Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May– 2017**

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| **Sub. Code:** | **14EC3021** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ANALYSIS AND DESIGN OF ANALOG INTEGRATED CIRCUITS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No | Sub Div. | Questions | | Course  Outcome | | Marks |
| 1. |  | Enumerate in detail about the common source amplifier with diode connected load using large and small signal analysis and derive thevoltage gain expression. | | CO1 | | 20 |
| (OR) | | | | | | |
| 2. |  | Derive the expression for voltage gain for source follower using small signal analysis. | | CO1 | | 20 |
| 3. | a. | Derive the expression for voltage gain for common source with source degeneration using small signal analysis. | | CO1 | | 15 |
|  | b. | Sketch the drain current and transconductance of the circuit given below. | | CO1 | | 5 |
| (OR) | | | | | | |
| 4. |  | Analyze and obtain the voltage gain expressions using large signal and small signal analysis of the source follower with resistive load. | | CO1 | | 20 |
| 5. | a. | Calculate the drain current in the transistor M4 of the circuit given below. | | CO1 | | 5 |
|  | b. | Analyze the high frequency model of common source stage and derive the transfer function. | | CO2 | | 12 |
|  | c. | Calculate the input capacitance of the circuit. | | CO2 | | 3 |
| (OR) | | | | | | |
| 6. | a. | Explain the effect of loading in voltage-voltage feedback circuit represented by G model and obtain the open loop gain expression. | | CO2 | | 15 |
|  | b. | Discuss about different types of noise voltages. | | CO2 | | 5 |
| 7. | a. | Sketch the simple implementation of a two stage op amp and obtain the voltage gain expression. | | CO3 | | 10 |
|  | b. | Calculate the maximum noise voltage that the MOSFET can generate. | CO3 | | 5 | |
|  | c. | Discuss the idea behind gain boosting of the op amps and explain about gain boosting in cascode stage with circuit diagrams. | CO3 | | 5 | |
| (OR) | | | | | | |
| 8. | a. | For an NMOS current source, calculate the total thermal and 1/f noise in the drain current for a band from 1khz to 1Mhz. | CO3 | | 12 | |
|  | b. | Calculate the equivalent noise voltage of two parallel resistors given in the circuit below. | CO3 | | 8 | |
|  | | **Compulsory:** |  | |  | |
| 9. | a. | Draw the circuit to establish supply independent currents and obtain the output current equation. | CO3 | | 7 | |
|  | b. | Discover the reasons for employing frequency compensation in opamps and list out the methods for implementation. | CO3 | | 8 | |
|  | c. | Calculate the phase margin for the two pole feedback system given in the figure below. | CO3 | | 5 | |

ALL THE BEST