S-487

Total Pages : 3   Roll No. ....

MPHY-608

Microwave Devices

M.Sc. Physics (MSCPHY)

4th Semester Examination, 2022 (Dec.)

Time : 2 Hours]   **[Max. Marks : 35**

Note : This paper is of Thirty Five (35) 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 Nine and Half (9½) marks each. Learners are required to answer any Two (02) questions only.
(2×9½=19)

1. Discuss the characteristics of rectangular waveguide and derive field equations for it.

2. What is S matrix? Discuss their properties and derive S matrix for a shunt tee.

3. Explain Faraday's rotation? Describe the construction, working and application of isolator.

4. Explain the process of avalanche multiplication. Describe the operating principle and construction of IMPATT diode and its major disadvantages.

5. Write a short note on any two of the following :

(a) BARITT Diode.

(b) S matrix of magic tee.

(c) Cutoff wavelength and its consequences.

(d) Gyrator in microwaves.

SECTION–B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Four (04) marks each. Learners are required to answer any Four (04) questions only.   (4×4=16)

1. What are waveguides? What are the differences in the propagation between TE and TM modes in rectangular waveguide?

2. Show that TEM wave cannot exist in a single conductor waveguide.

3. Explain the need of scattering matrix formulation.

4. What are the types of TEE junctions? What is the difference between E-plane and H plane?

5. Discuss the construction and working of hybrid ring. Also write its S-matrix.

6. What are phase shifters in microwave? Discuss the construction and working of rotary phase shifter.

7. Describe use of Tunnel diode as microwave amplifier.

8. Discuss Manley-Rowe power relations.

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