COMPUTR STUDIES FORM 3 MID TERM 2 2024 MARKING SCHEME

1. **Define the term data integrity.** **(2mks)**

   Data integrity refers to the dependability, timeliness, availability, relevance, accuracy & completeness of data/information

2. **State three ways of minimizing threats to data integrity. (3mks)**
   - Backing up the data on external storage media
   - Enforcing security measures to control access to data
   - Using error detection & correction software when transmitting data
   - Designing user interfaces that minimize chances of invalid data being entered

3. (a)   i. Subtract 110_2 from 11010_2 (1mk)

   11010_2

   $\underline{\quad 110_2}$

   10100_2

   ii. Find the sum of binary number 101.101_2 and 110.100_2 (1mk)

   101.101_2

   $\underline{110.100_2}$

   1100.001_2

   iii. Convert binary number 11010110.1001_2 into octal number.   (1mk)

   $$\begin{array}{c|c|c|c|c} 11 & 010 & 110 & 100 & 1 \\ 3 & 2 & 6 \cdot & 4 & 1_8 \end{array}$$

   vi. Convert binary number 11010110.1001_2 into hexadecimal number. (1 mark)

   $$\begin{array}{c|c|c} 1101 & 0110 \cdot & 1001 \\ D & 6 \cdot & 9_{16} \end{array}$$

4. Convert the following numbers to their decimal equivalent

    i. 11.011_2 (2 marks)

$(2^0 \times 1) + (2^1 \times 1) + (2^{-1} \times 0) + (2^{-2} \times 1) + (2^{-3} \times 1)$

$= 1 + 2 + 0 + 0.25 + 0.125$

$= 3.375_{10}$

  ii. 0.11011_2 (2 marks)

$0.(2^{-1} \times 1) + (2^{-2} \times 1) + (2^{-3} \times 0) + (2^{-4} \times 1) + (2^{-5} \times 1)$

$0.5 + 0.25 + 0.0 + 0.0625 + 0.03125$

$= 0.84375_{10}$

(5) i. Convert $3BD_{16}$ to Octal.   (3mks)

$A = 10 = 1010$

$B = 11 = 1011$

$C = 12 = 1100$

$D = 13 = 1101$ ✓1mk

001   010   101   110   001   101

1   2   5   7   1   5   ✓1mk

Therefore $ABCD_{16} = 125715_8$ ✓1mk

6. Using one's complement, calculate $5_{10} - 9_{10}$. use six bit in your calculation.   (3mks)

Conversion

$5_{10} = 000101_2$

$9_{10} = 001001_2$ ✓1mk

-9_{10}: ones complement $= 110110$

Adding 000101 ✓1mk

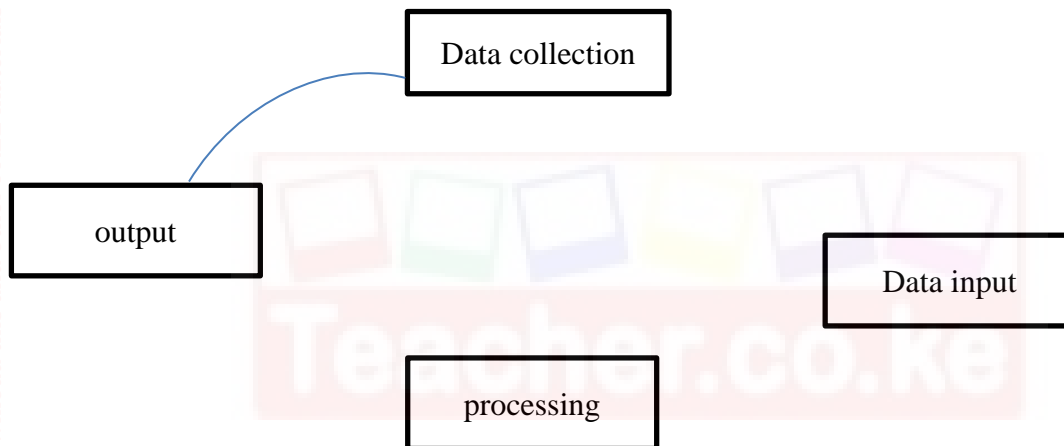*110110 +*

_111011_$_2$ ✓_1mk_

7. **State at least four advantages of storing data in computer files over the manual filing system** **(4mks)**
   - Stored information takes up less space
   - Easier to update and modify
   - Provides faster access and retrieval of data
   - Reduces duplication of data or stored records
   - Cheaper
   - Enhances data integrity (i.e. accuracy and completeness)

8. With aid of a diagram highlight four main stages of data processing.   (6mks)

```
        ┌──────────────────┐
        │ Data collection  │
        └──────────────────┘
      /
┌──────────┐                      ┌──────────────┐
│  output  │                      │  Data input  │
└──────────┘                      └──────────────┘
        ┌──────────────────┐
        │    processing    │
        └──────────────────┘
```

9. Discus five stages of data collection   (10mks)

   - ✓ Data creation
   - ✓ Data preparation
   - ✓ Conversion
   - ✓ Validation
   - ✓ transmission

10. Define the following elements of a computer file.   (3mks)

i. Character

a character is the smallest element in a computer file and refers to a letter, number or special symbol that can be input, processed stored and output by a computer.

ii) Field

a field is a logical combination of characters to represents meaningful piece of data.

iii) Record
a record is a collection of related fields that represent a single entity.