National Open University of Nigeria
Plot 91, Cadastral Zone, Nnamdi Asikiwe Expressway, Jabi – Abuja
Faculty of Sciences

APRIL/MAY, 2019 EXAMINATIONS

COURSE CODE: CIT 754
COURSE TITLE: DIGITAL COMMUNICATION
CREDIT: 3 Units
TIME ALLOWED: 3 Hours
INSTRUCTION: Answer Questions ONE and any other FOUR (4) Questions

Question 1

(a) Under what condition does an optimum decoder for a binary symmetric channel decode correctly? (2 marks)
(b) Explain the classification of Data compression (4 marks)
(c) List two types of Error Probability of a Linear Block codes (4 marks)
(d) What are the TWO general properties of a linear block code? (4 marks)
(e) State two major effects of signal fading (4 marks)
(f) List four (4) examples of a broadcast system. (4 marks)

Question 2

(a) Outline the approach(es) for coding a MIMO channel [4 marks]
(b) Disuss the use of Multiple Antennas. [4 marks]
(c) When is a Generator Matrix G said to be systematic? [4 marks]

Question 3

(a) Explain Maximum-Likelihood Timing Estimation (4 marks)
(b) Describe the function of the discrete channel encoder (4 marks)
(c) Briefly discuss the symbol timing estimation (4 marks)

Question 4

Briefly describe the following: (a) Weight of a Codeword (b) Hamming Distance (c) Minimum Distance of a code (d) Minimum Weight of a code **[3 marks each = 12 marks]**

Question 5

(a) List four factors affecting the path loss in mobile radio communications **(4 marks)**
(b) What is Minimum Shift Keying technique? **(4 marks)**
(c) Differentiate between memoryless modulation and modulation with memory **(4 marks)**

Question 6

(a) With focus on the lossless coding of information sources, state the goals of data compression **[5 marks]**
(b) What do you understand by (i) Code Rate (ii) time diversity **[5 marks]**
(c) State two major classifications of a channel code **[2 marks]**