

M.SC.(Phy.) Semester - 4 (CBCS) Examination
April/May-2023 (NEW COURSE)
Electronic Communication (Elective)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q.1. Answers the following any SEVEN [14]

- (i). Enlist different types of losses in optical fiber system.
- (ii). Define transmission line. Show that it is bridge between circuit theory to electromagnetic theory.
- (iii). Explain why is single-mode propagation impossible with graded index fiber.
- (iv). What is the dominant mode in wave guide? What is the cut off wave length in rectangular wave guide for the dominant mode?
- (v). Write a types of digital modulations.
- (vi). What are the normal modes of radio wave propagation ?
- (vii). Define look angels for a satellite.
- (viii). For a carrier frequency of 10 GHz and a distance of 100 km , determine the free space path loss.
- (ix). Define dynamic range for PCM.
- (x). Write “secant law”. Determine the maximum usable frequency for a critical frequency of 20 MHz and an angle of incidence 350.

Q.2. Answer any TWO [14]

- (1). Show that how a TE_{10} wave can be formed by superposition of two TEM waves. Prove the relation: $1/\lambda_g^2 = 1/\lambda^2 = 1/2a^2$ for a rectangular wave guide, where ‘a’ is broader dimension of rectangular waveguide.
- (2). Write a note on space wave propagation and “tropo-scatter” mode of propagation.
- (3). Describe in detail ground wave propagation.

Q.3. Answer the following [14]

- (1). Discuss in detail Classification of optical fiber.
- (2). Using circuit theory, drive a transmission line equation.

OR

Q.3. Answer the following [14]

- (1). Explain the working of Quadrature Amplitude modulation (8-QAM) modem with truth table, phasor and constellation diagrams.
- (2). What is frequency shift keying ? Discuss working of FSK-transmitter and receiver with neat diagrams.

Q.4. Answer any TWO [14]

- (1). What is pulse code modulation ? Explain the working of PCM system in detail.
- (2). Explain rectangular waveguides with necessary expression.
- (3). Discuss Geostationary satellite in detail.

Q.5. Answer any TWO [14]

- (1). Write a note on BPSK technique of digital modulation
- (2). Differentiate transmission line and wave guide. Discuss TEM, TE, TM and Hybrid modes with figure.
- (3). Explain Physics of propagation of light through optical fiber.
- (4). Derive expression for “Transmission path loss” incurred by an electromagnetic wave as it propagates through free-space.
