

University of Mumbai

Question Bank

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2019

Examination: SE Semester IV

Course Code: ELC402 and Course Name: Electronic Devices & Circuits - II

Max. Marks: 80

Each question carry 02 Marks	
1.	Which of the following is false statement
Option A:	The coupling and bypass capacitors affect the low frequency response of an amplifier.
Option B:	The mid frequency range is not affected by any of the capacitors.
Option C:	The internal capacitances affect the high frequency region of frequency response.
Option D:	The mid frequency range is affected by any of the capacitors.
2.	One of the important characteristics of an amplifier is
Option A:	Gain X Bandwidth = Constant
Option B:	Gain X Bandwidth = High
Option C:	Gain X Bandwidth = Low
Option D:	Gain X Bandwidth = zero
3.	The Miller's theorem can be applied to the MOSFET amplifiers while evaluating the effect of their
Option A:	gate to source capacitance C_{gs}
Option B:	drain to gate capacitance C_{gd}
Option C:	drain to source capacitance C_{ds}
Option D:	source to ground capacitance C_{sg}
4.	Which of the following is True statement
Option A:	In the mid-band range capacitances present in the equivalent circuit of an amplifier.
Option B:	In the mid-frequency response coupling and bypass capacitors replaced by open circuit.
Option C:	In the mid-frequency response stray and transistor capacitors should be treated as short circuit.
Option D:	In the mid-band range, there are no capacitances present in the equivalent circuit of an amplifier.
5.	Which of the following is not the features of cascade amplifier
Option A:	Overall input impedance is equal to that of the first stage
Option B:	Overall output impedance is equal to that of the last stage
Option C:	Overall current gain is equal to the product of current gains of individual stages
Option D:	Overall bandwidth is higher than that of an individual stage.
6.	In multistage amplifiers, which of the following is not the type of coupling
Option A:	R-C coupling
Option B:	Transformer coupling

Option C:	Direct coupling
Option D:	Indirect coupling
7.	Which of the following statement is correct
Option A:	Lower cutoff frequency corresponds to smallest of all the time constants and higher cutoff frequency corresponds to largest of all the time constants.
Option B:	Lower cutoff frequency and higher cutoff frequency corresponds to largest of all the time constants.
Option C:	Lower cutoff frequency corresponds to largest of all the time constants and higher cutoff frequency corresponds to smallest of all the time constants.
Option D:	Lower cutoff frequency and higher cutoff frequency corresponds to smallest of all the time constants.
8.	Gain of the cascaded configuration is given by
Option A:	Overall voltage gain= $A_{v1} + A_{v2}$
Option B:	Overall voltage gain= $A_{v1} \times A_{v2}$
Option C:	Overall voltage gain= A_{v1} / A_{v2}
Option D:	Overall voltage gain= $A_{v1} - A_{v2}$
9.	Which of the following is false statement for negative feedback
Option A:	The signal feedback from output to input is in phase with the applied excitation.
Option B:	It increases bandwidth.
Option C:	It lowers the output impedance for certain feedback configuration.
Option D:	It increases input impedance for certain feedback configuration.
10.	The equation of gain of the feedback amplifier, with negative feedback is given By
Option A:	$A_{vf} = A_v / (1 + A_v \beta)$
Option B:	$A_{vf} = A_v / (1 - A_v \beta)$
Option C:	$A_{vf} = A_v / (1 * A_v \beta)$
Option D:	$A_{vf} = A_v / (1 / A_v \beta)$
11.	Which of the following is true statement for positive and negative feedback respectively where V_s is supply volt, V_i is amplifier input volt and V_f is feedback volt
Option A:	$V_i = V_s + V_f$ and $V_i = V_s + V_f$
Option B:	$V_i = V_s - V_f$ and $V_i = V_s + V_f$
Option C:	$V_i = V_s + V_f$ and $V_i = V_s - V_f$
Option D:	$V_i = V_s - V_f$ and $V_i = V_s - V_f$
12.	RC oscillators and LC oscillators are
Option A:	Both are high frequency oscillators
Option B:	high frequency oscillators and low frequency oscillators
Option C:	low frequency oscillators and high frequency oscillators
Option D:	Both are low frequency oscillators
13.	The equivalent circuit of a _____ is R-L-C series circuit shunted by the mounting capacitance C_m
Option A:	Wien Bridge Oscillator
Option B:	Hartley Oscillator
Option C:	Colpitts Oscillator
Option D:	Crystal Oscillator

