdot dt$
Option B:	$i_c(t) = V_c(t) / C$
Option C:	$i_c(t) = V_c(t) + V_c(0^-)$
Option D:	$i_c(t) = C \frac{dV_c(t)}{dt}$
Q10.	Convert R, L and C to S domain.
Option A:	R, L and C
Option B:	RS, LS and CS
Option C:	R, LS and 1/CS
Option D:	R, 1/LS and CS
Q11.	Inductor with zero initial current, behaves as ----- at $t = 0^+$.
Option A:	Voltage source
Option B:	Produces non-zero current
Option C:	Short circuit
Option D:	Open circuit
Q12.	For R-L circuit value of time constant is given by ----
Option A:	L / R
Option B:	LR
Option C:	R / L
Option D:	$R + L$
Q13.	Laplace transform of unit step function is -----
Option A:	$\frac{1}{s}$
Option B:	$\frac{e^{as}}{s}$
Option C:	$\frac{1}{s-a}$
Option D:	$\frac{a}{s+a}$

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Q14.	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 three zeros.
Option D:	There is zero at right half of the S plane
Q15.	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:	$R + CS$
Q16.	If Laplace transform of $\{f(t)\} = F(S)$ then $L\{d(f(t))/dt\} = \text{-----}$
Option A:	$dF(S) / dS$
Option B:	$F'(S)$
Option C:	$dF(S) / dt$
Option D:	$S F(S) - f(0)$
Q17.	Two port equations of a networks are $V_1 = 3 I_1 + 5 I_2$ $V_2 = 8 I_1 + 7 I_2$
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:	$Z_{11} = 5, Z_{12} = 3, Z_{21} = 7, Z_{22} = 8$
Q18.	Which of the following is valid equations of transmission parameters?
Option A:	$V_1 = T_{11} V_2 - T_{12} I_2$
Option B:	$I_1 = Y_{11} V_1 - Y_{12} V_2$
Option C:	$I_2 = Y_{12} V_1 - Y_{22} V_2$
Option D:	$V_1 = A V_2 - B I_2$
Q19.	One of the Conditions for two port network to be reciprocal is ----
Option A:	$Z_{11} = Z_{22}$
Option B:	$Y_{11} = Y_{22}$
Option C:	$AD - BC = 1$
Option D:	$h_{11} = h_{22}$
Q20.	Test result of two port network are $I_1 = 0.1 \text{ A}$, $V_1 = 5.2 \text{ V}$, $V_2 = 4.1 \text{ V}$ with port-2 open circuited. Open circuit impedance parameters $Z_{11} = \text{---ohm}$.
Option A:	5.2
Option B:	52
Option C:	31
Option D:	42

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Q21.	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
Q22.	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 only on negative real axis
Option C:	Can lie anywhere on S-Plane
Option D:	Should be alternate on imaginary axis
Q23.	Driving point impedance function $Z(S) = 5 + 4s$ is ----
Option A:	Parallel combination of resistors and inductor.
Option B:	Parallel combination of Capacitor and inductor
Option C:	Series combination of resistor and inductor
Option D:	Series combination of two inductors
Q24.	Driving point admittance function $Y(S) = \frac{4S}{S^2+9}$ is -----
Option A:	Series combination of inductor and resistor
Option B:	Series combination of capacitor and resistor
Option C:	Parallel combination of two resistors
Option D:	Series combination of inductor and capacitor
Q25.	Function $F(S) = \frac{S(S+3)}{(S+2)(S-4)}$ is find the zeros and poles
Option A:	Zeros: -3, Poles: -2
Option B:	Zeros: -3, Poles: -2 and -4
Option C:	Zeros: -2 and -4, Poles: -3
Option D:	Zeros:0, -3, Poles: -2 and 4

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Q1.	B
Q2.	D
Q3.	B
Q4	C
Q5	D
Q6	C
Q7	A
Q8.	B
Q9.	D
Q10.	C
Q11.	D
Q12.	A
Q13.	A
Q14.	B
Q15.	A
Q16.	D
Q17.	C
Q18.	D
Q19.	C
Q20.	B
Q21.	D
Q22.	B
Q23.	C
Q24.	D
Q25.	D

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Program: __ Electronics and Telecommunication Engineering

