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## **MPHY-609**

### **Communication System**

M.Sc. Physics (MSCPHY)

4th Semester Examination, 2023 (June)

**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. 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 Nine and Half ( $9\frac{1}{2}$ ) marks each. Learners are required to answer any Two (02) questions only.  
( $2 \times 9\frac{1}{2} = 19$ )

- 1.** Derive the expression for output power & efficiency of a two cavity klystron.

2. Explain the frequency modulation. What are the advantages of FM over AM?
3. What are the different types of tracking radar systems? Explain with the diagram, how angle - tracking is done? Compare two major tracking systems.
4. Explain the directive gain, power gain, antenna radiation pattern, effective aperture and polarization of radar antenna with necessary equation and diagram.
5. What is demodulation? Explain envelope diode detector.

### **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 magnetrons? List out the different types of magnetrons.
2. Explain the working principal of Travelling Wave tube (TWT) with suitable diagram.
3. What is Monopulse Tracking Radar?

4. Derive the relation between Pulse Repetition period and Pulse Repetition frequency in a Radar System.
  5. State reciprocity theorem and explain its use in antennas.
  6. An antenna whose radiation resistance is  $300 \Omega$  operates at a frequency of 1 GHz and with a current of 3 amperes. Find the radiated power.
  7. The peak voltage of an AM signal varies from 2 V to 10 V (assume sinusoids). Find the total power and power efficiency.
  8. What are the characteristics of a radio receiver that determines its performance?
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