

B.Sc. Sem.-6 Examination**309****Electronics****April 2024****Time : 2-30 Hours]****[Max. Marks : 70****Instructions :** (1) Symbols used have their usual meaning.

- 1 (a) What is fiber optics? With necessary diagrams, explain how communication takes place in a fiber. What are the advantages of using optical fibers instead of copper wires? 14
- OR
- (a) Explain critical angle, total internal reflection and Fresnel reflection. 7
- (b) What is Snell's law? How can the critical angle of incidence be found? What is the critical angle for a ray passing from a medium with R.I. = 1.5 to a medium with R.I. = 1.46? 7
- 2 (a) Draw the block diagram of a superheterodyne receiver and explain its working. 7
- (b) Explain sensitivity and selectivity of a radio receiver. 7
- OR
- (a) How is intermediate frequency selected? Draw the circuit of a two-stage IF amplifier and explain it. 14
- 3 (a) Draw the block diagram of a monochrome TV transmitter and describe the camera tube, video amplifiers and sound circuits shown. 14
- OR
- (a) With the help of the circuit diagram of a simple matrix, show how the I, Q and Y signals are generated in a color TV transmitter. Also explain color phase relationships and chroma vectors. 14
- 4 (a) Explain the fundamentals of digital communication. How is the bandwidth of a data transmission system determined? Also explain what is cross-talk and how it can be avoided. 14
- OR
- (a) What are forward error-correcting codes? Explain in detail the matrix code and hamming code. 14
- 5 Answer any seven : 14
- (1) Write an equation relating the energy in a photon and the frequency of light. Also give the units.
 - (2) What is diffused reflection?
 - (3) What is meant by scattering of light?
 - (4) A superheterodyne receiver with an IF of 450KHz. is tuned to a signal at 1200 KHz. What will be the image frequency?
 - (5) Write the advantages (any two) of using an RF amplifier in a radio receiver.
 - (6) Define conversion transconductance.
 - (7) What do you mean by 4:3 aspect ratio in Television?
 - (8) What is negative video modulation polarity?
 - (9) What is the interlace ratio used in television systems?
 - (10) What is the unit of signalling speed?
 - (11) What is the BCD code of decimal number 56?
 - (12) Which code is generally used in a punched card?