

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (R,S) (FT/WP) / (S2 PT) Exam April 2025 (2019 Scheme)

Course Code: ECT202**Course Name: ANALOG CIRCUITS**

Max. Marks: 100

Duration: 3 Hours

PART A*(Answer all questions; each question carries 3 marks)*

Marks

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|----|--|---|
| 1 | What are the applications of a low pass RC circuit ? | 3 |
| 2 | What is meant by lower 3 Db frequency of a high pass circuit ? | 3 |
| 3 | What is the significance of Miller effect on high frequency amplifiers? | 3 |
| 4 | Three stages of individual RC coupled amplifier having midband 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. | 3 |
| 5 | Draw the small signal equivalent circuit of MOSFET. | 3 |
| 6 | Explain the applications of multistage amplifiers. | 3 |
| 7 | Draw the block diagram of voltage series and voltage shunt feedback. | 3 |
| 8 | What is Darlington pair. What are the main characteristics? | 3 |
| 9 | Why a power amplifier is always preceded by a voltage amplifier? | 3 |
| 10 | Differentiate between line and load regulation. | 3 |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

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|----|---|---|
| 11 | a) Design a suitable circuit to obtain the output level clipped at $\pm 2V$ and $-3V$ for a 10 V p-p sinusoidal input voltage. | 6 |
| | b) Explain fixed bias. Derive the expressions for Q point. Why it is seldom used? | 8 |
| 12 | a) Explain the working of an RC integrator circuit for a square wave input with period T. Sketch its output waveform for $RC > T$, $RC = T$ and $RC < T$. | 8 |
| | b) Derive the stability factor for voltage divider bias. | 6 |

Module -2

- 13 a) Derive R_i , R_o , A_i and A_v using hybrid- π parameters for CE configuration at low and mid frequencies. 10
- b) Differentiate between AC and DC load lines 4
- 14 a) Analyse BJT RC coupled amplifier in CE configuration at high frequency using hybrid π model. 10
- b) Draw the frequency response of an RC coupled amplifier. 4

Module -3

- 15 a) Draw a CS MOSFET amplifier. With the help of small signal equivalent circuit, compute its voltage and current gains. 10
- b) Briefly explain a cascode amplifier. 4
- 16 a) Explain biasing techniques used in MOSFET amplifiers. 9
- b) What are the effects of cascading in gain and bandwidth of an amplifier? 5

Module -4

- 17 a) Explain the working principle of Colpitts oscillator. Give the equation for frequency of oscillations 9
- b) State Barkhausen criteria. How it is achieved in Wien bridge oscillators? 5
- 18 a) How does negative feedback affect input and output impedances in feedback amplifiers? 7
- b) Design an oscillator to obtain sinusoidal wave form of 1 MHz. 7

Module -5

- 19 a) Draw and explain the working of series voltage regulator 8
- b) What do you mean by harmonic distortion in a power amplifier? how it is reduced in a push pull amplifier circuit? 6
- 20 a) For a class B amplifier providing a 20-V peak signal to a 16- Ω load (speaker) and a power supply of $V_{cc} = 30$ V, determine the input power, output power, and circuit efficiency. 7
- b) Draw the circuit and explain the working of complementary symmetry push pull amplifier 7
