**UNIT I: - Introduction to 8086 microprocessor**

**1 Mark Questions**

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| 1) What is the maximum memory size that can be addressed by 8086? 1Mb  2) What is the total I/O address space used by 8086 if I/O mapped addressing is used?  3) What is the function of Direction Flag?  To access data from higher to lower or  To access data from lower to higher  4) How many data lines and address lines are available for 8086?  16 data lines and 20 address lines  5) What is the maximum allowable size of a memory segment in 8086?  64kb  6) What is the size of Instruction queue in 8086 µp?6 bytes  7) The Interrupt Pointer of type 255 interrupt is located at \_\_\_\_3FC\_\_\_ (255\*4 in hexa decimal)\_\_ memory location.  8) The interrupt for which the processor has highest priority among all the external interrupts is \_\_\_ a) keyboard interrupt b) TRAP c) NMI d) INT  9) What is the effective address of data in the following instruction  MOV AL, [1200H] ?  Ans:1200H  10) What do you mean by pipelining in 8086?  Executing the no of instructions simulationsously and reduce delay between instructions.  11) What is the function of ADDER or SUMMER circuit in 8086 Architecture?  Provide 20 bit physical address.  12) Represent -15 in binary and Hexadecimal.  Hexadecimal:FFFFFFF1  Binary:11110001  13) Total number of interrupts possible in 8086 are \_\_256\_\_?  14) Whenever we try to divide a number by zero in 8086, then 8086 executes \_type0\_\_\_ type interrupt?  15) What is an Interrupt Vector table?  16) The INTR signal can be masked by resetting the \_\_\_\_\_\_ a) TRAP flag b) INTERRUPT flag c) MASK flag d) DIRECTION flag  17) The Interrupt Vector table is located from \_\_0000H\_\_\_\_\_ to \_\_\_\_03FFH\_\_\_\_\_\_\_\_ for 8086 system?  18) What are the status/conditional flags present in 8086 flag register? 6  19) What is the instruction at the end of any ISR  a) END b) ENDS c) IRET d) INTR  20) What sequence is followed by the 8086 stack?  a) first-in-first-out b) last-in-first-out c) last-in-last-out d) none of above | MID-1 |

**2 Mark Questions**

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| 1) What are the functions of bus interface unit (BIU) in 8086?  2) What are the functions of Execution unit in 8086?  3) What is the content of AL register after executing the program given below?  MOV AL, 10H  MOV BL, 20H  SUB AL, BL  INT 03  4) How many times the loop is executed in the following program  CLC  MOV CX, 0005H  UP: NOP  DEC CX  JC UP  INT 03  5) What are the different sources of 8086 interrupts? NMI and INTR  6) What is the difference between JMP and CALL instruction?  JMP is unconditional branching Instruction move from one location to another location without checking any condition.  CALL is also unconditional branching Instruction used to call procedure or sub program or function into main memory.  7) What are the Contents of Register AX and Zero Flag after executing the following program?  MOV AX, 1234H  MOV BX, 1234H  CMP AX, BX  INT 03  8) Draw 8086 flag register format?  U U U U OV DF IF TF SF ZF U AC U PF CY  9) What is the Content of AH after executing each Program?  a)  MOV AH, 00H  MOV AL, 0FFH  INC AL  INT 03 00  b)  MOV AH, 00H  MOV AL, 0FFH  INC AX  INT 03 01  10) What are the contents of BL and CL registers after executing the program given below?  MOV BL, 00H  MOV CH, 00H  MOV CL, 06H  UP: INC BL  LOOP UP  INT 03 | MID-1 |

**5 marks questions**

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| 1) Write an ALP to add any two multi-byte numbers.  2) Write an ALP to find the largest number from a given series of 8 numbers.  3 Draw the flag register format of the 8086 and discuss the conditions which can cause set or reset of the flags.  4) Write an ALP to find arithmetic mean of given 6 numbers.  5) Explain CMPSB and MOVSB instructions with examples.  6) Explain the process of physical address formation in 8086 microprocessor with an example.  7) Explain the different logical instructions supported by 8086 in detail.  8) Explain the different Arithmetic instructions supported by 8086 in detail.  9) Explain the different String instructions supported by 8086 in detail.  10) Explain Intra and inter segment Calls in 8086 with examples. | MID-1 |

