

# University of Mumbai

## Examinations Summer 2022

Program: Electronics Engineering

Curriculum Scheme: Rev 2019

Examination: SE Semester IV

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

Time: 2 hour 30 minutes Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	(Gain X Bandwidth) of amplifier =
Option A:	Constant
Option B:	High
Option C:	Low
Option D:	Zero
2.	Lower cutoff frequency corresponds to _____ of all the time constants and higher cutoff frequency corresponds to _____ of all the time constants.
Option A:	Smallest, Largest
Option B:	Largest, Largest
Option C:	Smallest, smallest
Option D:	Largest, smallest
3.	In negative feedback closed loop gain ( $A_{vf}$ ) is _____ open loop gain ( $A_v$ )
Option A:	Smaller than
Option B:	Larger than
Option C:	Equal to
4.	In Current series Input impedance _____ and output Impedance _____
Option A:	Increase, Increase
Option B:	Decrease, increase
Option C:	Increase, decrease
Option D:	Decrease, decrease
5.	$A_v = 40$ and $\beta = 0.02$ then what will be the over all gain $A_{vf}$ ?
Option A:	-400
Option B:	0.1
Option C:	200
Option D:	400
6.	Phase shift oscillators used for low frequency range
Option A:	True
Option B:	False
7.	Colpitt's oscillator uses tapped _____ and Hartley oscillator uses tapped _____
Option A:	Capacitance, inductance
Option B:	Capacitance, Capacitance
Option C:	Inductance, inductance
Option D:	inductance, Capacitance
8.	A Differential Amplifier should have drain resistor's value ( $R_{D1}$ & $R_{D2}$ ) as....
Option A:	10k $\Omega$ , 5k $\Omega$
Option B:	5k $\Omega$ , 5k $\Omega$

Option C:	5kΩ ,10kΩ
Option D:	5Ω , 5kΩ
9.	In Class-AB 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:	Above Cut-off Point
10.	Cross over distortion present in
Option A:	Class A
Option B:	Class B
Option C:	Class C
Option D:	Class AB

<b>Q2</b> <b>(20 Marks)</b>	<b>Solve any Two Questions out of Three 10 marks each</b>
A	<p>For the CS MOSFET amplifier shown in figure below, calculate the values of <math>f_H</math> and <math>f_L</math>. Assume the following values for the MOSFET. <math>C_{gd}=2pF</math>, <math>C_{gs}=5pF</math>, <math>R_{si}=100\Omega</math>, <math>g_m=10mS</math>, <math>C_1=0.5\mu F</math>, <math>C_2=1\mu F</math>, <math>C_s=10\mu F</math>, <math>R_1=R_2=250k\Omega</math>, <math>R_D=5k\Omega</math>, <math>R_S=250k\Omega</math> and <math>R_L=5k\Omega</math></p>
B	Explain in brief MOSFET differential amplifier with active load and small signal analysis of MOSFET active load circuit?
C	Explain the advantages of negative feedback and suggest and explain scheme for improving input and output impedance of amplifier
<b>Q3</b> <b>(20 Marks)</b>	<b>Solve any Two Questions out of Three 10 marks each</b>
A	Compare class B and class AB power amplifier with neat diagram, working, features and expression for its efficiency?
B	Derive the equation for overall voltage gain, input resistance and output resistance of cascade amplifier.
C	What are general conditions needed for an oscillator circuit to operate? Explain any one oscillator with detailed diagram

<b>Q4</b> <b>(20 Marks)</b>	<b>Solve any Two</b>	<b>5 marks each</b>
A		
i.	Compare all negative feedback topologies	
ii.	Short note on darlington pair	
iii.	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 $\Theta_{CS} = 0.5^\circ C/W$ , $\Theta_{JC} = 1.5^\circ C/W$ ,	



	TA(max) = 40° C, Tj(max) = 200° C and draw electrical equivalent circuit for heat sink flow
<b>B</b>	<b>Solve any One</b> <b>10 marks each</b>
i.	Explain voltage series negative feedback with appropriate circuit.
ii.	How power amplifier is different from voltage amplifier? Explain any power amplifier with suitable graphs and circuit diagram