



Regulation R20

Subject code: 3E7DA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VII- Semester Supplementary Examinations, December 2024
ANALOG IC DESIGN
(ECE)

Maximum Marks: 70

Date: 04.01.2025

Duration: 3 hours

- Note: 1. This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

| Q.NO | QUESTIONS | CO | Blooms Tx |
|------|--|-----|-----------|
| 1 | Define transconductance of a MOS transistor? | CO1 | L1 |
| 2 | What is sheet resistance? | CO1 | L1 |
| 3 | What is the working principle of current mirror? | CO2 | L2 |
| 4 | What is the need of voltage reference? | CO2 | L1 |
| 5 | List different types of inverting CMOS amplifiers. | CO3 | L1 |
| 6 | What are the advantages of current amplifiers? | CO3 | L2 |
| 7 | Define Power Supply Rejection Ratio (PSRR) of CMOS Op-amp. | CO4 | L1 |
| 8 | List the basic requirements to design an Op-amp. | CO4 | L2 |
| 9 | List the techniques to improve the performance of open loop comparators. | CO5 | L1 |
| 10 | Draw the circuit symbol for ideal comparator. | CO5 | L1 |

Part-B

Answer All the following questions. (10M X 5=50Marks)

| | | | |
|----|---|-----|----|
| 11 | Draw the small-signal model for the MOS transistor. Briefly explain each component in that. [10M] | CO1 | L3 |
| | OR | | |
| 12 | With the help of required expressions explain Sub-threshold MOS Model. [10M] | CO1 | L3 |
| 13 | Explain how CMOS transistor can be used as diode and draw its small signal model. [10M] | CO2 | L2 |
| | OR | | |
| 14 | Explain the difference between cascode current mirror and Wilson current mirror. [10M] | CO2 | L3 |
| 15 | List different types of inverting CMOS amplifiers and draw any one of it. [10M] | CO3 | L3 |

| | | | |
|----|--|-----|----|
| | OR | | |
| 16 | Describe small signal model of CASCODE Amplifiers. [10M] | CO3 | L3 |
| 17 | With neat sketch and necessary equations explain the concept of nulling resistor compensation of two stage CMOS Op-Amp. [10M] | CO4 | L3 |
| | OR | | |
| 18 | List various compensation techniques of Op Amps, explain feed forward compensation. [10M] | CO4 | L2 |
| 19 | With neat sketch and necessary equations explain the design aspect of a two-stage open loop comparator for slewing response. [10M] | CO5 | L3 |
| | OR | | |
| 20 | What is a comparator? Explain the static and dynamic characteristics of a comparator. [10M] | CO5 | L2 |