

P-946

Total Pages : 3

Roll No.

PHY-554

Microwave Devices and Communication System

M.Sc. Physics (MSCPHY)

2nd Year Examination, 2023 (June)

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. Candidates should limit their answer to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

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.** What are the characteristics of rectangular waveguide? Derive expressions for the TM mode field equations in a rectangular waveguide.

2. Explain the operation of Tunnel diode and its volt-ampere characteristics. Describe briefly Tunnel diode working as a microwave amplifier.
3. Discuss in detail with a neat diagram about two cavity Klystron. Derive the equation for velocity modulation.
4. Explain the working of Magnetron oscillator. Derive expressions for Hull's cut-off magnetic field and Hull's cut-off voltage equations.
5. Explain briefly usefulness of modulation? Deduce an expression indicating frequency spectrum of AM wave.

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. Derive an expression for the directivity. Also explain "Gain", "Efficiency" and "radiation resistance " of an antenna.
2. What are the types of loop antennas? Discuss the field patterns of vertical and horizontal loop antennas.

3. What are basic types of wave guide tee junctions ? Derive the scattering matrix of Magic tee.
 4. Explain the working of a basic Radar system. Derive the Radar range equation.
 5. What is demodulation? Explain the principle of square law detector.
 6. Explain the operating principle and construction of IMPATT diode. Also explain its major disadvantages.
 7. Explain frequency rotation and its applications.
 8. What is a directional coupler? Explain the working of a directional coupler with the help of a block diagram.
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