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INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

| MODEL QUESTION PAPER –I |

B.Tech VI Semester End Examinations, May -2020
Regulation: R16
MICROPROCESSOR AND MICROCONTROLLERS
(ECE)

Time: 3 Hours   **Max Marks: 70**

Answer any ONE question from each Unit
All questions carry equal marks
All parts of the question must be answered in one place only

UNIT – I

1 a) Differentiate between the 8085 & 8086 processors. Draw and explain in detail about the   [7M]
8086 architecture and explain about the functional blocks.

   b) Explain about pre-fetch Queue and Flag register of 8086. What is the prefetch Queue   [7M]
length and why it is limited to that length.

2 a) Discuss in detail about the following instructions of 8086 microprocessor,   [7M]
      i. XLAT
      ii. CWD
      iii. CMP
      iv. XCHG

   b) Define Assembler Directive? Explain about the following Assembler Directives of 8086   [7M]
microprocessor.
      i. ORG
      ii. SEG
      iii. SEGMENT
      iv. EXTERN

UNIT – II

3 a) Explain about Memory interfacing to 8086. Interface 64KB RAM and 32KB ROM to 8086   [7M]
Microprocessor.

   b) Write an Assembly level program for given numbers arrange in Ascending Order by using   [7M]
string manipulation instructions.

4 a) Write an Assembly level Program for given string in reverse Order by using string   [7M]
manipulation instructions.

   b) Discuss in detail about data transfer methods exist in 8086? Draw the functional block   [7M]
diagram of 8257 DMA in detail.

UNIT – III

5 a) Define interrupt? How to handle the interrupts in 8086 and Explain about Interrupt Service Routine. [7M]

   b) Define Interrupt Vector table and draw and explain the functioning of Interrupt Vector table for 8086 Microprocessor. [7M]

6 a) Write an ALP for stepper Motor to rotate in Clockwise direction   and Anti clock wise direction for 200 rotations. [7M]

   b) Explain about operating modes of Programmable Interrupt Controller? Discuss difference between Master mode and Slave mode. [7M]

UNIT – IV

7 a) Draw the pin diagram of 8051 microcontroller and explain the function of each pin in detail. Explain the different features of 8051 microcontroller in detail. [7M]

   b) Draw the internal architecture of 8051 Microcontroller and explain its operation Draw the PSW and TCON registers of 8051 microcontroller. [7M]

8 a) Give the specifications of interfacing bus? Explain in detail about high speed bus with an example? List the register set of 8051 Microcontroller with examples? Draw the SCON register frame format and explain it. [7M]

   b) Generate a program in 8051 to count number of zero bits available in a byte available in external RAM at 1000h. Store zero bit count in internal RAM location 60H. [7M]

UNIT – V

9 a) Explain the interrupt structure of 8051 microcontroller with suitable diagrams Explain the hard ware interrupts of 8051 microcontroller with examples. [7M]

   b) Draw the circuit diagram to interface a keyboard with microcontroller and explain how microcontroller recognizes the key-press [7M]

10 a) What is timer/counter in 8051 microcontroller? Explain the 16-bit timer mode and 8-bit auto-reload mode of 8051 microcontroller. [7M]

   b) List out the difference between microprocessor and microcontroller. List out the different instruction set of 8051 microcontroller and explain with examples [7M]

I. COURSE OBJECTIVES
The course should enable the students to

I	Introduce the basic concepts of microprocessors and to develop in students the assembly language programming skills and real time applications of Microprocessors.
II	Understand the concept of microprocessor and familiarize the architecture of 8085and 8086 processor.
III	Develop the knowledge of microprocessor based systems and interfacing techniques.
IV	Understand the basic concept of advanced processor architectures.
V	Impart the basic concepts of serial and parallel bus standards.
VI	Understand the basic concept of advanced processor architectures.

II. COURSE OUTCOMES (COs):

CO 1	Acquire knowledge about architecture and functional features of microprocessors particularly 8086
CO 2	Obtain an insight in to the instruction set of 8086 and write programs in assembly level language
CO 3	Interface different types of external peripherals like 8255,8259,8279, 8251 &8257 with 8086
CO 4	Imbibe knowledge about hardware details of 8051 microcontrollers and develop assembly language programs for data transfer, arithmetic, logical and branch instructions.
CO 5	Design simple systems using timers, interrupts, memories ADC and DACs etc. using 8051.

