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**KABARAK UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**TOWN CAMPUS**

**SECOND SEMESTER, 2020/2021 ACADEMIC YEAR**

**EXAMINATION FOR THE DEGREE OF BACHELOR SCIENCE IN COMPUTER SCIENCE**

**COMP 225 INTE 223 ASSEMBLY LANGUAGE PROGRAMMING**

**STREAM: Y2S1 TIME: 2:00-4:00PM**

**EXAMINATION SESSION: MAY-AUGUST DATE: 23/08/2021**

**INSTRUCTIONS TO CANDIDATES**

1. **Answer Question 1 and any other two questions in the answer booklet provided.**
2. **Do not write on your question papers. All rough work should be done in your answer booklet.**
3. **Clearly indicate which question you are answering.**
4. **Write neatly and legibly.**
5. **Follow all the instructions in the answer booklet**

**SECTION A: (COMPULSORY) TOTAL MARKS FOR THIS SECTION IS 30.**

**1.**

1. Explain any three importance of learning assembly language programs **[3 marks]**
2. What is the difference between PUSHF and PUSHA instructions in 8086. **[2 marks]**
3. Demonstrate how to use AND instruction to clear bits to zero, XOR instruction to invert bits and OR instructions to set bits to ones **[6 marks]**
4. Explain any three differences between a macro and a procedure **[3 marks]**
5. What do square brackets means when they appear in an operand? **[2 marks]**
6. Explain the function of the two special purpose registers in 8086 microprocessor [2 marks]
7. Explain the four fields of any assembly language program [4 marks]
8. Write any four rules of using a MOV instruction with examples in each [4 marks]
9. Explain any two examples of memory addressing modes **[4 marks]**

**SECTION B. TOTAL MARKS FOR THIS SECTION IS 40.**

**ANSWER ANY TWO QUESTIONS FROM THIS SECTION. EACH QUESTION IN THIS SECTION CARRIES 20 MARKS.**

**2.**

1. Computer system is made up of three functional buses parts. Explain them **[3 marks]**
2. Explain the difference between intra-segment and intersegment procedure? **[ [2 marks]**
3. Write a program in 8086 to add two 16-bit values when the resulting value would be larger than 16 bits.  **[4 marks]**
4. What is wrong with the following instructions
   1. ADC AH, AX
   2. MOV 12h, 15h **[4 marks]**
5. Show the syntax for the instructions SBB and SUB. What are the acceptable nature of the operands for the destination and source **[3 marks]**
6. To speed up the processor operations, the processor has a register. Explain the functions of all general purpose registers **[4 marks]**

**3.**

1. Explain with examples XOR and OR instructions **[4 marks]**
2. Write a procedure for a program that will multiply any two signed numbers. Call that procedure to be used within the segment of the program **[4 marks]**
3. Which register addresses the start of the program's machine code in memory **[2 marks]**
4. Explain the difference between operation of SAR and SHR instructions with the use of an examples **[4 marks]**
5. Write an instruction that will transfer the contents of extra segment register to data segment register **[2 marks]**
6. Demonstrate the difference between direct and indirect addressing **[4 marks]**

**4.**

1. Explain any three flag registers with examples of scenarios that can change the status of those registers. **[6 marks]**
2. If the value of AX=44FFh, what is the new value of AX after performing SAR AX, 2 **[4 marks]**
3. Write an assembly language program that subtracts unsigned numbers in DI, SI, and BP from the AX register. Store the difference in register BX **[4 marks]**
4. Write an Assembly language Program to divide a word size unsigned number by a byte size unsigned number. **[4 marks]**
5. Explain the two special purpose registers **[2 marks]**

**5.**

1. How do you deal with the ambiguity of AH as a number and as a register **[2 marks]**
2. Explain the Based Indexed Relative Addressing mode with an example of an instruction **[4 marks]**
3. Create a macro to be used in a program for the addition of any three values contained in any three general purpose registers. Use this macro to implement any two problems **[5 marks]**
4. What is the difference between MOV and MOVS instruction **[2 marks]**
5. Write an assembly language program for 8086 to divides 16 bit unsigned number by a 8bit register **[3 marks]**
6. What is the order of registers when POPA is used **[4 marks]**