COMPUTER STUDIES
FORM THREE
TERM 2 2025

OPENER EXAMINATION

MARKING SCHEME

1. Define the following terms. (4 marks)
   i. Bit
      - ✓ **Binary digit 0 or 1**

   ii. Byte
      - ✓ **Group of bits (mostly 8) used to represent a single character**

   iii. Nibble
      - ✓ **Half of a byte**

   iv. Word
      - ✓ **Two or more bytes**

2. Give two reasons for the use of binary numbers to represent data in computers (2marks)
   - ✓ **Human languages are complex hence it is easier to develop machines in that takes human language and encode it in binary form.**
   - ✓ **Digital devices and small in size, consume less energy and are more reliable than analog.**

3. Briefly explain how data is represented and interpreted in optical media such a compact disk. (3 marks)
   - ✓ **Shinny surface of the disk is made up of small lands and bits.**
   - ✓ **When light is directed to trike the shiny surface the raised lands reflect back light onto a photoelectric cell which is interpreted as a 1.**
   - ✓ **The pits scatter light there the computer interprets the absence of light on the cell as a 0.**

4. Give two reasons why we use higher number systems such octal and hexadecimal to represent data in computing. (2 marks)
   - ✓ **They can encode more than one binary digit hence data compression.**
   - ✓ **They ease transmission and quickens error detection by reducing the long streams of binary.**

5. Convert the following decimal numbers to their binary equivalent.
   i. 269_{10} (2 marks)
      - ✓ **100001101_2**

   ii. 13.375_{10} (3 marks)
      - ✓ **1101.011_2**

   iii. 26.45_{10}(3 marks)
      - ✓ **11010.01[1100] recurring.**

6. Convert the following numbers to their equivalent values in the number system given in the brackets.
   i. 1010011.1101_2 (octal) (4 marks)
      - ✓ **123.64_8**

   ii. $97DB_{16}$(binary) (2marks)
      - ✓ **1001011111011011_2**

   iii. $ABCD_{16}$(Octal) (3 marks)

- ✓ **125715_8**

iv. 576_8 (Denary) (3 marks)

- ✓ **382_{10}**

7. Write in full. (4 marks)

i. ASCII

- ✓ **American Standard Code for Information Interchange**

ii. BCD

- ✓ **Binary Coded Decimal**

iii. EBCDIC

- ✓ **Extended Binary Coded Decimal Interchange Code**

iv. Bit

- ✓ **Binary Digit**

8. Perform the following binary arithmetic and give your answer in decimal notation.

i. $10101.101_2 + 11.0111_2$ (3 marks)

- ✓ **11001.0001_2**

ii. $1010.011_2 - 11.0111_2$(3 marks)

- ✓ **110.1111_2**

9. Use 8-bit twos complement to perform the following subtraction and leave your answer in decimal notation.

i. 45_{10}-31_{10} (3 marks)

$45_{10} - 00101101_2$
$31_{10} = 00011111_2$
2 complements of 31 = 11100001
Summation = (1)00001110 = 14_{10}

ii. 18_{10}-25_{10} (4 marks)

$18_{10} = 00010010_2$
$25_{10} = 00011001_2$
2 complements of 25 = 11100111_2
Summation = 11111001_2
Subtract 1 = 11111000_2
Uncomplemented = 00000111_2 = -7

10. Differentiate between an analog signal and a digital signal. (2 marks)

- ✓ **Analog signals are in the form of a smooth continuous sine wave while digitals signals are discrete square waves.**