**BINDURA UNIVERSITY OF SCIENCEEDUCATION**

**FACULTY OF SCIENCEAND ENGINEERING**

**DEPARTMENT OF EDUCATIONAL TECHNOLOGY**

**CS006 Microcomputer Architecture**

**Time 3 hours**

**Instruction to candidates**

JUN 2024

**Answer all questions, each question carries 20 marks**

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**Question 1**

a. Carry out the following operations:

i. $2C_{16}+DD_{16}$ **[2]**

ii. $11001010_2-111111_2$ using **two's** complement **[4]**

b. Convert the following number systems:

i. $1011101_{10}$ to octal and hexadecimal **[4]**

ii. $456_{10}$ to binary **[2]**

c. Perform the operations below on the following bits

i. Left arithmetic shift **[2]**

ii. Left logical shift **[2]**

iii. Right logical shift **[2]**

iv. Right arithmetic shift **[2]**

**Question 2**

a. What are the functions of the following registers in the 8085 microprocessor:

i. Accumulator [2]

ii. General Purpose Register [2]

iii. Program Counter [2]

iv. Stack pointer [2]

v. Instruction Register [2]

b. Discuss **any two** types of microprocessor Systems [5]

c. Discuss the advantages of microprocessor Systems [5]

**Question 3**

a. What is an addressing mode? [2]

b. For each of the addressing modes below give one example and one advantage.

i. Register Addressing Mode [2]

ii. Direct Addressing mode [2]

iii. Immediate addressing mode [2]

iv. Index Addressing mode [2]

c. Discuss the machine instruction cycle [10]

**Question 4**

a. Use a well labelled diagram to explain the Von Neumann Architecture [10]

b. Discuss the advantages of using the assembly language [10]

**Question 5**

**a.** What is virtual memory? **[2]**

**b.** Discuss the advantages of virtual memory in computer architecture. **[8]**

**c.** What is a pipelining in Computer architecture **[2]**

**d.** What are the advantages of a pipelining process over a non-pipelining process? **[8]**