Curriculum Scheme: Rev2016

Examination: Second Year Semester III

Course Code: ECC305 and Course Name: EIC

Time: 1 hour

Max. Marks: 50

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	LVDT which is an instrument for the measurement of displacement, works on the principal of
Option A:	Linear inductance
Option B:	Non – linear inductance
Option C:	Mutual inductance
Option D:	Linear capacitance
Q2.	The undesirable characteristics of a measuring system is
Option A:	accuracy
Option B:	dead Zone
Option C:	precision
Option D:	repeatability
Q3.	If at one end, the two wires made of different metals are joined together then a voltage will get produced between the two wires due to difference of temp between the two ends of wires. This effect is observed in
Option A:	Thermocouples
Option B:	Thermistors
Option C:	RTD
Option D:	Ultrasonics
Q4.	Q meter works on the principle of _____
Option A:	Barkhausen criterion
Option B:	Piezoelectric effect
Option C:	Parallel resonance
Option D:	Series resonance
Q5.	Which of the following types of landline telemetry method has the advantage of simplicity and is free from noise,leakage and supply voltage variations
Option A:	Current type
Option B:	Voltage type

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Option C:	Impulse type
Option D:	Positions type
Q6.	Which one of the following modulation techniques is the most efficient for pulse telemetry?
Option A:	PAM
Option B:	PCM
Option C:	PDM
Option D:	PPM
Q7.	For the measurement of unknown inductance in terms of known capacitance, the suitable ac bridges are
Option A:	Maxwell and Schering bridge
Option B:	Maxwell and Wien's bridge
Option C:	Maxwell and Hay's bridge
Option D:	Hay's and Wien's bridge
Q8.	For the measurement of low resistances, Kelvin's double bridge has high accuracy because:
Option A:	It has two set of ratio arms which eliminates effect of resistance of connecting lead
Option B:	It has a null indicating galvanometer
Option C:	It has two null indicator
Option D:	It has four sets of ratio arms which eliminates the effect of resistance of connecting lead
Q9.	In an open loop control system
Option A:	Output is independent of control input
Option B:	Output is dependent on control input
Option C:	Only system parameters have effect on the control output
Option D:	Gain is constant
Q10.	The position and velocity errors of type-2 systems are
Option A:	Constant, Constant
Option B:	Constant, Infinity
Option C:	Zero, constant
Option D:	Zero, zero
Q11.	Which of the following is exhibited by Root locus diagram?

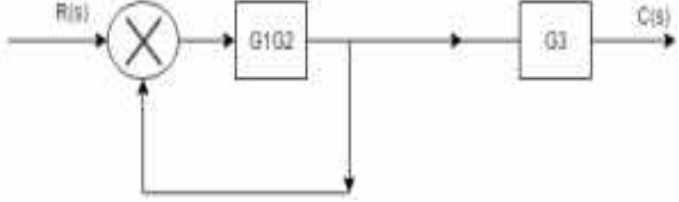
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Option A:	The poles of the transfer function for a set of parameter values
Option B:	The bandwidth of the system
Option C:	The response of a system to a step input
Option D:	The frequency response of a system
Q12.	The transfer function of closed loop control system given below is
Option A:	$G(s)/(1+G(s)*H(s))$
Option B:	$G(s)/(1- G(s)*H(s))$
Option C:	$G(s)+H(s)$
Option D:	$G(s)-H(s)$
Q13.	Signal flow graph is used to find-----
Option A:	Stability of the system
Option B:	Controllability of system
Option C:	Transfer function of system
Option D:	Poles of the system
Q14.	For root loci which of the following are the starting points?
Option A:	Open loop zeros
Option B:	Closed loop zeros
Option C:	Closed loop poles
Option D:	Open loop poles
Q15.	Consider the loop transfer function $K(s+6)/(s+3)(s+5)$ In the root locus diagram the centroid will be located at:
Option A:	-4
Option B:	-1
Option C:	-2
Option D:	-3

