HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Even) Semester Examination May-June 2025

Roll no.....

Name of the Program and semester:
Name of the Course: Analog Circuit
Course Code: TEC 402
Time: 3 hour

Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks) CO1

a. Explain DC and AC analysis of Dual input unbalanced Output Differential Amplifier with the help of suitable diagram
b. Explain in brief about the current mirror circuit.
c. The following specifications are given for the dual input balanced output differential amplifier: $R_c = 2.2k\Omega$, $R_E = 4.7\ k\Omega$, $R_{in1} = R_{in2} = 50\Omega$, $+V_{cc}=10V$, $-V_{EE} = -10V$ with ß values are 100 and $V_{BE}=0.715V$. Determine (i) I_{CQ} and V_{CEQ} (ii) Voltage gain (ii) input output resistance

Q2. (2X10=20 Marks) CO2

a. Derive an expression for low cut off frequency of second order active high pass filter.
b. Explain the ideal integrator and differentiator using Op-Amp in detail.
c. Explain logarithmic and exponential amplifier using Op-Amp.

Q3. (2X10=20 Marks) CO3

a. Explain in detail about four basic feedback topologies and their analysis.
b. Explain RC Phase shift oscillator using Op-Amp
c. Explain Hartley oscillator using Op-Amp and write its applications.

Q4. (2X10=20 Marks) CO4

a. What is Crossover distortion, explain methods to remove this distortion.
b. Explain in brief about Class B push pull Amplifier.
c. Explain in detail about classifications of power amplifier.

Q5. (2X10=20 Marks) CO5

a. Explain in detail about 78XX and 79XX voltage regulators.
b. Using 7805 voltage regulator, design a current source that will deliver a 0.5 A current to 48 Ω resistor.
c. Explain the circuit diagram and working of 555 timer IC.