

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: EC461

Course Name: MICROWAVE DEVICES AND CIRCUITS

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) What are the limitations of conventional solid state devices at microwave? (5)
b) Explain modes of operation of Gunn diode (7)
c) State Gunn effect. (3)
- 2 a) Design a one port negative resistance oscillator. (5)
b) Design a single stage Transistor Amplifier used in microwave circuits (10)
- 3 a) What is MESFET? Mention its structure and operation. (10)
b) An IMPATT diode has carrier drift velocity $V_d = 3 \times 10^7$ cm/s, Drift region length $L = 6\mu\text{m}$, Maximum operating voltage $V_{0\text{max}} = 100\text{V}$, Maximum operating current $I_{0\text{max}} = 200\text{mA}$, Efficiency $\eta = 15\%$, Breakdown voltage $V_{bd} = 90\text{V}$. Find maximum CW output power in watts and the resonant frequency in gigahertz

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) For a microwave circuit, discuss the equivalent voltage and currents. (10)
b) Derive expressions for S parameters in terms of Z parameters for a 2-port network. (5)
- 5 a) Explain the principle of double stub matching (5)
b) What are the steps required to transfer a LPF from HPF. explain. (10)
- 6 a) List the Kuroda's identity. (5)
b) Design a low-pass composite filter with a cut-off frequency of 2MHz and impedances of 75Ω . Place the infinite attenuation pole at 2.05MHz. (10)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Analyse the hybrid MMICs (8)
b) Discuss Stripline in planar transmission and also find the Quality factor. (8)
c) What is Monolithic MICs and Discuss its construction. (4)

- 8 a) What are limiters? Explain different types of limiters (8)
b) Explain the working and applications of Circulators and Isolators. (8)
c) Explain the working of diode switches and attenuators? (4)
- 9 a) Explain the configuration of Planar capacitor film (5)
b) Discuss Microwave resonators with neat diagram (8)
c) Classify the losses in Microstrip lines (7)

