ROLL NO. _____

Code: AE67 **Subject: DIGITAL COMMUNICATIONS**

AMIETE – ET

Time: 3 Hours **DECEMBER 2014** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. In a digital communication system, the combination of modulator, channel and detector is called

(A) Analog channel **(B)** Discrete channel
(C) Radio channel **(D)** Broadcast channel

b. The source encoder is said to be efficient when the coding efficiency (η) approaches

(A) Unity **(B)** Zero
(C) Infinity **(D)** High value

c. When coherent detection is use, knowledge of which of the following is necessary?

(A) Only frequency of the carrier
(B) Only the phase of the carrier
(C) Both frequency and phase of the carrier
(D) Neither frequency nor phase of the carrier

d. The symbol duration (T) of the M-ary format is related to the bit duration T_b by (M an integer power of 2)

(A) $T = T_b$ **(B)** $T = T_b \log_2 M$
(C) $T = T \log_2 M$ **(D)** $M = T_b \log_2 T$

e. The combination of matched filter and envelope detector is called

(A) Coherent Matched Filter **(B)** Quadrature Filter
(C) Noncoherent Matched Filter **(D)** Phase shifting Filter

f. A pair of sinusoidal waves that differ only in a relative phase shift of 180^0 are referred to as

(A) Orthogonal Signals **(B)** Interpolation Signals
(C) Correlated Signals **(D)** Antipodal signals

g. The phenomenon of a high frequency in the spectrum of the original signal seemingly taking on the identity of a lower frequency in the spectrum of the sampled signal is called

(A) Fold over **(B)** Cross over
(C) Phase over **(D)** Band overlap

h. A continuous-phase frequency shift keying (CPFSK) signal with a deviation ratio of one half is referred to as

(A) Binary phase shift keying **(B)** Quadrature phase shift keying
(C) Minimum shift keying **(D)** Differential phase shift keying

i. If the PN sequence length (N) of a feedback shift register is 1023, then the length of the shift register is

(A) 10 **(B)** 9
(C) 8 **(D)** 7

j. The technique used to cater for the requirements of synchronization and rate adjustment to accommodate small variations in the input data rates is

(A) Bit stuffing **(B)** Bit interleaving
(C) Bit signalling **(D)** Bit matching

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain digital communication system with the help of block diagram. **(8)**

b. State & prove source coding theorem with explanation. **(8)**

Q.3 a. Explain sample and hold circuit for signal recovery. **(8)**

b. Define Time division multiplexing with a neat block diagram. **(8)**

Q.4 a. Write a note on delta modulation with the help of block diagrams. **(10)**

b. Explain the process of encoding in pulse code modulation. **(6)**

Q.5	a.	What do you mean by the term eye pattern in digital communication.	**(6)**
	b.	Explain Adaptive equalization for data transmission.	**(10)**
Q.6	a.	Explain coherent binary PSK with diagrams.	**(8)**
	b.	What is differential phase-shift keying.	**(8)**
Q.7	a.	Explain Gram-Schmidt Orthogonalization Procedure.	**(8)**
	b.	Write a note on Correlation receiver with neat diagrams.	**(8)**
Q.8	a.	With help of block diagram explain slow frequency hopping.	**(8)**
	b.	What is DSSS? Explain the transmitter and receiver of DSSS.	**(8)**
Q.9		Write short notes on : (i) Digital Radio (ii) Digital Multiplexers	**(8+8)**