III. COURSE OUTCOMES

AEC013.01	Understand the internal Architecture and different modes of operation of popular 8086 microprocessors.
AEC013.02	Basic understanding of 8085 and 8086 microprocessors architectures and its functionalities.
AEC013.03	An ability to distinguish between RISC and CISC based microprocessors.
AEC013.04	Understand the importance of addressing modes and the instruction set of the processor which is used for programming.
AEC013.05	Understand and apply the fundamentals of assembly level programming of microprocessors.
AEC013.06	Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP.
AEC013.07	Ability to interface the external peripherals and I/O devices and program the 8086 microprocessor using 8255.
AEC013.08	Understand the memory organization and interrupts of processors helps in various system designing aspects.
AEC013.09	Identify the significance of serial communication in8086 with required baud rate
AEC013.10	An ability to distinguish between the serial and parallel data transfer schemes.
AEC013.11	Identify the significance of interrupts and interrupt service routines with appropriate illustrations.
AEC013.12	Develop the interfacing of universal synchronous asynchronous receiver transmitter 8251 with 8086 processor
AEC013.13	Ability to interface the programmable interrupt controller 8259 with 8086.
AEC013.14	Understand the internal Architecture and different modes of operation of popular 8051 microcontrollers.
AEC013.15	Basic understanding of 8051 microcontrollers functionalities.
AEC013.16	Understand the different addressing modes used in assembly language programming of microcontrollers.

AEC013.17	Write programs for arithmetic and logical computations using 8051 instruction sets.
AEC013.18	Construct, and develop of required delay circuits using timers of 8051 in the laboratory.
AEC013.19	Interfacing of physical elements using Digital and analog converters with microcontrollers.
AEC013.20	Assess and interface required memory to microcontrollers with appropriate memory mapping.
AEC013.21	Apply concept of microprocessors and microcontrollers to understand and analyze real time applications.
AEC013.22	Acquire the knowledge and develop capability to succeed national and international level competitive examinations.

IV. MAPPING OF SEMESTER END EXAMINATION TO COURSE LEARNING OUTCOMES

SEE Question No.			Course Outcomes	CO	Blooms Taxonomy Level
1	a	AEC013.02	Basic understanding of 8085 and 8086 microprocessors architectures and its functionalities.	CO1	Understand
	b	AEC013.02	Basic understanding of 8085 and 8086 microprocessors architectures and its functionalities.	CO1	Understand
2	a	AEC013.05	Understand and apply the fundamentals of assembly level programming of microprocessors.	CO1	Understand
	b	AEC013.05	Understand and apply the fundamentals of assembly level programming of microprocessors.	CO1	Understand
3	a	AEC013.05	Understand and apply the fundamentals of assembly level programming of microprocessors.	CO2	Remember
	b	AEC013.05	Understand and apply the fundamentals of assembly level programming of microprocessors.	CO2	Understand
4	a	AEC013.08	Understand the memory organization and interrupts of processors helps in various system designing aspects.	CO2	Remember
	b	AEC013.07	Ability to interface the external peripherals and I/O devices and program the 8086 microprocessor.	CO2	Remember
5	a	AEC013.08	Understand the memory organization and interrupts of processors helps in various system designing aspects.	CO3	Remember
	b	AEC013.08	Understand the memory organization and interrupts of processors helps in various system designing aspects.	CO3	Understand
6	a	AEC013.07	Ability to interface the external peripherals and I/O devices and program the 8086 microprocessor.	CO3	Remember
	b	AEC013.14	Ability to interface the Programmable interrupt controller(PIC) 8259 with 8086.	CO3	Remember
7	a	AEC013.14	Understand the internal Architecture and different modes of operation of popular 8051 microcontrollers.	CO4	Understand
	b	AEC013.17	Write programs for arithmetic and logical computations using 8051 instruction sets.	CO4	Remember
8	a	AEC013.14	Understand the internal Architecture and different modes of operation of popular 8051 microcontrollers.	CO4	Remember
	b	AEC013.20	Assess and interface required memory to microcontrollers with appropriate memory mapping.	CO4	Understand
9	a	AEC013.14	Understand the internal Architecture and different modes of operation of popular 8051 microcontrollers.	CO5	Understand
	b	AEC013.21	Apply concept of microprocessors and microcontrollers to understand and analyze real time applications.	CO5	Understand

				CO5	Understand
10	a	AEC013.18	Construct, and develop of required delay circuits using timers of 8051 in the laboratory.	CO5	Understand
	b	AEC013.14	Understand the internal Architecture and different modes of operation of popular 8051 microcontrollers.	CO5	Understand

Students, who complete the course, will have demonstrated the ability to do the following:

Course Coordinator   **HOD,ECE**