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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023**

Semester : Semester IV - 2021

Course Code : EEE2004

Course Name : Sem IV - EEE2004 - Opamps and Linear Integrated Circuits

Program : EEE

Date : 19-JUN-2023

Time : 9.30AM - 12.30PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
 - (ii) Question paper consists of 3 parts.
 - (iii) Scientific and non-programmable calculator are permitted.
 - (iv) Do not write any information on the question paper other than Roll Number.
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PART A

ANSWER ALL THE QUESTIONS

(10 X 3 = 30M)

1. Operational Amplifiers, also known as Op-amps, are basically a voltage amplifying device designed to be used with components like capacitors and resistors. What is a voltage follower ? State the conditions to form a voltage follower circuit from Non inverting op amp circuit.
(CO1) [Knowledge]
2. Op-amps are considered as the basic building blocks of the circuits in the field of analogue electronics. Describe the configuration of non inverting op amp.
(CO1) [Knowledge]
3. Operational Amplifiers, also known as Op-amps, are basically a voltage amplifying device designed to be used with components like capacitors and resistors. State the significance of precision diode? Write the applications of precision diode.
(CO2) [Knowledge]
4. Write any three fixed voltage regulator series for positive voltages and negative voltages.
(CO4) [Knowledge]
5. How can you use an op amp as a comparator ? State the conditions.
(CO3) [Knowledge]
6. Op-amps were basically designed to perform mathematical operations like addition, subtraction, multiplication, differentiation, integration etc. Describe the configuration of summing amplifier.
(CO2) [Knowledge]
7. What is a comparator? State any two applications of comparator.
(CO3) [Knowledge]

8. Describe the functional block diagram of a unregulated voltage to a regulated voltage.
(CO4) [Knowledge]
9. An operational amplifier is an integrated circuit that can amplify weak electric signals. What is a filter? Write some commonly used active filters.
(CO2) [Knowledge]
10. An operational amplifier is a DC-coupled high-gain electronic voltage amplifier with a differential input and, usually, a single-ended output. Write any three linear and non linear applications of op – amps.
(CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(3 X 10 = 30M)

11. Mr. Thomson wants to operate a load (motor) which needs an input voltage range of 1.2 V to 57 V DC supply. He don't want to use a power converter system to get the voltage range as stated. Is there any other way through which he can get the required voltage range. If yes/No, explain the same with necessary conditions.
(CO4) [Comprehension]
12. Mr. Nayar is looking to upgrade the sound system in his car by reducing the likelihood of interference from sources like low frequency noise signals. Mr. Nayar comes and approaches you regarding the suitable circuit for attenuating the low frequency Signals. Suggest him a suitable circuit with clear explanation.
(CO2) [Comprehension]
13. Level detector circuits are very often employed in static relay circuits as a final stage before the trip coil circuit of the circuit breaker. The name level detector is derived from the fact that the circuit operates abruptly when the input level exceeds a predetermined value. Explain the way how an op amp can be used to detect the level of voltage and zero crossing.
(CO3) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(2 X 20 = 40M)

14. Mr. Gopal wants to design oscillator circuits which are to be used for audio systems. He comes and approaches you for selecting the circuits. Suggest him the oscillators that can be used by him for audio systems.
Design a wein bridge oscillator with frequency of 25 KHz. Let $C_1=C_2=C= 1nF$, $R_1=R_2=R$. Assume the necessary data(As per the standards).
(CO3) [Application]
15. a. The video encoder system will process a video signal and send digital signals to a variety of DACs to produce analog video signals of various formats, along with optimizing of output levels. As with audio codecs, these ICs may have integrated DACs. Illustrate the conversion of a DAC for the the following inputs
a. 1000 b. 0010 c. 0001
b. An unregulated DC power supply output changes from 20V to 19.7V when the load is increased from zero to maximum. The voltage also increases to 20.2V, When the AC supply increases by 10%. Identify the performance parameters of the voltage regulators. Compute the listed parameters.
(CO4) [Application]