14.	CMRR is defined as _____ where Ad is differential gain and Ac is common mode gain.
Option A:	Ad/Ac
Option B:	Ac/Ad
Option C:	Ad+Ac
Option D:	Ad*Ac
15.	The important feature of differential amplifier is
Option A:	High differential gain and high common mode gain
Option B:	Low differential gain and low common mode gain
Option C:	High differential gain and low common mode gain
Option D:	Low differential gain and high common mode gain
16.	Which of the following is not the method to improve CMRR in differential amplifier?
Option A:	To use an active load
Option B:	To use a current mirror circuit
Option C:	To use a constant current bias
Option D:	To use a passive load
17.	When the collector current flows at all times during the full cycle of input signal, the power amplifier is known as
Option A:	Class A Power amplifier
Option B:	Class B Power amplifier
Option C:	Class C Power amplifier
Option D:	Class AB Power amplifier
18.	The efficiency of _____ amplifier is very high while linearity is poor.
Option A:	class A
Option B:	class B
Option C:	class C
Option D:	class AB
19.	The maximum collector efficiency of _____ power amplifier is 78.5%.
Option A:	class A
Option B:	class B
Option C:	class C
Option D:	class D
20.	Which of the following is not the features of power MOSFETs
Option A:	They can switch with faster rates.
Option B:	It has stable gain.
Option C:	Wide operating temperature range.
Option D:	There is second breakdown.
21.	Which capacitors assists in preventing the loss of gain due to negative feedback without affecting the DC stability of R-C Coupled amplifier?
Option A:	Coupling capacitors (Cc)
Option B:	Bypass capacitors (Cs)
Option C:	Internal Capacitance Cgd

Option D:	Internal Capacitance Cgs
22.	An amplifier has an input signal voltage of 0.054 mV. The output voltage is 12.5 V. The voltage gain in dB is....
Option A:	53.6 dB.
Option B:	107.3 dB.
Option C:	231 dB.
Option D:	116 dB.
23.	A certain amplifier has a bandwidth of 22.5 kHz with a lower cutoff frequency of 600 Hz. What is the value of upper cut-off frequency?
Option A:	600 Hz
Option B:	22.5 kHz
Option C:	23.1 kHz
Option D:	21.9 kHz
24.	In Current Shunt Negative feedback topology.....
Option A:	Ri Increases and Ro Decreases
Option B:	Ri Increases and Ro Increases
Option C:	Ri Decreases and Ro Decreases
Option D:	Ri Decreases and Ro Increases
25.	An amplifier has a $R_{in} = 1.2 \text{ k}\Omega$. The coupling capacitor is $1 \text{ }\mu\text{F}$. Determine the approximate lower cutoff frequency.
Option A:	132.62 Hz
Option B:	1.33 kHz
Option C:	13.3 kHz
Option D:	133.55 kHz
26.	The gain of an amplifier without feedback is 100 db. If a negative feedback of 3 db is applied, the gain of the amplifier will become
Option A:	5 db
Option B:	300 db
Option C:	103 db
Option D:	97 db
27.	In Voltage Shunt Negative feedback topology.....
Option A:	Ri Increases and Ro Decreases
Option B:	Ri Increases and Ro Increases
Option C:	Ri Decreases and Ro Decreases
Option D:	Ri Decreases and Ro Increases
28.	If a three-stage amplifier has individual stage gains of 10 db, 5 db and 12 db, then total gain in db is
Option A:	600 db
Option B:	24 db
Option C:	14 db
Option D:	27 db
29.	The frequency of oscillations in an LC oscillator is L or C.

Option A:	Inversely proportional to square root of
Option B:	Directly proportional to
Option C:	Proportional to square of
Option D:	Independent of the values of
30.	The total gain of a multistage amplifier is less than the product of the gains of individual stages due to
Option A:	Power loss in the coupling device
Option B:	Loading effect of the next stage
Option C:	The use of many transistors
Option D:	The use of many capacitors
31.	If, $\theta_{JC}=1.5\text{ }^{\circ}\text{C/W}$, $\theta_{CS}=1\text{ }^{\circ}\text{C/W}$, $\theta_{SA}=4\text{ }^{\circ}\text{C/W}$, $\theta_{CA}=50\text{ }^{\circ}\text{C/W}$, $T_{JMax}=100\text{ }^{\circ}\text{C}$ and $T_{AMB}=25\text{ }^{\circ}\text{C}$, then Maximum power dissipation with and without Heat Sink will be.....
Option A:	16.75W, 2.45W
Option B:	18.75W, 1.45W
Option C:	20.75W, 3.45W
Option D:	19.25W, 2.45W
32.	Phase shift provided by each one phase shift network in RC Phase Oscillator in 3 stage RC network is
Option A:	90 degrees
Option B:	180 degrees
Option C:	60 degrees
Option D:	120 degrees
33.	Maximum Power Conversion Efficiency of transformed coupled Class-A Power Amplifier is.....
Option A:	75%
Option B:	25%
Option C:	50%
Option D:	100%
34.	In Class-B Power Amplifier, Q-Point is located at.....
Option A:	Cut-off Point
Option B:	Saturation Point
Option C:	Middle of the DC Load Line
Option D:	After Cut-off Point
35.	If a power amplifier having zero signal power dissipation of 5 watts and a.c. power output of 2 watts, What will be the collector efficiency?
Option A:	20%
Option B:	40%
Option C:	80%
Option D:	50%
36.	What is the meaning of Dual Input Balanced Output?
Option A:	Output is measured between collectors of any one transistor and the Differential amplifier with two input signals
Option B:	Output is measured between two collectors of transistors and the Differential

