

S-1132

Total Pages : 3

Roll No.

PHY-554

Microwave Devices and Communication System

M.Sc. Physics (MSCPHY)

2nd Year Examination, 2022 (Dec.)

Time : 2 Hours]

Max. Marks : 70

Note : This paper is of Seventy (70) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION-A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of Nineteen (19) marks each. Learners are required to answer any Two (02) questions only.

(2×19=38)

1. Discuss the propagation of TM waves in a rectangular waveguide. Also derive expressions for λ_c , f_c , λ_p in TM mode.

2. Explain the operation of Tunnel diode and its volt-ampere characteristics. Describe Tunnel diode working as microwave amplifier.
3. Explain the working of Magnetron oscillator. Derive expressions for Hull cut-off magnetic and cut-off voltage equations.
4. Deduce an expression indicating frequency spectrum of AM wave. Describe plate modulated class C amplifier for the production of AM wave.
5. Discuss the field patterns of vertical and horizontal loop antennas. Also derive an expression for the radiation resistance of loop antenna.

SECTION-B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only. (4×8=32)

1. Write short note on modulation & demodulation.
2. What is the S-matrix and what are its properties? Discuss about the scattering matrix of a two-port junction.

3. Draw the equivalent circuits of E-plane and H-plane tee. Derive the scattering matrix of E-plane tee.
 4. Draw the block diagram of CW Radar and MTI Radar. Explain the working of CW Radar.
 5. What is Faraday rotation and its applications. Describe the construction and working of a Gyrator.
 6. Derive Manley-Rowe power relations.
 7. What is two cavity Klystron? Derive the equation for velocity modulation.
 8. Derive an expression for the directivity. Explain "gain", "efficiency" and "radiation resistance" of an antenna.
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