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Q16.	If the unity feedback system is given by the open loop transfer function $G(s) = \frac{k s^2}{[(1 + 0.3s)(1 + 0.05s)]}$, what would be the initial slope of magnitude plot?
Option A:	20dB/decade
Option B:	40dB/decade
Option C:	60dB/decade
Option D:	Unpredictable
Q17.	The system is said to be marginally stable, if gain margin is _____
Option A:	0
Option B:	1
Option C:	$+\infty$
Option D:	10
Q18.	If the phase angle at gain crossover frequency is estimated to be -105° , what will be the value of phase margin of the system?
Option A:	23°
Option B:	45°
Option C:	60°
Option D:	75°
Q19.	The polar plot of a transfer function passes through the critical point $(-1,0)$. Gain margin is
Option A:	ZERO
Option B:	-1dB
Option C:	1dB
Option D:	Infinity
Q20.	First column elements of the Routh's tabulation are 3, 5, $-3/4$, $1/2$, 2. It means that there are:
Option A:	One root in the left half of s- plane
Option B:	two roots in the left half of s-plane
Option C:	two roots in the right half of s-plane
Option D:	one root in the right half of s-plane
Q21.	Which of the following is true for Routh -Hurwitz criterion? Routh -Hurwitz criterion gives 1.Estimation of absolute stability 2.The number of roots lying on right half of s-plane 3.The gain and phase margin
Option A:	1,2,3
Option B:	1 and 2
Option C:	1 and 3
Option D:	2 and 3
Q22.	The given characteristic equation $s^4+s^3+2s^2+2s+3=0$ has:
Option A:	Zero root in the s-plane
Option B:	One root in the RHS of s-plane

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Option C:	Two root in the RHS of s-plane
Option D:	Three root in the RHS of s-plane
Q23.	For the block diagram given in the following figure, the expression of C/R is: 
Option A:	$G_1G_2G_3/1-G_2G_1$
Option B:	$G_1G_2/1-G_1G_2G_3$
Option C:	$G_1G_2G_3/1-G_1G_2G_3$
Option D:	$G_1G_2/G_3(1-G_1G_2)$
Q24.	The overall transfer function from block diagram reduction for cascaded blocks is
Option A:	Sum of individual gain
Option B:	Product of individual gain
Option C:	Difference of individual gain
Option D:	Division of individual gain
Q25.	Two loops are said to be non-touching only if no common _____ exists between them.
Option A:	Loop
Option B:	Feedback Path
Option C:	Branch
Option D:	Node

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Program: Electronics and telecommunication Engineering

Curriculum Scheme: Rev2016

Examination: Second Year Semester III

Course Code: ECC305 and Course Name: EIC

Time: 1 hour

Max. Marks: 50

Question Number	Correct Option
Q1.	C
Q2.	B
Q3.	A
Q4	D
Q5	D
Q6	B
Q7	C
Q8.	A
Q9.	A
Q10.	C
Q11.	A
Q12.	A
Q13.	C
Q14.	D
Q15.	C
Q16.	B
Q17.	C
Q18.	D
Q19.	A
Q20.	C
Q21.	B
Q22.	C
Q23.	A
Q24.	A
Q25.	D

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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: 1 hour

Max. Marks: 50

Note: -

1. All the Questions are compulsory and carry equal marks.
2. Assume suitable data wherever necessary.

Q1.	Laplace Transform of $f(t) = \cos^2 t$ is
Option A:	$\frac{1}{2} \left \frac{1}{s} + \frac{s}{s^2 + 4} \right $
Option B:	$\left \frac{1}{s} - \frac{s}{s^2 + 4} \right $
Option C:	$\left \frac{1}{s} + \frac{s}{s^2 + 4} \right $
Option D:	$\frac{1}{2} \left \frac{2}{s} - \frac{2s}{s^2 + 4} \right $
Q2.	Laplace Transforms $f(t) = t \cdot \sin t$ is
Option A:	$\frac{2s}{(s^2 + 1)^2}$
Option B:	$\frac{-s}{(s^2 + 1)^2}$
Option C:	$\frac{-s}{(s^2 - 1)^2}$
Option D:	$\frac{-2s}{(s^2 + 1)^2}$
Q3.	Find the Laplace transform of $f(t) = t^2 + \sin 2t$
Option A:	$\left -\frac{2}{s^2} + \frac{2}{s^2 + 4} \right $
Option B:	$\left \frac{2}{s^3} + \frac{2}{s^2 + 4} \right $
Option C:	$\left \frac{2}{s^3} + \frac{4}{s^2 + 4} \right $
Option D:	$\left \frac{4}{s^2} - \frac{2}{s^2 + 6} \right $
Q4.	Laplace Transforms $f(t) = t \cdot e^{at}$ is
Option A:	$\frac{1}{(s + a)^2}$
Option B:	$-\frac{1}{(s - a)^2}$
Option C:	$\frac{1}{(s - a)^2}$

