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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION – JULY 2024

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| **Semester : IV** | **Date : 5 July 2024** |
| **Course Code : ECE3001** | **Time : 01:30 p.m. – 04:30 p.m.** |
| **Course Name :Linear Integrated Circuits** | **Max Marks :100** |
| **Program :B. Tech. (ECE)** | **Weightage :50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 3 QUESTIONS 3Q X 5M = 15 M** | | | |
| 1 | List 5 properties of an ideal op-amp | (CO 1) | [Knowledge] |
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| 2 | Define the following parameters   1. Input bias current 2. SVRR   List the value of the above parameters for an ideal op-amp and 741 IC | (CO 1) | [Knowledge] |
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| 3 | Draw the circuit of a non-inverting comparator which will compare with a reference voltage of -5 V. Draw the input waveform and the corresponding output waveform and the transfer characteristics. | (CO 3) | [Knowledge] |
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| 4 | Draw the circuit of a non inverting amplifier for a gain of 4. List the value of resistors to be used. | (CO 2) | [Knowledge] |
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| 5 | An op-amp has a CMRR of 120 dB and a common mode gain of 0.1. Find the differential gain in dB and in linear scale. | (CO 1) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 20M = 40M** | | | |
| 6 | Draw the circuit diagram of an inverting Schmitt trigger for a case in which the absolute value of UTP and LTP will not be the same. Derive an expression for the triggering voltages. Estimate the value of the components to be used if and . Draw the input waveform, the corresponding output waveform and the transfer characteristics if . Let | (CO 3) | [Comprehension] |
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| 7 | 1. Draw the circuit diagram of a 3 bit R-2R ladder DAC. Explain the working and derive an expression for the output voltage. Tabulate the output if and 2. Draw the block diagram of a SAR type ADC and explain. List the content of the SAR when the correct digital data is 1100 0100 | (CO 3) | [Comprehension] |
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| 8 | Draw the circuit diagram of a 555 timer which can be used to generate a 100 Hz square wave with a duty cycle of 80%. Explain the working of the circuit with the help of the block diagram. Estimate the components values to be used. Draw the output voltage and the voltage across the capacitor. | (CO 3) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 3 QUESTIONS 3Q X 15M=45M** | | | |
| 9 | Draw the circuit diagram of a first order high pass filter. Estimate the component values to be used if the cut off frequency required is 800 Hz and a pass band gain of 2. Find the steady state output when the following input is applied to the filter | (CO 3) | [Application] |
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| 10 | Draw the circuit diagram of an instrumentation amplifier. Derive an expression for the output voltage. Estimate the component values to be used if the gain is to be between 200 and 1500. | (CO 2) | [Application] |
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| 11 | Draw a circuit which will perform the following mathematical operation Estimate the resistor values to be used. Use a minimum resistor value of | (CO 2) | [Application] |
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| 12 | 1. Draw the circuit of Voltage to current converter with a grounded load and derive and expression for the load current [10 Marks] 2. Draw the circuit diagram of a voltage follower and explain. [5 Marks] | (CO 2) | [Application] |
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