



COLLEGE OF ENGINEERING, SCIENCE AND TECHNOLOGY
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

ADVANCE DIPLOMA IN ENGINEERING (ELECTRICAL & ELECTRONICS)

EEE 607 ELECTRONIC TECHNOLOGY

FINAL EXAMINATION
(SEMESTER 2, 2016)

Duration – 3 Hour

DATE/TIME/ROOM – Refer to Timetable

INSTRUCTIONS TO CANDIDATES

1. You are allowed 10 minutes extra time during which you are not to write.
2. Begin each answer on a fresh new page and use both sides of the sheets.
3. Write your identification number on the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper etc. in their correct sequence and secure with string provided.
5. For all sheets of paper in which rough work has been done, cross it through and you must attach to your answer script.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. ANSWER ONLY TEN QUESTIONS. (All Questions carry 10 Marks)

Total no of pages – 4 (including cover page)

UNIT CODE – EEE607, UNIT NAME – ELECTRONIC TECHNOLOGY, SEMESTER 2, 2016

Question 1

- a) Define Modulation and list the needs of modulation? (5 Marks)
- b) Define Frequency Modulation. A radio station wishes to use an audio signal containing frequencies up to 15 kHz (for Hi-Fi reproduction of music) to frequency modulate a carrier. The rated system deviation is 75 kHz. What will be the bandwidth of the modulated signal? (5 Marks)

Question 2

- a) Derive the equation for Amplitude modulated Wave. (7 Marks)
- b) A transmitter puts out a total power of 25 Watts of 30% AM signal. Calculate the power is contained in the carrier and each of the sidebands? (3 Marks)

Question 3

Analyze and Explain the OSI model for communication networks (10 Marks)

Question 4

- a) Draw the block diagram for a super heterodyne Receiver. (4Marks)
- b) Elaborate the basic characteristics that determine the quality of a receiver. (6 Marks)

Question 5

- a) What is pulse Width Modulation (PWM)? (4 Marks)
- b) Explain the Generation of PWM Signal. (4 Marks)
- c) List the advantages and disadvantages of PWM. (2 Marks)

Question 6

- a) An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. Calculate the data elements carried by each signal element? How many signal elements do we need? **(5 Marks)**
- b) For a binary FSK signal with a mark frequency of 149 kHz, a space frequency of 51 kHz, and an input bit rate of 2 kbps Calculate
- (i) The peak frequency deviation, **(2 Marks)**
 - (ii) Minimum bandwidth and **(2 Marks)**
 - (iii) Baud **(1 Marks)**

Question 7

- (a) Define entropy, mutual information and state the properties of mutual information. **(5 Marks)**
- (b) What is multiplexing? What are the advantages and disadvantages of digital transmission? **(5 Marks)**

Question 8

Consider the binary [7, 4, 3] - Hamming code with the generator polynomial **(10 Marks)**

$g(x) = 1 + x^2 + x^3$. Suppose the following words are received:

Received: $W_0 = 0111100$, $W_1 = 1001010$, $W_2 = 0100111$, $W_3 = 0010111$, $W_4 = 0001110$.

- (a) Use the polynomial syndrome to decode the above received words:
- (b) Use the generator matrix of C^\perp to decode the above received words:

Question 9

For the bit stream 01001110, sketch the waveform for each of the following codecs:- NRZ-L, NRZI, Bipolar AMI, Pseudoternary, Manchester, Differential Manchester, B8ZS. Assume that the signal level for the preceding bit for NRZI was high, the most recent preceding bit (AMI) has a negative voltage; and the most recent preceding 0 bit (pseudoternary) has a negative voltage. (10 Marks)

Question 10

Explain the following Data Compression standards

- a) V.42bis Data Compression (5 Marks)
- b) MNP5 Data Compression (5 Marks)

Question 11

The Intermediate Frequency filter of a super heterodyne receiver is shown in Fig. 1

The inductor has a resistance r_L of 1.2Ω . The resonant frequency of the filter must be 465 kHz, with a bandwidth of 8 kHz. (10 Marks)

- (a) Calculate the Q-factor of the circuit.
- (b) Use your answer to (a) to Calculate the value of the inductor L required.
- (c) Use your answer to (b) in order to calculate the setting of the preset capacitor required to complete the filter so that resonance occurs at 465 kHz.

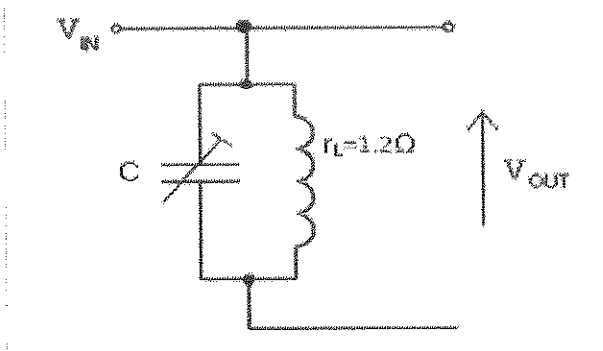


Fig.1

Question 12

Explain in brief about the following

a) Pulse Code Modulation (PCM) with a suitable block diagram. (5 Marks)

b) Sampling Theorem & Nyquist interval. (5 Marks)

THE END