**10 marks questions**

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| 1) Draw the register organization of 8086 and explain typical application of each register.  2) Explain different addressing modes of 8086 microprocessor with examples.  3) Draw and discuss the internal architecture of 8086 microprocessor.  4) Draw the Interrupt vector Table and explain different interrupts of 8086 microprocessor. 5) a)What is memory segmentation and explain different segments in 8086 microprocessor.b) Write an ALP to perform memory to memory transfer of 100 bytes using string instructions. | MID-1 |

**UNIT II: - Hardware features of 8086**

**1 Mark Questions**

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| 1) 8086 microprocessor IC has \_\_\_\_\_\_\_ no. of pins.  2) Status lines S4S3=11, indicates \_\_\_\_\_\_\_\_\_\_\_ segment register is being used for data accessing.  3) When =1, A0=0 then which data lines of 8086 will become active?  4) Which signal of 8086 when it is active, indicates that the processor is performing memory read cycle.  5) What happens if the logic level on READY pin is equal to zero while 8086 is accessing memory?  6) 8086 Interrupt Request signal is a \_\_\_\_ triggered input.  7) 8086 NMI signal is a \_\_\_\_ triggered input.  8) If the signal on input is High then what happens to 8086 microprocessor operation.  9) When 8086 receives RESET signal then it restarts Execution from \_\_\_\_\_ address.  10) If the logic level on MN/ pin is LOW, then processor enters into \_\_\_\_\_ mode.  11) If the logic level on M/ is Low then it indicates the CPU is having \_\_\_\_\_ operation.  12) Memory write operation of 8086 is indicated by which control signal(s) in 8086?  13) The availability of the valid address on the multiplexed lines is indicated by which signal of 8086?  14) What are the DMA signals available for 8086 when it is in minimum mode?  15) When the logic level on status signals,, =001 then what is the status of 8086?  16) Which logic levels on queue status signals indicate that the instruction queue is empty.  17) \_\_\_\_ Pin of 8086 indicates that other system bus master will be prevented from gaining the system bus when it is low.  18) By using Absolute Address Decoding Method each and every I/O device or a memory location can have \_\_\_\_ addresses.  19) When the unused memory addresses are used for addressing I/O devices, then Such I/O devices are called \_\_\_\_\_ mapped I/O devices.  20) A 4K x 8 memory contains \_\_\_\_ memory locations, where each location contains \_\_\_ bits of data. | MID-2 |

**2 Mark Questions**

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| 1) Explain the function of the Pins and A0  2) Explain the function of NMI and INTR pins?  3) What are the contents of CPU Registers after RESET?  4) Explain the function of the pin MN/  5) Explain the function of the Pins HOLD , HLDA  6) Explain the function of the Pins ,, .  7) Explain the function of the Pins QS0, QS1.  8) Explain the function of the Pin M/.  9) Explain the function of the Pins S4 and S3  10) How many address and data lines are present for a Memory IC of size 4096x4 bits. | MID-2 |

**5 marks questions**

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| 1) Explain about multiplexed ADD/DATA and ADD/STATUS buses in 8086.  2) Draw the timing diagram for Memory read operation in minimum mode.  3) Draw the timing diagram for Memory write operation in minimum mode.  4) Explain the function of following pins: ALE, READY, RESET  5) Explain the different pins that are used only in maximum mode of 8086.  6) Explain the different pins that are used only in minimum mode of 8086.  7) Draw the timing diagram for Memory write operation in maximum mode.  8) Draw the timing diagram for Memory read operation in maximum mode.  9) Draw the timing diagram for Memory read operation in minimum mode with one wait state.  10) Draw the timing diagram for Memory write operation in minimum mode with one wait state. | MID-2  MID-2 |

**10 marks questions**

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| 1) Design an interface between 8086 CPU and two chips of 16K X 8 EPROM and two chips of 32K X 8 RAM. Select the starting address of EPROM suitably. The RAM address must start at 00000H.  2) Draw the minimum mode configuration of 8086 and explain its read cycle operation.  3) Draw the maximum mode configuration of 8086 and explain its read cycle operation.  4) Explain the function of all the pins of 8086 Processor with a neat pin diagram.  5) Explain the physical memory organization in an 8086 system with examples. | MID-2 |

