Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S,FE) Examination December 2025 (2019 Scheme)

Course Code: RAT203
Course Name: ELECTRONIC DEVICES AND CIRCUITS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions. Each question carries 3 marks

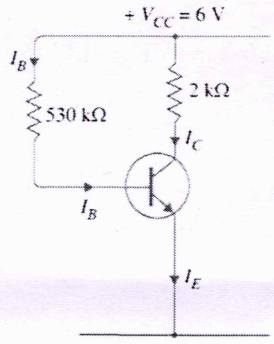
		Marks
1	Distinguish between series and shunt positive clippers.	(3)
2	Draw the low frequency equivalent circuit of a BJT.	(3)
3	How can an FET be used as a switch.	(3)
4	Draw the Hybrid Pi model of BJT amplifier and list the parameters.	(3)
5	What are the two different feedback arrangements used in electronic circuits?	(3)
6	Analyse the effect of negative feedback on the gain of the amplifier.	(3)
7	Explain the basic principle of LC Oscillators.	(3)
8	Calculate the output voltage of an inverting amplifier with an input of 10V, R_1=10 KΩ, R_f=10KΩ. Assume an ideal op-amp.	(3)
9	Draw the functional block diagram 555 Timer IC.	(3)
10	Illustrate the circuit of a 78XX IC based voltage regulator.	(3)

PART B

Answer any one full question from each module. Each question carries 14 marks

Module 1

11	a	Identify the need for biasing in electronic circuits. With a neat circuit diagram and relevant equations explain voltage divider bias for a common emitter configuration.	(8)
	b	Consider the Fixed Bias circuit as shown in the figure below that has a silicon transistor with β=50, V_{CC}=6V, R_C=2KΩ, R_B=530 KΩ, V_{BE}=0.7V. Draw the DC load line and determine the operating point and stability factor.	(6)



12	a	Draw and explain the circuit for bias compensation using diode.	(7)
	b	Analyse the working of a Zener diode shunt regulator with the help of a circuit diagram.	(4)
	c	Define stability factor. Write down the expression for stability factor S.	(3)

Module 2

13	a	Explain the constructional details and characteristics of a JFET with neat diagrams.	(8)
	b	Select a suitable biasing scheme for MOSFET amplifiers.	(6)
14	a	Enumerate on low frequency analysis of BJT Common Emitter amplifier.	(8)
	b	Briefly explain about Miller effect capacitance.	(6)

Module 3

15	a	Draw the circuit diagram and explain the working of a Transformer Coupled amplifier. Also list its advantages and disadvantages.	(8)
	b	Draw a negative voltage series feedback topology and derive the expression for its output impedance.	(6)
16	a	Explain the working of a class B power amplifier with a neat circuit diagram. Derive the expression for maximum efficiency of a class B power amplifier.	(8)
	b	Briefly explain the three types of coupling methods used in multistage amplifiers.	(6)

Module 4

17	a	With a neat schematic explain the working of Colpitts oscillator and derive the expression for its frequency of oscillation.	(8)
	b	Draw an Adder-Subtractor circuit using a single op-amp and derive the expression for the output voltage.	(6)
18	a	With a neat circuit diagram explain the working of a Wein bridge oscillator and derive its frequency of oscillation.	(8)
	b	With the help of a diagram explain a three input inverting summing amplifier.	(6)

Module 5

19	a	With a neat circuit diagram and relevant waveforms, explain the working of a monostable multivibrator using IC555 timer.	(8)
	b	Draw the internal schematic of IC723 and explain its working.	(6)
20	a	Explain with a neat circuit diagram the working of a triangular waveform generator using op-amp.	(7)
	b	Draw the block schematic of PLL IC 565 and describe the function of each block.	(7)

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