

**NATIONAL INSTITUTE OF TECHNOLOGY, HAMIRPUR (HP)**

Electronics and Communication Engineering Department

End-Semester Examination (May 2023)

Branch: ECE (DD)

Subject: Advanced IC Design

Time: 3 Hours

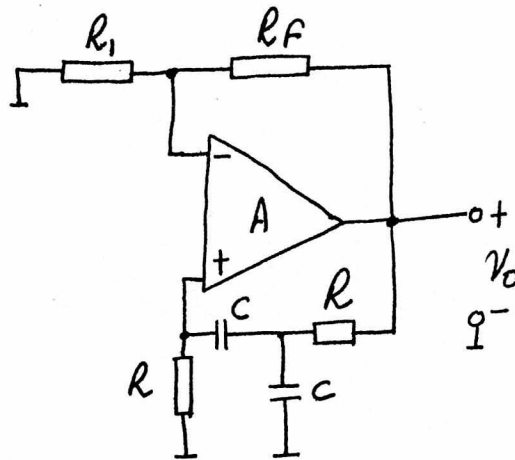
Semester: 8<sup>th</sup>

Subject Code: EC-741

Maximum Marks: 50

**Note:** 1. Attempt all questions  
2. Presume data if required

- Q. 1:** Consider the following figure and ideal op-amp. (i) Compute the condition of oscillation  
(ii) Determine the frequency of oscillation. (8)



- Q. 2:** Design a second-order all-pass filter using Kerwin-Huelsman-Newcomb (KHN) network. Determine the transfer function and resonance frequency. (8)
- Q. 3:** Design a Schmitt trigger having lower and upper thresholds of 120 mV. Input to this circuit is 1 V peak-to-peak triangular wave of 100 Hz. Draw the Hysteresis loop. (8)
- Q. 4:** Discuss  $h$ -feedback to realize a near-ideal voltage-controlled voltage-source. (8)
- Q. 5:** Enumerate problems associated with a difference amplifier. How these can be overcome using an Instrumentation amplifier? Discuss in detail along with circuit diagrams. (8)
- Q. 6:** How a single-stage CE transistor amplifier can be converted to an IC version? (5)
- Q. 7:** Write brief notes on: (i) 555 Timer (ii) Absolute-value detector. (5)

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