

11. (a) (i) Discuss the advantages and disadvantages of digital communication and give a functional description of a digital communication system. (10)
- (ii) Explain how channels can be classified. (6)
- Or
- (b) (i) Explain geometric representation of signals. (8)
- (ii) Describe the different mathematical models of a communication channel. (8)
12. (a) (i) Explain Nyquist sampling theorem and how the message can be reconstructed from its samples with an example. (10)
- (ii) Explain the practical limitations in sampling and reconstruction. (6)
- Or
- (b) (i) Explain the principle of quantization and obtain the expression for the signal to quantization noise for the case of a uniform quantizer. (8)
- (ii) Explain the spectral waveform encoding methods. (8)
13. (a) (i) Explain the generation of (n, k) block codes and how block codes can be used for error control. (10)
- (ii) Consider a $(6, 3)$ block code and explain how error syndrome helps in correcting a single error for a data 110. (6)
- Or
- (b) Describe how convolutional codes can be generated with an example. Draw and explain the tree diagram and trellis diagram representation of convolutional codes. (16)
14. (a) (i) Describe the principle of signal reception using a correlator type receiver. (8)
- (ii) Explain the important properties of a matched filter. (8)
- Or
- (b) (i) Describe how eye pattern can be obtained and can be used for observing the characteristics of a communication channel. (8)
- (ii) Explain the function of maximum likelihood detector. (8)
15. (a) (i) Explain QPSK modulation. Describe with a block diagram the operation of a QPSK Transmitter. (10)
- (ii) Explain the bandwidth considerations of QPSK. (6)
- Or
- (b) (i) Describe noncoherent and coherent FSK demodulation. (10)
- (ii) Obtain the probability of error of a FSK system. (6)

