

Question Paper Code:427231

B.E./B.Tech. DEGREE EXAMINATIONS April/May 2025

Second Semester

Electronics and Communication Engineering

EC23231 — ELECTRONIC DEVICES AND CIRCUITS

(Common to Electronics Engineering (VLSI Design and Technology))

(Regulations 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL Questions

PART A -- (10x2=20 Marks)

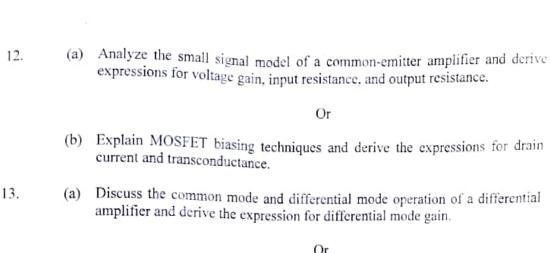
- Define the depletion region of a PN junction diode.
- Give the significance of the Zener breakdown in voltage regulation.
- 3. Design BJT fixed bias circuit with $V_{cc} = 12V$, $R_B = 240 \text{ K}\Omega$, $R_C = 2.2 \text{ K}\Omega$ and $\beta = 75$. Determine the values of operating point.
- Mention the importance of biasing in transistor amplifiers.
- Explain the advantages of a cascode amplifier.
- Define Common-Mode Rejection Ratio (CMRR) in differential amplifiers.
- State Barkhausen's criterion for oscillation.
- Write the function of negative feedback in amplifiers.
- Differentiate Class A and Class B power amplifiers.
- Give the applications of using DC-DC converters in electronic circuits.

PART B — (5x13= 65 Marks)

 (a) Explain the V-I characteristics and operation of a PN junction diode. Derive the diode current equation.

Or

(b) Discuss the working of a half-wave rectifier. Derive expressions for rippl factor and efficiency.



(b) With a neat circuit diagram, explain the working of a cascode amplifier and analyze its voltage gain.

Derive the expression for gain in a current series feedback amplifier. Discuss 14. its advantages and disadvantages.

Or

- (b) Explain the working of a Wein bridge oscillator and derive the frequency of oscillation.
- (a) Compare Class A, Class B, and Class AB power amplifiers. Derive the 15. efficiency of a Class A, Class B amplifier and Class AB amplifier.

Or

(b) Explain the working of a buck-boost converter. Derive its output voltage equation.

PART C — (1x15=15 Marks)

(a) Design a regulated power supply using a Zener diode. Explain its working and derive the necessary expressions. 16.

Or

(b) Discuss the working operation and characteristics of UJT with neat diagram.