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Option D:	$-\frac{1}{(s+a)^2}$
Q5.	The inverse Laplace Transforms of $F(s) = \tan^{-1}\left(\frac{2}{s}\right)$
Option A:	$\frac{\sin 2t}{t}$
Option B:	$-\frac{t}{\cos 2t}$
Option C:	$-\frac{t}{\sin 2t}$
Option D:	$\frac{\cos 2t}{t}$
Q6.	Find the inverse Laplace Transform of $F(s) = \frac{s+2}{s^2-4s+13}$
Option A:	$e^{-2t} \cos 3t + \frac{4}{3} e^{-2t} \sin 3t$
Option B:	$-e^{2t} \cos 3t - \frac{4}{3} e^{2t} \sin 3t$
Option C:	$e^{2t} \cos 3t + \frac{4}{3} e^{2t} \sin 3t$
Option D:	$e^{2t} \cos 3t - \frac{4}{3} e^{2t} \sin 3t$
Q7.	$L^{-1}\left[\frac{8e^{-3s}}{s^2+4}\right]$ is
Option A:	$4\sin 2(t-3) \cdot H(t-3)$
Option B:	$\sin 2(t+3) \cdot H(t-3)$
Option C:	$4\sin 2(t-3) \cdot H(t+3)$
Option D:	$\sin(t-2) \cdot H(t-2)$
Q8.	A function $f(x)$ is said to be odd if
Option A:	$f(-x) = f(x)$
Option B:	$f(-x) = -f(x)$
Option C:	$f(x+2p) = f(x)$
Option D:	$f(-x) = [f(x)]$
Q9.	If $f(x) = x$ in $(-\pi, \pi)$, then the Fourier coefficient a_2 is
Option A:	π
Option B:	0
Option C:	1
Option D:	-1
Q10.	If $f(x) = \cos x$ in $(-\pi, \pi)$, then the Fourier coefficient b_n is

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Option A:	0
Option B:	π
Option C:	1
Option D:	-1
Q11.	For half range sine series of $f(x) = \cos x, 0 \leq x \leq \pi$ Fourier series is represented by $\sum_{n=1}^{\infty} b_n \sin nx$, then Fourier coefficient b_1 is
Option A:	$\frac{1}{\pi}$
Option B:	0
Option C:	$\frac{2}{\pi}$
Option D:	$-\frac{2}{\pi}$
Q12.	A function $f(x)$ is said to be odd if
Option A:	$f(-x) = f(x)$
Option B:	$f(-x) = -f(x)$
Option C:	$f(x + 2p) = f(x)$
Option D:	$f(-x) = [f(x)]$
Q13.	If $f_1(x) = 1, f_2(x) = x, f_3(x) = -1 + ax + bx^2$ are orthogonal on $(-1, 1)$, then values of a and b are:
Option A:	$a = 0$ and $b = 3$.
Option B:	$a = -1$ and $b = -3$.
Option C:	$a = 1$ and $b = -3$.
Option D:	$a = 2$ and $b = 3$.
Q14.	Using Gauss's Divergence Theorem, the value of the integral $\int_S (ax^2 + by^2 + cz^2) ds$ over the sphere $x^2 + y^2 + z^2 = 1$ is
Option A:	$\frac{2}{3}\pi(a + b + c)$
Option B:	$\frac{4}{3}\pi(a + b + c)$
Option C:	$-\pi(a + b + c)$
Option D:	$\pi(a + b + c)$
Q15.	If $\vec{F} = a(x + y)\vec{i} + a(y - x)\vec{j} + z^2\vec{k}$, then using Stoke's theorem the value of the integral $\int_C \vec{F} \cdot d\vec{r}$; where C: the boundary of the plane surface of the hemisphere $x^2 + y^2 + z^2 = a^2, z = 0$ is
Option A:	$-2\pi a^3$
Option B:	$2\pi a^3$
Option C:	$4\pi a^2$
Option D:	$4\pi a^3$

