

## **Model Question paper of Microcontroller for electronics and communication**

Microcontrollers: As name suggest is a single baby computer on a single integrated circuit containing various other elements.

BRANCH: ECE

TIME : 3 Hrs.

NOTE: All the questions of Section-A is compulsory and from Section-B any 5.

### **SECTION-A**

#### **SHORT QUESTIONS: ( each 2 marks)**

##### **1. What do you mean by the term embedded controllers ?**

Ans: The devices that has all the functional blocks on chip, including the program and data memory andthere is no external data/address bus provided. For example, ATMEL89C2051.

##### **2. Discuss the advantages of microcontrollers over microprocessors in control applications?**

Ans: The first main advantage is that the ALUs can be assembled together horizontally to form computers that can handle very large data at a time. Another advantage is bit slice design that makes use of possible bipolar chip technology that is very fast.

##### **3. What are RISC and CISC processors?**

Ans: RISC chips requires lesser hardware implementations, which makes them simpler to design and hence lesser costs of production.

##### **4. Discuss the criteria for selecting a microcontroller device.**

Ans: It must have ram and rom to support its inbuilt functions. It must have +5v supply, must be fast and should have programmable and data memory.

##### **5. List few features of 8051 microcontroller?**

Ans: - Operating frequency is 12mhz, separate 64k program and 64k data memory, multiply and divide instructions  
has a boolean processor

### **6. Discuss the advantages and disadvantages of Harvard and Von Neuman architectures.**

Ans: Harvard architecture uses separate memories for program and data memory whereas Von Neuman uses same program and data memory. Therefore Harvard is faster compared to other one.

### **7. What is the purpose of ALU ?**

Ans: ALU performs arithmetic and logical operation on 8- bit operands. Accumulator is the register which gets the output of the ALU in most of the arithmetic and logical operations.

### **8. Name 2 register that consists of 16 bit.**

Ans: Program counter and Data pointer

### **9. Name few general purpose registers**

Ans: Accumulator, B-register, R0- R7

### **10. What are SFR?**

Ans: The 128 bytes of on-chip additional RAM locations from 80H to 0FFH are reserved for the special functions and therefore these are called as special function register.

## **SECTION-B**

### **LONG QUESTIONS: (each 10 marks)**

#### **1. List all the registers used in 8051 microcontroller in brief.**

ans: **General purpose register:** Accumulator, B-registers and four register banks may be used as general purpose registers.

**Accumulator:** Similar to any microprocessor like 8085 , MCS-51 has an 8- bit accumulator. Accumulator is used by all the arithmetic and logical instructions.

**B-register:** B- register is an 8- bit wide register. It is available as general- purpose register when it is not being used by multiplication and division operations.

**Registers R0 to R7:** These eight registers are used as scratch pad registers. There are four registers banks each containing R0 to R7 registers.

**Stack pointer:** Stack pointer of 8051 is a 8 bit wide. It is incremented during push or call operation and is decremented during pop or return operation.

**Special function register:** The 128 bytes of on-chip additional RAM locations from 80H to 0FFH are reserved for the special functions and therefore these are called as special function register.

**Program Status Word:** PSW is an 8 bit register . It consists of auxillary flag, overflow flag, parity flag.

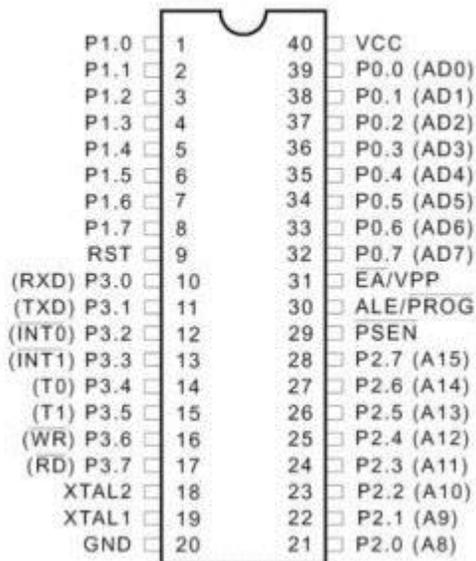
**DPTR (Data pointer):** It is 16 bit register consisting of two types DPH and DPL . One with data pointer high and other data pointer low.

**Timer register:** Register pairs th0 , tl0, th1, tl1.

**Control registers:** TCON, TMOD, IE,IP, SCON, PCON contain the control and status for interrupts, serialy and timer/ counters.

**Capture register::** RCAP2H - RCAP2L are the capture registers.

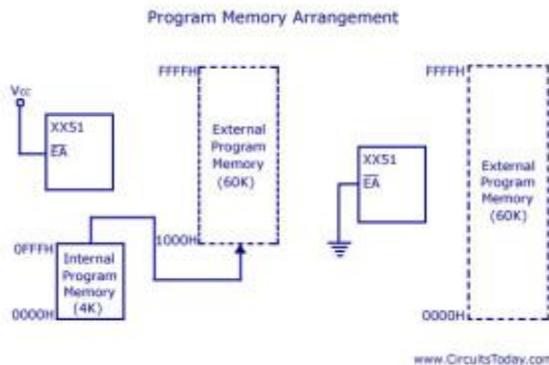
## 2. Draw the pin diagram of 8051 microcontroller.



*Pin diagram of microcontroller*

ans:

### 3. Draw the memory organisation of mcs - 51.



ans:

### 4. What are all addressing modes of mcs-51?

ans: There are five addressing modes in 8051 which are as follows:-

**1. Register Addressing:** In this registers r0 to r7 from the selected register bank, accumulator, b- register, carry bit and dptr are used.

**2. Direct Addressing:** In this, direct address of the operand is specified in the instruction itself . Direct addressing mode uses the lower 128 bytes of internal RAM and the special function registers.

**3. Register Indirect Addressing:**

It uses any one of the registers R0 to R7 from the selected register bank, as pointer to the location in the 256 bytes of data memory.

**4. Immediate Addressing:** Immediate addressing allows using immediate data as a part of the instructions .

**5. Base register and index register:** This mode allows a byte to be accessed from the program memory, whose address is calculated as the sum of a base register and index register.

### 5. Enlist the various flags in the PSW register.

ans: The various flag used in PSW register is as follows:-

**Parity flag**

**Overflow flag**

**RS0**

**RS1**

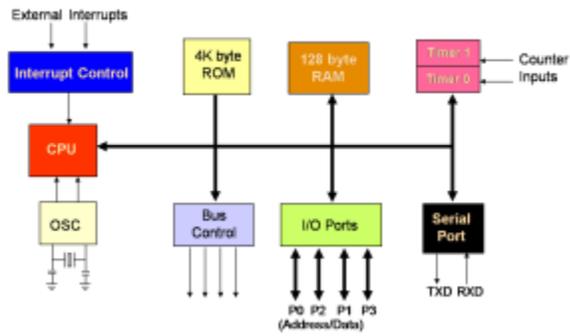
**Future Use**

Auxillary Flag

Carry Flag

6. Draw the block diagram of 8051 microcontroller

### The 8051 Block Diagram



*microcontroller 8051*

ans: