

**AC - 3374**  
**M. Phil. Examination**  
April / May – 2003  
**Physics : Paper - III**  
*(Microwaves - II)*

Seat No. \_\_\_\_\_

Time : 3 Hours]

[Total Marks : 100

- Instructions :** (1) Attempt any **five** questions.  
(2) All questions carry **equal** marks.  
(3) Symbols and Terminology used have their usual meaning.

- 1** (a) Discuss in brief the classification of electronic circuits. What are the advantages of MMIC ?  
(b) Describe MMIC fabrication techniques.

**OR**

- 2** (a) Describe insertion loss method for filter design.  
(b) Discuss quarterwave coupled cavity filters.
- 3** (a) Sketch a slot antenna and explain its working. How this antenna can be energized by a coaxial line. With a neat diagram describe broad side array of slots in waveguide.  
(b) Write a note on horn antenna.
- 4** (a) What is radiation pattern of an antenna ? Describe an experimental setup to obtain antenna radiation pattern and discuss requirement to obtain accurate far field pattern.  
(b) Define gain of an antenna. Describe a method to determine gain of an antenna.
- 5** (a) Explain the main features of microwaves which make them useful for industrial applications. Describe monitoring of moisture content in paper and textile industry using microwaves.

- (b) Explain the principle of microwave heating. What are the applications of microwaves heating ?
- 6** Discuss physical principle involved in remote sensing. What are the advantages of microwave remote sensing over visible and IR remote sensing ? With a block diagram describe a microwave radiometer and explain its operation. What are the applications of microwave radiometer ?
- 7** (a) Give block diagram of a typical telecommunication earth station and explain in brief function of each part. Discuss various parameters of earth station.  
(b) Explain : FDMA, TDMA and CDMA.
- 8** Describe biological effects of microwaves. Discuss safety standard for microwave radiations.
- 9** (a) Describe infinite sample method for determination of dielectric constant of lossy material.  
(b) With a block diagram explain two point method for determination of dielectric constant of a lossless sample.
- 10** Write notes on : (any **two**)
- (i) Doppler sensors
  - (ii) Hybrid integrated circuits
  - (iii) Anechoic chamber.
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