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PHY-554

Microwave Devices and Communication System

M.Sc. PHYSICS (MSCPHY-12/13/16/17)

Second Year, Examination 2021 (Winter)

Time: 2 Hours

Max. Marks: 80

Note : This paper is of Eighty (80) 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 Twenty (20) marks each. Learners are required to answer any two (02) questions only.

[2 x 20 = 40]

Q.1. Discuss $TE_{1,0}$ mode propagation of the wave in a rectangular waveguide. Obtain field component expression and sketch the field configuration.

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- Q.2. What do you mean by the process of modulation? Discuss various method of modulating the carrier amplitude of broadcast transmission with special reference to the method which is used commonly.
- Q.3. Discuss why the conventional oscillator circuits cannot be used for the generation of microwaves? Show how oscillations are generated by the reflex klystron?
- Q.4. Deduce an expression for the induced electromotive force in a loop antenna. Discuss its application as direction finder.
- Q.5. What is the basic principle of radar system? How does it determine distance to a target?

Section – B

(Short-answer-type questions)

Note: Section 'B' contains Eight (08) short-answer-type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only.

[4 x 10 = 40]

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- Q.1. What do you mean by passive device waveguide?
- Q.2. Describe S-matrix and E plane tee.
- Q.3. Give the principle and working of waveguide phase shifter.
- Q.4. Why are oscilloscopes less commonly used than spectrum analyzers in microwave work?
- Q.5. Discuss the performance of magnetron and list the important applications.
- Q.6. Discuss in brief about the modulation and demodulation.
- Q.7. Explain with working procedure of VHF antenna.
- Q.8. Discuss the tracking radar and explain its application.
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