

Exam.Code:0923
Sub. Code: 6359

1078

B.E. (Information Technology) Fifth Semester
ITE-545: Principles of Telecommunication

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

- Q.1
- i. What is modulation and why is it needed?
 - ii. Define thermal noise.
 - iii. What is the difference between a random process and a deterministic process?
 - iv. What is the importance of core and cladding in the functionality of an optical fiber?
 - v. Why is Handover necessary?
- (2x5)

PART A

- Q.2a A three digit message is transmitted over a noisy channel having a probability of error $P(E)=1/5$ per digit. Find out the CDF.
- b Define the term "variance" for the random variable X. Calculate the same if PDF for X is given by: $F_x(x)=1/3e^{-|x|}$ for $-\infty < x < \infty$. (5,5)
- Q.3a Explain how various noises are generated and the method of representing them.
- b If each stage has a gain of 20dB and noise figure of 20dB, calculate the overall noise figure of a two stage cascaded amplifier. (5,5)
- Q.4a Explain the concept of short noise.
- b Assume that 8 digit binary words are being transmitted over a noisy channel, with a per digit error probability of 0.005. Calculate the probability that 3 digits out of 8 are in error. Also obtain the values of mean and variance for a random variable representing the number of errors. Use binomial distribution. (5,5)

PART-B

- Q.5a An event has six possible outcomes with probabilities $1/32, 1/32, 1/16, 1/8, 1/4, 1/2$. Find the entropy of the system.
- b Explain the properties of entropy and with suitable examples, explain the difference between joint entropy and conditional entropy. (5,5)
- Q.6a Determine the Shannon Fano code for the following message with their probabilities given
- | X_1 | X_2 | X_3 | X_4 | X_5 | X_6 | X_7 |
|-------|-------|-------|-------|-------|-------|-------|
| 0.15 | 0.05 | 0.2 | 0.15 | 0.05 | 0.3 | 0.1 |
- b Develop Huffman code for five message given by probabilities $1/2, 1/4, 1/8, 1/16, 1/16$. Calculate the average number of bits/message. (5,5)
- Q.7a Discuss Kepler's three laws.
- b Draw the block diagram of Satellite communication system and describe the function of each component (4,6)

x-x-x