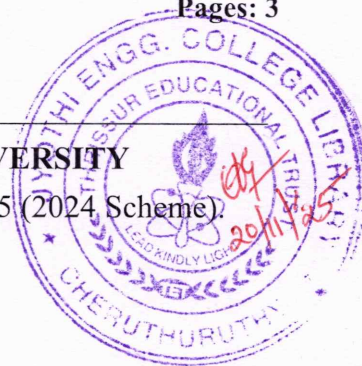


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (R) (FT/WP) Examination November 2025 (2024 Scheme)

**Course Code: PCECT303****Course Name: ANALOG CIRCUITS**

Max. Marks: 60

Duration: 2 hours 30 minutes

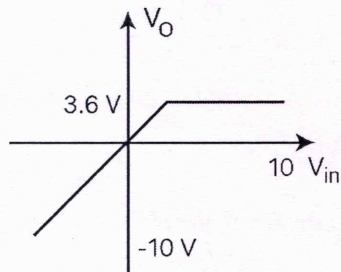
PART A*(Answer all questions. Each question carries 3 marks)*

		CO	Marks
1	Explain why a fixed bias circuit is not widely used in amplifiers, despite its simplicity.	2	(3)
2	Design a low pass filter for a cutoff frequency of 5KHz.	1	(3)
3	Draw the frequency response of a CE amplifier. What is the significance of gain bandwidth product?	2	(3)
4	Explain the impact of the Miller effect on the frequency response of an amplifier.	2	(3)
5	Deduce the expression for closed loop gain A_f of a negative feedback amplifier.	1	(3)
6	Explain the criteria for sustained oscillations.	1	(3)
7	Why class AB power amplifiers are preferred over class B operations?	2	(3)
8	Define line regulation and load regulation, and discuss their importance in power supply design.	1	(3)

PART B*(Answer any one full question from each module, each question carries 9 marks)***Module -1**

- 9 a) What is thermal runaway? Explain the role of emitter resistance R_E in the potential divider biasing circuit. 1 (5)

- b) Design a clipper circuit to obtain the following transfer characteristics. 1 (4)



- 10 a) Obtain the operating point set by the voltage divider bias circuit for an NPN transistor in common emitter configuration with $\beta = 50$ and $V_{BE} = 0.7 \text{ V}$. Given $V_{CC} = 12 \text{ V}$, $R_1 = 47 \text{ k}\Omega$, $R_2 = 10 \text{ k}\Omega$, $R_C = 2.2 \text{ k}\Omega$ and $R_E = 680 \Omega$. 2 (5)

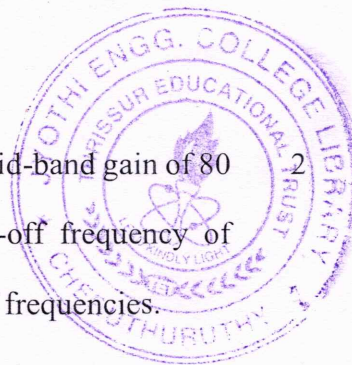
- b) Design a clamper circuit to clamp a 10 V_{pp} sine wave so that positive peak is clamped at -3 V . Draw the output waveform and transfer characteristics. Assume diode is ideal. 1 (4)

Module -2

- 11 a) Draw and explain the circuit of RC coupled amplifier and draw its frequency response curve. 2 (5)

- b) Draw and explain the Common Source MOSFET amplifier. 2 (4)

- 12 a) Draw the small signal low frequency hybrid π model for common emitter configuration. Give the expression for voltage gain, input and output impedance. 2 (5)



- b) Three stages of individual RC coupled amplifier having mid-band gain of 80 with lower cut-off frequency of 100Hz and upper cut-off frequency of 300MHz are cascaded. Find the resultant gain and cut-off frequencies. 2 (4)

Module -3

- 13 a) With necessary diagram, explain the working of crystal oscillator. 2 (5)
- b) Explain voltage series feedback topology with neat block diagram. Derive the expression for net input and output impedance. 2 (4)
- 14 a) Draw the circuit of Wien bridge oscillator. Derive the expression for its frequency of oscillation. 1 (5)
- b) Explain the effect of negative feedback on gain, bandwidth, stability and distortion in feedback amplifiers. 2 (4)

Module -4

- 15 a) Explain the working of series voltage regulator. 1 (5)
- b) What is cross over distortion? How can it be overcome? 2 (4)
- 16 a) What is a Class B push-pull power amplifier? With necessary diagram Explain its working. 2 (5)
- b) With necessary diagram, explain the working of shunt voltage regulator. 1 (4)
