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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - AUGUST 2024**

Semester : IV	Date :11-07-2024
Course Code : OPAMP & Linear Integrated Circuits	Time :9:30 AM-12:30PM
Course Name : EEE2004_V2	Max Marks :100
Program :BTech	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.

PART A

ANSWER ANY 5 QUESTIONS

5Q X 4M=20M

1	Operational amplifiers (op-amp) are amplifiers with a very high gain having two inputs and one output. List the characteristics of an ideal op-amp.	(CO 1)	[Knowledge]
2	An operational amplifier (op-amp) was developed for perform arithmetic operations. Amplifiers, buffers, comparators, filters, etc. can be implemented with simple external circuits. Design an integrator which is wired using a resistor of 20 K ohms and C=0.01u F .	(CO1)	[Knowledge]
3	In the Mono stable multivibrator , the component values are R =5.6K ohms and C=0.068uF ,then state the value of Pulse Width?	(CO3)	[Understand]
4	IC voltage regulators are three-terminal devices, what is minimum unregulated voltage must be applied , if the output regulated voltage is 5V.	(CO3)	[Understand]
5	ADCs transform continuous audio and video data into digital form for processing and reproduction in multimedia systems. This makes it possible to use functions like audio effects, video editing, and digital multimedia content transfer. List out the components required to built 3-bit Flash ADC .	(CO4)	[Remember]
6	In electronics, an analog-to-digital converter (ADC, A/D, or A-to-D) is a system that converts an analog signal, such as a sound picked up by a microphone or light entering a digital camera, into a digital signal. Draw the functional block diagram of Successive Approximation ADC.	(CO4)	[Remember]

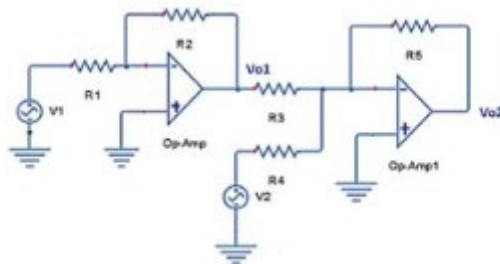
7	Op-amps were basically designed to perform mathematical operations like addition, subtraction, multiplication, differentiation, integration etc. Describe the configuration of summing amplifier.	(CO2)	[Evaluate]
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PART B

ANSWER ANY 5 QUESTIONS

5Q X 10M=50M

8	Identify the Analog to Convertor which converts analog to digital signal in no time. With neat supporting diagram .explain a method of analog to digital conversion	(CO4)	[Evaluate]
9	Schmitt trigger is a comparator circuit with hysteresis implemented by applying positive feedback to the noninverting input of a comparator or differential amplifier. It is an active circuit which converts an analog input signal to a digital output signal. The circuit is named a trigger because the output retains its value until the input changes sufficiently to trigger a change Design an inverting Schmitt trigger for VLTP =- 2V and VUTP = +2V Given VCC =15V and VEE = -15V	(CO3)	[evaluate]
10	Communication system uses filters to tune the radio signal and to suppress the noise. It is required to have a low pass filter at the receiver of FM radio. Find the values of various components used in the 1st order low pass active filter circuit to have a cutoff frequency of 12KHz with a gain of 5. Use 741 Opamp with VCC = ±15V	(CO3)	[Apply]
11	Design a 555 Astable multivibrator for an output frequency of 1KHz & duty cycle 60%.	(CO4)	[Evaluate]
12	Op amp circuits are components or modules used in the creation of complex circuits. In real-world applications, cascading op amp circuits together is frequently required to obtain a high total gain. When two circuits are connected in tandem, one behind the other in a single file, as is usually the case, they are said to be cascaded. Two op-amp amplifier designs are cascaded in a particular electronic device, as seen in figure. Determine the corresponding output voltages and current flowing through resistors for each step through knowing its configuration.(Given) $R_1= 1k\Omega$, $R_2=10 k\Omega$, $R_3=2 k\Omega$, $R_4 =8 k\Omega$, $R_5=4k\Omega$, $V_1=1V$, $V_2=2V$.	(CO3)	[Apply]]



13	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.	(CO2)	[Understand]
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PART C

ANSWER ANY 2 QUESTIONS

2Q X 20M=40M

14	For the 555 Astable multivibrator $R_A = 50K \text{ ohm}$, $R_B = 1K \text{ ohm}$ & $C = 0.01\mu F$ Determine : i) charging pulse width T_c ii) The discharging pulse width T_d iii) Free running frequency 'f' iv) duty cycle.	(CO4)	[Evaluate]
15	Microprocessor-controlled circuits, Arduinos, Raspberry Pis, and other similar digital logic circuits may connect with the outside world by means of analogue-to-digital converters, or ADCs. Explain a method of analog to digital conversion which uses a successive approximation register in the design for given analog input $V_i = 178V$ and Illustrate the conversion of a ADC	(CO4)	[Evaluate]]]
16	The video encoder system is going to process a video stream, optimise output levels, and send digital signals to several DACs to produce analogue video signals in different formats. These ICs might have built-in DACs, just like music codecs.. Illustrate the conversion of a DAC for the the following inputs a. 1000 b. 0010	(CO4)	[Evaluate]