

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S,FE) (FT/WP) (S2 PT) Examination December 2025/January 2026 (2019 Scheme)

Course Code: ECT202

Course Name: ANALOG CIRCUITS

Max. Marks: 100

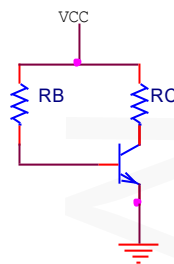
Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

Marks

- 1 Design a differentiator to differentiate a square wave of 10V_{pp} amplitude and 1KHz frequency? 3
- 2 What is the need for Bias Stabilization? 3
- 3 Calculate the collector current and the collector to emitter voltage for the given circuit. Given $R_C=2K\Omega$, $R_B=300K\Omega$, $\beta=50$, $V_{CC}=9V$ 3



- 4 Draw the high frequency hybrid- π model of a BJT. What are the additional parameters in comparison with low frequency model? 3
- 5 Explain with a diagram the Common Source stage with current source load 3
- 6 For an n channel MOSFET, given $K_n=0.4mA/V^2$ and $I_{(ON)}=3.5mA$, with $V_{GS(ON)}=4V$. Determine the value of V_{TH} . 3
- 7 Draw the block diagrams of Voltage Series & Current Series feedback topology? 3
- 8 State Barkhausen criteria for sustained oscillations. 3
- 9 Describe about Class AB Power amplifiers 3
- 10 With the help of block diagram, explain the working of a linear regulated power supply 3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

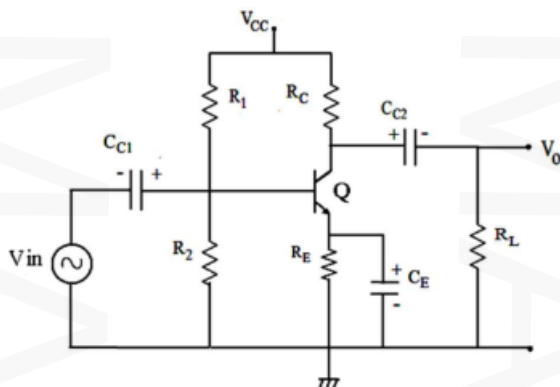
- 11 a) Draw the circuit and explain the working of an RC integrator circuit for a square 8

wave input with period T . Sketch its output waveform for $RC \gg T$, $RC \ll T$ and $RC = T$

- b) Set up and explain a clipper circuit that clips the input sine wave at +5V and -3V. 6
Draw the transfer characteristics.
- 12 a) "Voltage divider biasing is superior to other biasing circuits" Justify with suitable equations? 8
- b) Explain the concept of operating point with the help of DC load lines. 6

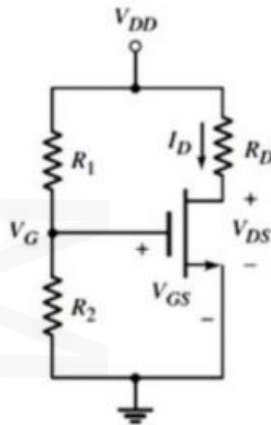
Module -2

- 13 a) With neat diagrams, explain the frequency response of RC Coupled amplifier 7
- b) Using small signal hybrid π model, obtain the expression for input impedance, output impedance and mid-band voltage gain of a common emitter amplifier 7
- 14 Draw the hybrid π model and calculate the small signal voltage gain, input impedance and output impedance of the given circuit, having $R_1=56K\Omega$, $R_2=10K\Omega$, $R_C=2.2K\Omega$, $R_E=680\Omega$, $R_L=10K\Omega$, $V_{CC}=12V$, $V_{BE}=0.7V$, $V_A=80V$, $I_C=2mA$, and $\beta=100$. (Neglect r_o) 14



Module -3

- 15 Draw and explain the Common Source MOSFET amplifier and derive the expressions for the voltage gain, input impedance and output impedance. 14
- 16 a) With a neat circuit diagram of a Cascode amplifier, derive the expression for mid-band gain 7
- b) Calculate the drain current and drain-to-source voltage of the following common source circuit. Given $R_1 = 10K\Omega$, $R_2 = 15K\Omega$, $R_D = 1K\Omega$, $V_{DD}=10V$, $V_T=1V$, $K_n=0.2mA/V^2$ 7



Module -4

- 17 a) With the help of block schematic of Voltage- Shunt feedback amplifier configuration and deduce the expression for gain, input impedance and output impedance with feedback 9
- b) Explain the working principle of Hartley Oscillator with neat diagram 5
- 18 Explain how Barkhausen criterion for oscillation is satisfied by the Wein Bridge oscillator and derive the expression for the frequency of oscillation 14

Module -5

- 19 Explain the working of Transformer coupled Class A power amplifier with a neat circuit diagram and collector waveforms. Derive the expression for its efficiency. 14
- 20 Draw the circuit of a series voltage regulator and explain its working. Discuss how short circuit and fold back protection can be implemented in the circuit. 14
