

Set-2

Course Title	Computer Fundamentals	Course Code	CSE112		
Marks	15	Quiz No:	01	Time	40 minutes
Student ID		Student Name			

1. In a **satellite communication system**, sensor data is encoded using different base systems at various stages to optimize storage and transmission.
- The **sensor module** generates readings in **base-4** for compact representation.
 - The **communication controller** requires the readings in **base-7** for intermediate processing.
 - The **central server** stores all received values in **hexadecimal (base-16)** format for efficient memory usage.

During a system test, the sensor transmitted the reading **3123 (base-4)**. As a system engineer, you must ensure the data is properly converted for each stage of transmission and storage.

Tasks:

1. Convert the sensor data $(3123)_4$ to its **base-10 equivalent**. [Mark 1.5]
2. Convert the result from **base-10 to base-7** (for the communication controller). [Mark 1.5]
3. Convert the **base-7** value into its **hexadecimal (base-16)** equivalent (for server storage). [Mark 3]
4. Verify your final hexadecimal result by performing a **direct base-4 $\rightarrow$ binary $\rightarrow$ hexadecimal** conversion. [Mark 4]

2. Perform the following binary arithmetic operations: [marks 2+ 3]

- A. $100100_2 - 11111_2$
- B. $101110_2 + 10_2$