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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 → binary → hexadecimal** conversion. **[Mark 4]**

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

A. $100100_2 - 11111_2$
B. $101110_2 \div 10_2$