**UNIT III: - I/O Interfacing**

**1 Mark Questions**

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| 1. USART stands for \_\_\_\_\_\_\_\_\_\_\_ 2. When both the data-out buffer register and the transmit shift register are empty the TxEMPTY output of the 8251A will be\_\_\_ level. 3. Which of the following is not a mode of data transmission? a) simplex b) full duplex c) semi duplex d) half duplex 4. If the data transmission takes place in either direction, but at a time data may be transmitted only in one direction then, it is of a) simplex mode b) full duplex mode c) semi duplex mode d) half duplex mode 5. In 8251A, the pin that controls the rate at which the character is to be transmitted is a) TXC(active low) b) TXC(active high) c) TXD(active low) d) RXC(active low) 6. TXD(Transmitted Data Output) pin carries serial stream of the transmitted data bits along with a) start bit b) stop bit c) parity bit d) all of the mentioned 7. The signal that may be used either to interrupt the CPU or polled by the CPU is a) TXRDY(Transmitter ready) b) DTR(active low) c) DSR(active low) d) none of the above 8. Which port of 8255 can be used as two independent data ports in mode-0? 9. Which ports of 8255 can be operated in mode-2 as data ports? 10. What are the different I/O modes in which 8255 can operate? 11. Reading the contents of \_\_\_\_Port of 8255 allows the programmer to test or verify the “status” of each peripheral device. 12. When non-specific EOI command is issued to 8259A it will automatically a) set the ISR b) reset the ISR c) set the INTR d) reset the INTR 13. In the application where all the interrupting devices are of equal priority, the mode used is a) automatic rotation b) automatic EOI mode c) specific rotation d) EOI 14. The \_\_\_ register in 8259 records the requests currently being serviced. 15. Give the different types of command words used in 8259A? 16. In 8259 the register that stores all the interrupt requests in it in order to serve them one by one on priority basis is a) Interrupt Request Register b) In-Service Register   c) Priority resolver d) Interrupt Mask Register  17) In 8259 the register that stores the bits required to mask the interrupt inputs is a) In-service register b) Priority resolver c) Interrupt Mask register d) none  18) In cascaded mode, the maximum number of vectored interrupts provided by 8259A is a) 4 b) 8 c) 16 d) 64  19) What is meant by frame error in 8251?  20) What is hunt mode in 8251? | MID-2 |

**2 Mark Questions**

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| 1. What is parity error in 8251? 2. What is over run error in 8251? 3. What is AEOI mode in 8259? 4. What is Rotating priority mode in 8259? 5. Explain TXE pin in 8251. 6. Draw BSR format of 8255. 7. In 8259 Cascading mode, how to identify Master and Slave? 8. Explain how to mask any IR pins in 8259. 9. What is the control word to operate 8255 in mode-0 with Port A and CLower as input ports, remaining ports as output ports? 10. Explain Framing Error in 8251. | MID-2 |

**5 marks questions**

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| 1) What are the different modes of serial data transmission?  2) Compare I/O mapped I/O and memory mapped I/O.  3) Draw the CWR format of 8255 for BSR and IO modes.  4) Explain the interrupt structure of 8086.  5) Draw 8251 command word register format.  6) Explain the following terms  i) Simplex, Half-Duplex and Full Duplex ii) Framing Error  7) Draw 8251 Mode Instruction Control Word format.  8) Interface a DAC 0800 to 8086 through 8255 PPI. And also generate the Triangular wave.  9) Interface a DAC 0800 to 8086 through 8255 PPI. And also generate the Square wave.  10)Draw the format for OCW-2 of 8259 | MID-2 |

**10 marks questions**

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| 1. Draw the block diagram of 8255 and explain the function of each block.  2. Explain the basic architecture of 8259 Programmable Interrupt Controller (PIC) with the aid of a block diagram and explain its functioning.  3. What are the different operating modes of 8259 PIC and explain them?    4. Explain the basic architecture of 8251 USART module with the aid of a block diagram and explain its functioning.  5. Explain different IO modes of operation of 8255 Programmable Peripheral Interface (PPI). | MID-2 |

