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

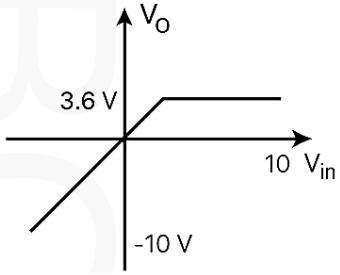
PART A

	(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 V. Given Vcc = 12V, R_1=47kΩ, R_2=10KΩ, Rc=2.2KΩ and R_E= 680Ω.	2	(5)
	b)	Design a clamper circuit to clamp a 10Vpp sine wave so that positive peak is clamped at -3V. 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)

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