## Elective B2. MICROWAVE ELECTRONICS

UNIT 1: CIRCUIT THEORY OF WAVE GUIDE SYSTEMS:

Equivalent voltages and currents. Impendence description of one-port circuits and two port junctions. Scattering matrix formulation for N-port junction.

UNIT 2: PASSIVE MICROWAVE DEVICES:

Termination - Attenuators - Phase changers - Directional couplers and hybrid junctions - Microwave propagation in Ferrites - Faraday rotation - Ferrite devices - Gyrotors - Isolators and Circulators - Basic Microwave measurements.

High Frequency Effects in conventional Tubes:-

Limitation due to lead inductance and inter electrode capacitance - Transit angle effects Gain Band width product limitation.

UNIT 3: MICRO WAVE TUBES:

Klystrons velocity modulation - Bunching - Output power and efficiency for two cavity klystrons multi cavity klystrons - Reflex klystron - modes - Admittance spiral - Power output and efficiency - TWT: Helix Type TWT - Amplification process - Convention current - Axial electric field - Wave modes and gain - Back - word wave oscillators - Magnetrons - types - Wave modes and gain - Principles of operation and characteristics - Hull cut - off condition - performance harts and Rieke diagram - Pushing and pulling.

UNIT 4: MICRO WAVE SOLID STATE DEVICES:

Microwave transistors and FETS - Physical structures - Principles of operation - Microwave characteristics - Power frequency limitations - Transferred Electron Devices - (TEDs): Gunn - effect Diode - Gunn diode as an Oscillator and amplifier.

UNIT 5: AVALANCHE TRANSIT - TIME DEVICES:

IMPATT and TRAPATT devices - Principles of operation - performance - Master:- Principle off operation and Microwave characteristics.

Parametric Devices:- Non-linear reactance and Manley - Rowe power relations - Parametric amplifier up and down converters.

REFERENCES:


1. S.Y. Liao:- Microwave devices and circuits.
2. R.E. Collin:- Foundation for Microwave Engineering.
3. Soohoo:- Microwave Electronics.
4. Gupta:- Microwaves.
5. Gewartowsks and Watson:- principles of Electro tubes.


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