

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

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| 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 $V_{\text{bd}} = 90\text{V}$. Find maximum CW output power in watts and the resonant frequency in gigahertz | (5) |

PART B

Answer any two full questions, each carries 15 marks.

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| 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.

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| 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)