	amplifier with two input signals
Option C:	Output is measured between collector of first transistor and the Differential amplifier with two input signals
Option D:	Output is measured between collector of second transistor and the Differential amplifier with two input signals
37.	A Differential Amplifier should have collector resistor's value (R_{C1} & R_{C2}) as....
Option A:	10k Ω ,15k Ω
Option B:	15k Ω ,10k Ω
Option C:	15k Ω ,15k Ω
Option D:	15 Ω ,15k Ω
38.	The value of emitter resistance in Emitter Biased circuit are $R_{E1}=25k\Omega$ & $R_{E2}=20k\Omega$. Find R_E
Option A:	45k Ω
Option B:	11.11k Ω
Option C:	5.11k Ω
Option D:	100k Ω
39.	One of the most important condition to get sustained oscillation is
Option A:	A phase shift around the feedback loop of 0 degree or 360 degree
Option B:	A phase shift around the feedback loop of 180 degree
Option C:	A gain around the feedback loop of one-third
Option D:	A gain around the feedback loop of less than 1
40.	Why the size of Power MOSFET is made considerably large?
Option A:	To provide easy handling
Option B:	To dissipate Maximum Heat
Option C:	To get maximum Efficiency
Option D:	To facilitate connections
41.	Phase shift provided by one phase shift network in RC phase shift oscillator in 3 stage is _____
Option A:	180 degrees
Option B:	60 degrees
Option C:	120 degrees
Option D:	90 degrees
42.	_____ Amplifiers have the highest overall efficiency.
Option A:	Class A
Option B:	Class B
Option C:	Class AB
Option D:	Class C
43.	What is Barkhausen criterion for sustained oscillation
Option A:	$\beta A = 0$
Option B:	$\beta A < 1$
Option C:	$\beta A = 1$
Option D:	$\beta A \neq 1$
44.	Which type of oscillators is used in timing elements?

Option A:	RC oscillator
Option B:	LC oscillator
Option C:	Crystal oscillator
Option D:	Wien bridge oscillators
45.	The highest efficiency is obtained in class B operation when the level of $V_L (P)$ is equal to
Option A:	$0.25 V_{CC}$
Option B:	$0.5 V_{CC}$
Option C:	V_{CC}
Option D:	$2V_{CC}$
46.	The overall bandwidth _____ in a multistage amplifier compared to an identical single-stage amplifier.
Option A:	increases
Option B:	decreases
Option C:	remains the same
Option D:	becomes twice
47.	For which of the following frequency region(s) can the coupling and bypass capacitors no longer be replaced by the short-circuit approximation?
Option A:	Low-frequency
Option B:	Mid-frequency
Option C:	High-frequency
Option D:	Very High-frequency
48.	The purpose of coupling capacitors in a transistor amplifier is to
Option A:	Increase the output impedance of transistor
Option B:	Protect the transistor
Option C:	Pass AC and block DC.
Option D:	Provide biasing
49.	The value of Bypass Capacitor must be
Option A:	Small
Option B:	Zero
Option C:	Large
Option D:	One
50.	The Miller Effect Can
Option A:	Cause an amplifier to oscillate and reduce the bandwidth of an Amplifier
Option B:	Cause an amplifier to improve gain
Option C:	Increases the bandwidth of an Amplifier
Option D:	Decrease equivalent input capacitance.
51.	Heat sinks work through the process of _____
Option A:	resistive heat transfer
Option B:	conductive and convection heat transfer
Option C:	active process
Option D:	no heat transfer

