

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

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

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|---|---|------|
| 1 | a) With a graph explain the characteristics of Gunn diode. | (5) |
| | b) What does IMPATT diode stand for and with neat diagram mention construction and working of it and derive power and η of the same. | (10) |
| 2 | a) Explain the biasing of microwave bipolar FET | (5) |
| | b) Why are GaAs MESFET's preferred to Si MESFET's? | (5) |
| | c) Discuss briefly the Stability of Amplifier with necessary conditions. | (5) |
| 3 | a) An n-type GaAs Gunn diode has the following parameters: | (10) |
| | Threshold field $E_{th}=2600\text{V/cm}$ | |
| | Applied field $E=3200\text{V/cm}$ | |
| | Device length $L=6\mu\text{m}$ | |
| | Doping concentration $n_0=24*10^{14}\text{ cm}^{-3}$ | |
| | Operating frequency $f=12\text{Ghz}$ | |
| | a. Compute the electron drift velocity. | |
| | b. Calculate the current density. | |
| | c. Estimate the negative electron mobility | |
| | b) Design a one port negative resistance oscillator | (5) |

PART B

Answer any two full questions, each carries 15 marks.

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| 4 | a) Explain the importance of impedance matching or tuning. | (5) |
| | b) Discuss the significance of $k-\beta$ diagram in filter characteristics | (5) |
| | c) With neat circuit explain the Design procedure of an m-derived LPF section and plot the frequency response. | (5) |
| 5 | Explain working of Double Stub tuning and Quarter Wave Transformer | (15) |
| 6 | a) Define wave velocity. Explain in detail. | (5) |
| | b) Discuss in detail about impedance and frequency scaling. | (10) |

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Compare Monolithic MICs with hybrid MICs (7)
b) Explain the fabrication technique involved in hybrid Microwave Integrated Circuits in detail (8)
c) List the characteristics of planar transmission lines? (5)
- 8 a) Explain in detail about thick film and thin film technology? (10)
b) Classify Switches based on Characteristics (10)
- 9 a) Explain the frequency characteristics of single layer square inductor. (7)
b) Explain the characteristics and configuration of limiter. (7)
c) Explain the principle of operation of circulators? (6)