**UNIT IV:- Introduction to 8051 Microcontroller**

**1 Mark Questions**

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| 1) List the different addressing modes of 8051?  2) When the micro controller executes some arithmetic operations, then the flag bits of which register are affected?  a) PSW b) SP c) DPTR d) PC  3) 8051 series has how many 16 bit registers?  a) 2 b) 3 c) 1 d) 0  4. When 8051 wakes up then 0×00 is loaded to which register?  a) DPTR b) SP c) PC d) PSW  5) Give the alternate functions for the port-3 pins in 8051?  6) The mnemonic used to perform a subtraction of source with an 8-bit data and jumps to specified relative address if subtraction is non-zero is  a) DJNZ b) CJNE c) JZ d) JNC  7) Which of the following is not an unconditional control transfer instruction?  a) JMP b) RET c) JNC d) CALL  8) Which of the following is an 8-bit register?  a) PSW (Program Status Word) b) TCON (Timer Control Register)  c) Accumulator d) all of the mentioned  9) The register that is used for accessing external data memory is  a) DPH b) DPL c) DPTR d) NONE  10) If RS1=1, RS0=0, then the register bank selected is  a) register bank 0 b) register bank 1 c) register bank 2 d) register bank 3  11) The number of bytes stored on the stack during one operation of PUSH is  a) 1 b) 2 c) 3 d) 4  12) The 8051 stack is  a) auto-decrement during PUSH operations b) auto-increment during POP operations  c) auto-decrement during POP operations d) auto-increment during PUSH operations  13.On power up, the 8051 uses which RAM locations for register R0- R7   a) 00-2FH b) 00-07H c) 00-7FH d) 00-0FH  14. How many bytes of bit addressable memory is present in 8051 based micro controllers?  a) 8 bytes b) 32 bytes c) 16 bytes d) 128 bytes  15) How is the status of the carry, auxiliary carry and parity flag affected if write instruction  MOV A,#9C  ADD A,#64H  a) CY=1, AC=0, P=0 b) CY=1, AC=1, P=0  c) CY=0, AC=1, P=0 d) CY=1, AC=1, P=1  note :the result contains even no of 1’s--🡪zero  16) The instruction, RL A performs  a) rotation of address register to left b) rotation of accumulator to left  c) rotation of address register to right d) rotation of accumulator to right  17) The instruction, ADD A, #100 performs  a) 100(decimal) is added to contents of address register  b) 100(Hexa decimal) is added to contents of accumulator  c) 100(decimal) is added to contents of accumulator  d) none  18) If the most significant bit of relative address byte is 1, then the short jump instruction is  a) forward jump b) back jump c) either forward or back jump d) none  19) The logical instruction that affect the carry flag during its execution is  a) XRL A b) ANL A c) ORL A d) RLC A  20) The instruction that is used to complement or invert the bit of a bit addressable SFR is  a) CLR C b) CPL C c) CPL Bit d) ANL Bit | MID-3 |

**2 Mark Questions**

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| 1. What is the difference between RET and RETI in 8051.  2. Explain Register Indirect Addressing mode of 8051.  3. Explain Direct Addressing mode of 8051.  4. Write a program to select register bank-2 in 8051.  Psw.4 and psw.3  5. In 8051 the lower 128 bytes of data RAM are accessed by \_\_\_\_Indirect\_\_\_\_\_\_\_\_\_\_\_   addressing mode and the SFRs are accessed by \_\_\_\_direct\_\_\_\_\_\_\_\_\_ addressing mode.  6. Explain DIV AB instruction in 8051.  7. What are the status/conditional flags available in 8051?  P,ov,ac,cy  8. Write any four features of 8051.  9. Define Program counter.  10. Explain the function of the RST Pin . | MID-3 |

**5 marks questions**

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| 1. List differences between Microprocessors and Microcontrollers.  2. Draw and explain PSW register of 8051.  3. Draw the internal RAM organization of 8051.  4. Explain five Logical operation instructions in 8051 with one example for each.  5. Explain five Program branching instructions in 8051 with one example for each.  6. Write an ALP for 8051 to find largest number from given series of numbers.  7. Explain five data transfer instructions in 8051 with one example for each.  8. Explain five Arithmetic instructions in 8051 with one example for each.  9. Put the number 34H in registers R5, R6 and R7 using at least three different methods?  10. Write a program to multiply the data in RAM location 22h by the data in RAM location 15h; Put the result in RAM location 19h (low byte) and 1A h (high byte). | MID-3 |