52. coupling is generally employed in power amplifiers
Option A:	Transformer
Option B:	RC
Option C:	Direct
Option D:	Impedance
53.	To increase the input resistance of transistor and the current gain which of the following connection is more useful
Option A:	Current mirror
Option B:	Current repeater
Option C:	Darlington pair
Option D:	Voltage divider bias
54.	Which is not the biasing scheme for class AB power amplifier
Option A:	Class AB output stage with diode biasing
Option B:	Class AB output stage with VBE multiplier biasing
Option C:	Class AB output stage with input buffer transistors
Option D:	Class AB output stage with Current repeater
55.	What will be the emitter current in a differential amplifier, where both the transistor is biased and matched? (Assume current to be I_Q)
Option A:	$I_E = I_Q/2$
Option B:	$I_E = I_Q$
Option C:	$I_E = (I_Q)^2/2$
Option D:	$I_E = (I_Q)^2$
56.	If output is measured between two collectors of transistors, then the Differential amplifier with two input signals is said to be configured as
Option A:	Dual Input Balanced Output
Option B:	Dual Input Unbalanced Output
Option C:	Single Input Balanced Output
Option D:	Single Input Unbalanced Output
57.	In a negative feedback amplifier, $A= 100$, $\beta=0.02$ and input signal voltage is 40mV. Determine output voltage?
Option A:	33.33V
Option B:	1.33V
Option C:	0.03V
Option D:	3.33V
58.	The complementary Darlington-connected transistor for a class B amplifier provides _____ output current and _____ output resistance.
Option A:	higher, higher
Option B:	higher, lower
Option C:	lower, lower
Option D:	lower, higher
59.	What happens to the non-linear distortion due to the initiation of the negative feedback?
Option A:	level of non- linear distortion increases

Option B:	level of non- linear distortion decreases
Option C:	level of non- linear distortion remains stable
Option D:	level of non-linear distortion changes sinusoidal
60.	A transconductance amplifier is also called _____
Option A:	current to voltage convertor
Option B:	voltage to current convertor
Option C:	resistor
Option D:	inductor

Subjective/Descriptive Questions

<i>Each question carry 05 Marks</i>	
1	Explain High Frequency Equivalent Circuit of MOSFET including Miller capacitance?
2	What are the advantages and disadvantages of negative feedback?
3	Compare in brief Voltage-series feedback, Voltage-shunt feedback, Current-series feedback And Current shunt feedback amplifier?
4	Explain Crystal oscillators with diagram, working principal and its oscillations frequency?
5	Design a suitable heat sink using transistor 2N3055 for following specification: Actual power dissipation in transistor= 40 watts, Maximum thermal resistance from case to heat sink $\Theta_{CS} = 0.5^\circ \text{ C/W}$, $\Theta_{JC} = 1.5^\circ \text{ C/W}$, $T_{A(\max)} = 40^\circ \text{ C}$, $T_{j(\max)} = 200^\circ \text{ C}$ and draw electrical equivalent circuit for heat sink flow.
6	Explain Low Frequency Response of CS-MOSFET amplifier with proper equation?
7	Explain high frequency equivalent circuit of MOSFET.
8	Draw and explain the working principle of CASCODE amplifier using MOSFET.
9	What are the advantages and dis-advantages of negative feedback?
10	State and explain Barkhausen's criterion.
11	Draw the MOSFET differential amplifier with active load.
12	Draw and explain the working of Class-AB output stage with diode biasing
13	Write a short note on power MOSFET.
14	Write short note on condition of sustained oscillations in the oscillator.
15	Explain the advantages of negative feedback and suggest scheme for improving input and output impedance of amplifier.
16	Explain which components in an amplifier (CS) circuits affect low frequency response?
17	What are the different techniques to improve CMRR in differential amplifier? Explain any one.
18	How power amplifier is different from voltage amplifier?

Each Question Carry 10 Marks	
1	Compare class B and class AB power amplifier with neat diagram, working, features and expression for its efficiency?
2	Explain in brief MOSFET differential amplifier with active load and small signal analysis of MOSFET active load circuit?
3	<p>An RC coupled CS amplifier uses MOSFETs with $g_m = 1.6 \text{ mS}$, $r_o = 44 \text{ k}\Omega$, $R_D = 50 \text{ k}\Omega$ and $R_G = 1 \text{ M}\Omega$. Calculate: overall mid frequency voltage gain $A_{V(\text{mid})}$, Input resistance R_i, Output resistance R_o.</p>
4	Draw transformer coupled Class-A Power amplifier and load line, derive the maximum power conversion efficiency for the same.
5	<p>For the CS MOSFET amplifier shown in figure below, calculate the values of f_H and f_L. Assume the following values for the MOSFET. $C_{gd}=2\text{pF}$, $C_{gs}=5\text{pF}$, $R_{si}=100\Omega$, $g_m=10\text{mS}$, $C_1=0.5\mu\text{F}$, $C_2=1\mu\text{F}$, $C_s=10\mu\text{F}$, $R_1=R_2=250\text{k}\Omega$, $R_D=5\text{k}\Omega$, $R_S=250\text{k}\Omega$ and $R_L=5\text{k}\Omega$</p>
6	For the MOSFET differential amplifier, the transistor parameters are $K_{n1}=K_{n2}=0.1\text{mA/V}^2$, $K_{n3}=K_{n4}=0.3\text{mA/V}^2$, $V_{TN}=1\text{V}$ for all MOSFET's. $\lambda=0$ for M1, M2 and M3 and $\lambda=0.01\text{V}^{-1}$ for M4. Determine the bias current I_Q , O/P resistance of current source, A_d , A_{CM} and $CMRR$

