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

**1 Mark Questions**

|  |
| --- |
| 1) List the different addressing modes of 8051?  Immediate, Register, Direct, Register Indirect, Implicit  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) 4** (DPTR, PC, Timer 0, Timer 1) 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?  RXD, TXD , INT0\*, INT1\*, T0,T1, RD\*, WR\*  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  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 |

**2 Mark Questions**

|  |
| --- |
| 1. What is the difference between RET and RETI in 8051.  RET: It is the last instruction in any sub-routine.  RET I: It is the last instruction in any interrupt sub-routine (ISR).  2. Explain Register Indirect Addressing mode of 8051.  Address of data is stored in a register. Eg: **MOV A, @R0 MOV A, @R1**  3. Explain Direct Addressing mode of 8051.   * The **address of the data is directly placed** in the operand field * MOV A, 20H * MOV R1, 70H   4. Write a program to select register bank-2 in 8051.  SETB PSW.4  CLR PSW.3  **SETB RS1 OR**  **CLR RS0**  5. In 8051 the lower 128 bytes of data RAM are accessed by **Direct** addressing mode and the SFRs are accessed by **Direct & Register Indirect** addressing mode.  6. Explain DIV AB instruction in 8051.  Performs **A/B.**  **Quotient** is stored in **‘A’** register and  **Remainder** is stored in **‘B’** register.  7. What are the status/conditional flags available in 8051?  **1. Carry flag, 2. Auxiliary Carry, 3. Overflow flag, 4. Parity**    8. Write any four features of 8051.  It has  1. 8 data lines. 2. 16 Address lines 3. Four I/O ports 4. Two timers 5. One serial port  6. Internal RAM🡪 128 bytes ; can be expandable upto 64KB.  7. Internal ROM🡪 4kB; can be expandable upto 64KB.  9. Define Program counter.  It stores the **address** **of the next instruction** byte to be fetched from program memory.  10. Explain the function of the RST Pin .  It is used to reset the **µC**. It is an active high signal. |

**5 marks questions**

|  |
| --- |
| 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.**  MOV DPTR, #3000H  MOVX A, @DPTR  MOV R0, #’N’  L1: MOV B, A  L3: DJNZ R0, L2  SJMP DOWN  L2: INC DPTR  MOVX A, @DPTR  CJNE A, B, UP  SJMP L3  UP: JC L3  SJMP L1  DOWN: MOV R1, B  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).** |

**10 marks questions**

|  |
| --- |
| 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. |

**UNIT V:- 8051 Microcontroller Hardware**

**1 Mark Questions**

|  |
| --- |
| 1. **What is the default priority order of the interrupts in 8051?**   INT 0\*, T 0\*, INT 1\*, T 1\*, Serial Interrupt   1. **What are the different modes of serial communication?**   Mode 0 : Shift Register Mode  Mode 1 : 8-bit UART  Mode 2 : 9-bit UART  Mode 3 : 9-bit UART   1. **The 8051 has** Four **parallel I/O ports.** 2. **How much total external data memory that can be interfaced to the 8051?** 64kB 3. **When an 8-bit timer overflow happens if the initial value of timer is 00000000?**   After 28 (ie 256) clock cycles   1. **What is the name of mode when Serial Port is set in Mode 2?**   9-bit UART: Fixed Baud Rate   1. **What is the name the Special Function Register used for setting priorities for Interrupts?**   **IP**: Interrupt Priority register   1. **What is the significance of DPTR?**   It is used for accessing data from external data memory.   1. **The 8051 has** two **16-bit UP counter/timers.** 2. **The 8051 can handle 6 interrupt sources.** 3. **An alternate function of port pin P3.4 in the 8051 is** timer 0**.** 4. **The I/O ports that are used as address and data for external memory are**   Port 0 and Port 2   1. **List the different modes of Timer/counter in 8051?**    1. **Mode 0 : 13-bit Timer Mode**    2. **Mode 1 : 16-bit Timer Mode**    3. **Mode 2 : 8-bit Auto Reload Mode**    4. **Mode 3 : Split timer Mode.** 2. **What is the significance of C/ bit in TMOD register of 8051?**   To select counter or timer operation.  If : for counter operation.  If : for timer operation   1. **What is the significance of TRx bit in TCON register of 8051?**   TR x : Timer x run control bit; to set the timer x, as ON/OFF   1. **List the Interrupt sources in 8051?**   INT 0\*, T 0\*, INT 1\*, T 1\*, Serial Interrupt   1. **How many I/O ports are placed in microcontroller 8051?**   4   1. **What is the use of TMOD register in 8051?**   Used to set the various timer operational modes  Mode 0 : 13-bit Timer Mode  Mode 1 : 16-bit Timer Mode  Mode 2 : 8-bit Auto Reload Mode  Mode 3 : Split timer Mode.   1. **Physically how many SBUF registers are present in 8051?**   Two registers:  Transmit SBUF  Receive SBUF   1. **The machine cycle in 8051 is made up of 6 states and each state comprises of 2 oscillator pulses.** |

**2 Mark Questions**

|  |
| --- |
| 1. **What is the significance of pin?** 2. **What is the significance of pin?** 3. **If the Crystal frequency is 16MHz, then the time to execute a one machine cycle instruction is \_\_\_\_\_\_\_\_\_\_ microseconds.** 4. **When the 8051 accesses external ROM memory?** 5. **If the crystal frequency is 6MHz, then the timer clock will have frequency of \_\_\_\_\_\_\_\_.** 6. **When the bit IE0 in TCON register is set to 1?** 7. **Explain the significance of GATE bit in TMOD register.** 8. **Explain the significance of SMOD bit in PCON register.** 9. **For generating Baud frequency which Timer is used and in what mode?**   **10. Explain how to disable all the interrupts in 8051?** |

**5 Mark Questions**

|  |
| --- |
| **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.** |

**10 Mark Questions**

|  |
| --- |
| **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?** |