**10 marks questions**

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| 1. Draw and explain the internal architecture of Micro-Controller 8051.  2. Explain the addressing modes of 8051 microcontroller with suitable examples.  3. Draw the pin diagram of 8051 Microcontroller and explain the function of each pin.  4. a) What are the different Bit level logical instructions? Explain them with examples?  b) Write a program in assembly language that accepts a number in register and   complement least significant bit without affecting other bits in the register?  5. Describe the internal and external memory organization of 8051 microcontroller. | MID-3 |

**UNIT V:- 8051 Microcontroller Hardware**

**1 Mark Questions**

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| 1. What is the default priority order of the interrupts in 8051? 2. What are the different modes of serial communication?   Asynchronous and synchrouns   1. The 8051 has \_\_\_\_4\_\_\_\_ parallel I/O ports. 2. How much total external data memory that can be interfaced to the 8051?   64kb   1. When an 8-bit timer overflow happens if the initial value of timer is 00000000? 2. What is the name of mode when Serial Port is set in Mode 2?8 bit auto reload 3. What is the name the Special Function Register used for setting priorities for Interrupts? IP 4. What is the significance of DPTR? Used to external memory access. 5. The 8051 has \_\_\_\_2\_\_\_\_ 16-bit UP counter/timers. 6. The 8051 can handle \_\_\_\_5\_\_\_\_ interrupt sources. 7. An alternate function of port pin P3.4 in the 8051 is \_\_\_timer 0\_\_\_\_\_\_\_. 8. The I/O ports that are used as address and data for external memory are \_\_\_\_port0 and port 2\_\_\_\_\_\_\_\_. 9. List the different modes of Timer/counter in 8051?   13 bit,16 bit,8 auto,16 split   1. What is the significance of C/ bit in TMOD register of 8051? 2. What is the significance of TRx bit in TCON register of 8051?   Trx=1 softwarwe control  Trx=0 hardware control   1. List the Interrupt sources in 8051? 2. How many I/O ports are placed in microcontroller 8051? 3. What is the use of TMOD register in 8051? Genegrate time delay 4. Physically how many SBUF registers are present in 8051? 2 5. The machine cycle in 8051 is made up of \_\_6(s1tos7)\_\_\_ states and each state comprises of \_\_2\_\_ oscillator pulses. | MID-3 |

**2 Mark Questions**

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| 1. What is the significance of pin?   External aceess input   1. What is the significance of pin?   External access data   1. If the Crystal frequency is 16MHz, then the time to execute a one machine cycle instruction is \_\_\_\_\_\_\_\_\_\_ microseconds. 2. When the 8051 accesses external ROM memory? 3. If the crystal frequency is 6MHz, then the timer clock will have frequency of \_\_\_\_\_\_\_\_.   Clock frequency = crystal frequency/2   1. When the bit IE0 in TCON register is set to 1? 2. Explain the significance of GATE bit in TMOD register. 3. Software cotol and hardware contol 4. Explain the significance of SMOD bit in PCON register. 5. For generating Baud frequency which Timer is used and in what mode?   10. Explain how to disable all the interrupts in 8051? | **Mid 3** |

**5 Mark Questions**

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| 1. Explain the structure of TCON Register?  2. Explain the structure of TMOD Register?  3. Explain Mode-1 of Serial Data Transmission?  4. Explain the sequence of steps involved in how 8051 services an interrupt on its occurrence?  5. Explain the structure of IE Register?  6. Explain the significance of IP special function register.  7. Explain the Timer Mode 2 operation in 8051.  8. Draw the Timer/counter control logic diagram.  9. Draw the pin diagram of 8051 and identify all the pins?  10. Draw the Port-0 Pin configuration diagram of 8051. | Mid 3 |

**10 Mark Questions**

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| 1. Explain the interrupt structure of 8051 microcontroller? Explain how interrupts are prioritized?  2. Explain the I/O port structure of 8051?  3. Explain the different serial communication modes in 8051?  4. Explain the function and operating modes of timer in 8051?  5. Draw and explain interfacing of External memory to 8051 with an example? | Mid 3 |