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Q16.	The value of the integral $\int_C (e^{-x} \sin y dx + e^{-x} \cos y dy)$ where C: the rectangle whose vertices are $(0, 0), (\pi, 0), (\pi, \frac{\pi}{2}), (0, \frac{\pi}{2})$ using Green's Theorem is
Option A:	$3(e^{-\pi} - 1)$
Option B:	$3(e^{-\pi} + 1)$
Option C:	$2(e^{-\pi} - 1)$
Option D:	$2(e^{-\pi} + 1)$
Q17.	The value of an integral $\int_C \vec{F} \cdot d\vec{r}$ if $\vec{F} = \cos y \cdot \vec{i} - x \sin y \cdot \vec{j}$ where C: the curve $y = \sqrt{(1-x^2)}$ in the xy-plane from $(1, 0)$ to $(0, 1)$.
Option A:	-5
Option B:	2
Option C:	0
Option D:	-1
Q18.	The work done in moving a particle once round the circle $x^2 + y^2 = a^2, z = 0$ in the force field given by $\vec{F} = \sin y \cdot \vec{i} + (x + x \cos y) \cdot \vec{j}$ is
Option A:	$2\pi a^2$
Option B:	$-\pi a$
Option C:	πa^2
Option D:	$-3\pi a^2$
Q19.	The values of a, b, c of irrotational field $\vec{F} = (axy + bz^3)\vec{i} + (3x^2 - cz)\vec{j} + (3xz^2 - y)\vec{k}$ is
Option A:	$a = 5, b = c = -1$
Option B:	$a = -5, b = c = 2$
Option C:	$a = -6, b = c = -1$
Option D:	$a = 6, b = c = 1$
Q20.	Determine the constants a, b, c and d if $f(z) = x^2 + 2axy + by^2 + i(cx^2 + 2dxy + y^2)$ is analytic.
Option A:	$a = -1; b = c = -1; d = -1$
Option B:	$a = 2; b = c = -2; d = 2$
Option C:	$a = 2; b = c = -1; d = 2$
Option D:	$a = 1; b = c = -1; d = 1$
Q21.	The analytic function of the imaginary part $v = e^{-x}(y \sin y + x \cos y)$ is
Option A:	$f(z) = ze^{-z} + c$
Option B:	$f(z) = ie^{-z} + c$
Option C:	$f(z) = i ze^{-z} + c$
Option D:	$f(z) = z^2 + c$
Q22.	The fixed points of $w = \frac{z-1}{z+1}$ are
Option A:	$i, -i$

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Option B:	$3i, 2 - i$
Option C:	$2i, 5 - i$
Option D:	$7i, -8i$
Q23.	$J_{\frac{1}{2}}(x)$ is given by
Option A:	$\sqrt{\frac{2}{\pi x}} \cdot \cos x$
Option B:	$-\sqrt{\frac{2}{\pi x}} \cdot \cos x$
Option C:	$\sqrt{\frac{2}{\pi x}} \cdot \sin x$
Option D:	$\sqrt{\frac{2}{\pi}} \cdot \cos x$
Q24.	The value of $\frac{d}{dx} x^{1/2} \cdot J_n(\sqrt{x}) $ is
Option A:	$x^{(n+1)/2} \cdot J_{n-1}(\sqrt{x})$
Option B:	$-\frac{1}{2} \cdot x^{(n+1)/2} \cdot J_{n+1}(\sqrt{x})$
Option C:	$-x^{(n-1)/2} \cdot J_{n-1}(\sqrt{x})$
Option D:	$\frac{1}{2} \cdot x^{(n-1)/2} \cdot J_{n-1}(\sqrt{x})$
Q25.	$J_{\frac{3}{2}}(x)$ is given by
Option A:	$\sqrt{\frac{2}{\pi x}} \cdot \left(\frac{\sin x}{x} - \cos x \right)$
Option B:	$-\sqrt{\frac{2}{\pi x}} \cdot \left(\frac{\sin x}{x} - \cos x \right)$
Option C:	$\sqrt{\frac{2}{x}} \cdot \left(-\frac{\sin x}{x} + \cos x \right)$
Option D:	$\sqrt{\frac{2}{\pi x}} \cdot \left(\frac{\cos x}{x} + \sin x \right)$

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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: 1 hour

Max. Marks: 50

Note: -

1. All the Questions are compulsory and carry equal marks.
2. Assume suitable data wherever necessary.

Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	A
Q3.	C
Q4	C
Q5	A
Q6	C
Q7	A
Q8.	B
Q9.	B
Q10.	A
Q11.	B
Q12.	B
Q13.	A
Q14.	B
Q15.	A
Q16.	C
Q17.	D
Q18.	C
Q19.	D
Q20.	D
Q21.	C
Q22.	A

Q23.	C
Q24.	D
Q25.	A