*R20 Regulation* *Subject code: 3E7DA*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

## B.Tech VII Semester Supplementary Examinations, October 2026

## ANALOG IC DESIGN

## (ECE)

*Maximum Marks: 70* Date: 02.11.2026 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) | | Marks | CO | BTL |
|---|---|---|---|---|
| 1 | What is body effect? | 2M | 1 | L1 |
| 2 | Write the conditions of MOS transistor to operate in saturation and non-saturation regions. | 2M | 1 | L1 |
| 3 | Draw the MOS implementation of current source. | 2M | 2 | L1 |
| 4 | List the effects that cause the current mirror to be different from ideal current mirror. | 2M | 2 | L1 |
| 5 | Classify output amplifiers. | 2M | 3 | L1 |
| 6 | What is current amplifier? | 2M | 3 | L1 |
| 7 | Define Slew rate. | 2M | 4 | L1 |
| 8 | Give the steps in designing typical CMOS Op-amp. | 2M | 4 | L1 |
| 9 | Draw the model for ideal comparator. | 2M | 5 | L1 |
| 10 | What is clamped comparator? | 2M | 5 | L1 |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 11 | Draw the small-signal model for the MOS transistor. Briefly explain each component in that. | 10M | 1 | L2 |
| | OR | | | |
| 12 | With the help of required expressions explain Sub-threshold MOS Model. | 10M | 1 | L2 |
| 13 | Write short notes on current sinks and sources. | 10M | 2 | L2 |
| | OR | | | |
| 14 | Explain the difference between cascode current mirror and Wilson current mirror. | 10M | 2 | L2 |
| 15 | What is the need of high gain? Draw and explain the operation of high gain amplifiers architectures. | 10M | 3 | L2 |

| | | | | |
|---|---|---|---|---|
| | OR | | | |
| 16 | Explain about a) current amplifier b) cascode amplifier. | 10M | 3 | L2 |
| 17 | List various compensation techniques of Op Amps, explain feed forward compensation. | 10M | 4 | L2 |
| | OR | | | |
| 18 | Derive the expression for power-supply rejection ratio of two-stage op-amps. | 10M | 4 | L2 |
| 19 | With neat sketch and necessary equations explain the design aspect of a two-stage open loop comparator for slewing response. | 10M | 5 | L2 |
| | OR | | | |
| 20 | What is a comparator? Explain the static and dynamic characteristics of a comparator. | 10M | 5 | L2 |