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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S) Examinations (FT/WP) May 2026 (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	Design a differentiator to differentiate +5 V square wave with 1KHz frequency. Draw the input and output waveforms.	1	(3)
2	Why voltage divider biasing is superior to other biasing circuits?	1	(3)
3	Define Miller's theorem and discuss its significance on high frequency performance of amplifiers.	2	(3)
4	What are multistage amplifiers? Explain the effect of cascading on gain and bandwidth.	2	(3)
5	Explain the impact of negative feedback on the stability and input & output impedances.	1	(3)
6	What are the applications of the Wien bridge oscillator in electronic circuits?	2	(3)
7	What is the difference between Class A and Class B power amplifiers in terms of efficiency and linearity?	2	(3)
8	Compare the advantages and disadvantages of series voltage regulators and shunt voltage regulators.	1	(3)

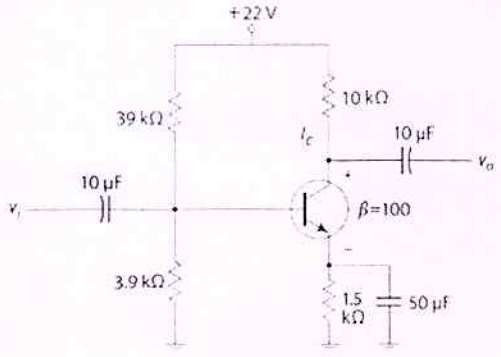
PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

			CO	Marks
9	a)	Explain why operating point is fixed in the middle of the active region of transition characteristics in a good voltage amplifier.	1	(5)
	b)	Design a diode clipping circuit that limits a 20 Vpp sine wave input signal to ±5V. Assume diode drop is 0.7. Draw the output waveform and transfer characteristics.	1	(4)
10	a)	Design an integrator for an input sine wave of frequency 1.5KHz.	1	(5)

	b)	Determine the dc bias voltage V_{CE} and current I_C for the voltage divider circuit shown in figure.	1	(4)



Module -2

11	a)	Draw and explain the frequency response of a common-emitter amplifier. What are the factors that influence its low-frequency response?	2	(5)
	b)	Draw and explain the small signal hybrid -π model of CS MOSFET.	2	(4)
12	a)	Explain the high-frequency behaviour of a BJT amplifier using the hybrid-π model.	2	(5)
	b)	Draw the circuit of a common source amplifier using MOSFET. Explain the working.	2	(4)

Module -3

13	a)	Explain the analysis of voltage-series feedback amplifier.	2	(5)
	b)	With necessary diagram explain the working of crystal oscillator.	2	(4)
14	a)	Explain the voltage-shunt feedback topology and its effect on input and output impedances.	2	(5)
	b)	Explain the working principle of a Hartley oscillator and its applications in signal generation.	2	(4)

Module -4

15	a)	Explain how short circuit and current foldback protection can be implemented in a series voltage regulator circuit.	1	(5)

	b)	Explain the operation of a push-pull Class B power amplifier. How does it reduce distortion compared to a Class B amplifier?	2	(4)
16	a)	Explain the working of a shunt voltage regulator.	1	(5)
	b)	Classify different types of power amplifiers based on their operation and efficiency. Explain their applications.	2	(4)

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