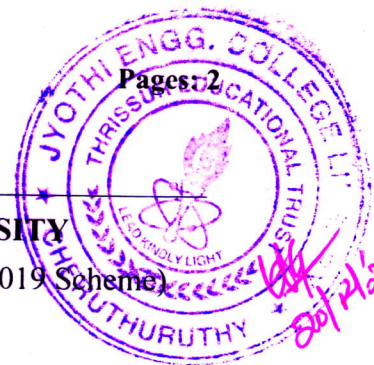


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree (S, FE) Examination June 2024 (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	State the factors affecting the stability of Q point.	(3)
2	Explain the role of Zener diode in voltage regulator circuit	(3)
3	State Millers Theorem.	(3)
4	Draw the hybrid pi model of BJT amplifier.	(3)
5	Explain the concept of feedback in amplifiers.	(3)
6	Illustrate the frequency response of an RC coupled amplifier	(3)
7	Differentiate between an amplifier and an oscillator	(3)
8	State the ideal characteristics of an opamp	(3)
9	Explain the principle of operation of a zero-crossing detector.	(3)
10	Compare 78xx and 79xx series voltage regulator ICs	(3)

PART B*Answer any one full question from each module. Each question carries 14 marks***Module 1**

- 11a Compare clipper and clamper circuits. (6)
- 11b In a common emitter circuit, an NPN transistor having a value of $\beta = 50$ is used with $V_{CC} = 10V$ and $R_C = 2k\Omega$. If a $100k\Omega$ resistor is connected between collector and base with $V_{BE} = 0V$, determine (8)
- (i) Quiescent point
- (ii) Stability factor
- 12 a Explain the working of a common emitter amplifier circuit. State the role of coupling and bypass capacitors in the circuit. (7)
- 12 b Derive the expression for input resistance, current gain and voltage gain for a hybrid equivalent circuit of a CE amplifier (7)

Module 2

- 13a Explain the construction, working and characteristics of an n-channel depletion MOSFET. (10)
- 13b Explain the application of FET as a switch. (4)
- 14a Discuss the low frequency analysis of BJT common emitter amplifier. (8)
- 14b Compare JFET and MOSFET (6)

Module 3

- 15a Compare different types of coupling used in multistage amplifiers (9)
- 15b Explain the effect of negative feedback on gain and bandwidth of an amplifier. (5)
- 16 Compare the working of class B and class AB power amplifiers. Derive the expression for the maximum efficiency of a class B power amplifier (14)

Module 4

- 17a Explain the working of a Colpitts oscillator. Derive an expression for its frequency of oscillation. (8)
- 17b Explain the working of an inverting amplifier using op-amp. Also derive the expression for closed loop voltage gain (6)
- 18a Describe the working of crystal oscillators and compare it with LC oscillators (9)
- 18b Describe the working of a summing amplifier using opamp (5)

Module 5

- 19a Explain the function of 555 Timer IC as an Astable multivibrator with relevant waveforms and functional diagram. (8)
- 19b Explain the working of a triangular waveform generator with a neat circuit diagram (6)
- 20a Describe the block diagram of PLL and its different modes of operation. (8)
- 20b Draw the circuit of an op- amp integrator and derive the expression for output voltage. (6)