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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION - JULY 2024

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| **Semester : 4 & 5** | **Date :2/7/2024** |
| **Course Code :ECE3111** | **Time :1.30 PM to 4.30pm** |
| **Course Name : Microprocessor and Microcontroller ( D-IV)** | **Max Marks :100** |
| **Program :B.Tech** | **Weightage :50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 2M=10M** | | | |
| 1 | The number of address lines (A0 to AN−1) depends on the number of locations it contains. How many address lines and data lines are required for the memory chip of memory 32K×8? | (CO 1) | [Knowledge] |
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| 2 | Assume the professor is teaching in class and an outsider knocks on the door to interrupt him. The professor has two options. The first is to go to the door and address the problem of that person before returning to teaching from where he paused. The second option is for the professor to ignore the outsider and continue teaching in class. There are two input Interrupt pins based on this concept: INTR and NMI. Which Interrupt pin corresponds to which of the options given? | (CO1) | [Knowledge] |
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| 3 | Just like indexing in any book helps a reader to identify topics faster there is a concept of segmentation in the memory chip of 8086. What is meant by memory segmentation? Write the advantages of memory segmentation. | (CO1) | [Knowledge] |
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| 4 | In an 8086 microprocessor, there are a few instructions that are used exclusively for logical operations. Among those are NEG instruction. Describe the function of the NEG instruction. | (CO1) | [Knowledge] |
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| 5 | A multi-function pinout is when two or more features are integrated into one pin. There are a few multifunctional pins in 8086 microprocessors, Explain the functions of the following pins in microprocessor.  1.AD0-AD15  2.M/IO  3.INTR  4.ALE  5.MN/MX | (CO1) | [Knowledge] |
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| 6 | Every instruction has a distinct operation in the microcontroller. Mention the difference between MOV and MOVC instruction of the 8051 microcontrollers. How MOVX is different from the above two instructions? | (CO1) | [Knowledge] |
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| 7 | Explain the instruction “LOOP” in 8086 microprocessor. How this instruction is related to the instruction “DJNZ operand, label” in 8051 microcontroller? What is the alternative of LOOP instruction in 8086? | (CO1) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 8 | The microprocessor is an important part of Computer Architecture. It is a programmable device that takes in input, and performs some arithmetic and logic operations over it to produce a desired output. The Intel 8086 is widely used in many applications. Sketch the internal architecture of 8086 Microprocessor and explain the role of all its parts. | (CO1) | [COMPREHENSION] |
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| 9 | The memory chip for the 8086 microprocessor is divided into various segments such as CS, DS, SS, and ES so that code and data can be stored separately. Given that the DS contains 7FA2h and the offset address is 438Eh, then calculate the following  addresses giving an appropriate explanation for each.  1. Physical Address  2. Lower Range address in the Data Segment  3. Upper Range address in the Data Segment  4. Logical address | (CO2) | [COMPREHENSION] |
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| 10 | There are various classifications of instruction such as data transfer, arithmetic & logic, shift & rotate, etc. in 8086. Write a program to add two 8-bit numbers. | (CO2) | [COMPREHENSION] |
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| 11 | A program is a set of instructions that can be executed by a processor to do a specific task. Write an ALP to multiply the First five natural Numbers without using MUL or IMUL instruction. | (CO2) | [COMPREHENSION] |
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| 12 | The microcontroller and microprocessors are unique in its own way. There are a few features that are available to a icrocontroller that are missing in the microprocessor. Recall at least four features that are specific to the microcontroller. | (CO3) | [COMPREHENSION] |
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| 13 | The way in which operands are specified in an assembly language instruction is called its addressing mode. Explain all the addressing modes of 8086 with an example. | (CO2) | [COMPREHENSION] |
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| 14 | For any microcontroller to work effectively, there are few criteria that are to be met. State all the criteria that are required to choose an effective microcontroller. | (CO3) | [COMPREHENSION] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** | | | |
| 14 | It is possible to modify the contents of the flag register using instructions that are available with the 8051 microcontroller. Name the instructions that are used to set / clear the interrupt flag and carry flag. Also, explain how to switch between different register banks in RAM of 8051. | (CO3) | [APPLICATION] |
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| 15 | An address decoder is a combinational logic circuit, whose purpose is to examine the address and raise an select signal in order to access the memory.Design an address decoder using OR logic for 8Kx8 RAM. Find the address space of this memory chip. | (CO2) | [APPLICATION] |
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| 16 | a.Write an assembly language program in 8086 microprocessor to sort a given array of n numbers using Selection Sort.  Assumptions – The number of elements in the array is stored at offset 500. The array starts from offset 501.                                     10M  b.Write an ALP to transfer a block of 5 bytes of data from one Memory location to another memory location in 8051 microcontroller. Assume the starting address of source is 50H and starting address of destination is 60H. 10M | (CO3) | [APPLICATION] |
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