



**SF-8340**

**B. E. - III (Electrical) (Sem. - VI) Examination**  
**May/June - 2011**  
**Microcontroller**  
*(New Course)*

Time : 3 Hours]

[Total Marks : 100

**Instructions :**

(1)

नीचे दशांशवैल निशानीवाणी विगतो उत्तरवडी पर अवश्य लभवी. Fillup strictly the details of signs on your answer book.		Seat No. :	
Name of the Examination :		<input type="text"/>	
← B. E. - 3 (ELECTRICAL) (SEM. - 6)		<input type="text"/>	
Name of the Subject :		<input type="text"/>	
← MICROCONTROLLER (NEW)		<input type="text"/>	
← Subject Code No. : <input type="text" value="8"/> <input type="text" value="3"/> <input type="text" value="4"/> <input type="text" value="0"/>		← Section No. (1, 2,.....) : <input type="text" value="Nil"/>	
		Student's Signature	

- (2) Attempt **all** questions.  
(3) Assume appropriate data whenever necessary.  
(4) Figures to the **right** indicate full marks.

- 1 (a) Fill in the following blanks : 6
- (i) The CJNE instruction target address is limited to \_\_\_\_\_ bytes from the present content of PC.
- (ii) \_\_\_\_\_ register is used as a pointer for external RAM data transfer.
- (iii) The addressing mode of MOV A, @R1 instruction is \_\_\_\_\_.
- (iv) The control signal generated during external ROM read operation is \_\_\_\_\_.
- (v) \_\_\_\_\_ bit is set to 1 in order to double the baudrate generated by timer-1 during serial communication.
- (vi) \_\_\_\_\_ Interrupt of 8051 has lowest priority and its vector address is \_\_\_\_\_.
- (b) Compare Microprocessor and Microcontroller. 4
- (c) Explain the following instructions of 8051. 6
- (i) JNZ radd
- (ii) SUBB A, add
- (iii) DIV AB

- (d) Explain the functionality of following pins of 8051 : 4
- (i) TO
  - (ii) PSEN
- 2 Attempt any four : 20**
- (i) Explain SCON register and function of each of its bits.
  - (ii) Draw timer-0 hardware and explain mode-3 operation of timer-0.
  - (iii) Explain internal RAM organization of 8051.
  - (iv) Write an assembly language program that separates positive and negative numbers from a set of 10 data available in RAM starting from 35H and store positive numbers starting from 45 H and negative numbers starting fro 55H.
  - (v) Write an assembly language program that reverses a block of 10 8-bit binary numbers available in internal RAM starting fro 40.
  - (vi) Draw and explain Port-1 architecture.
- 3 Attempt any two : 20**
- (i) Draw an interfacing scheme to interface 2 common cathode seven segment LEDs with 8051 microcontroller and using that interfacing scheme write an embedded 'C' program that updates and displays real time second.
  - (ii) Draw an interfacing scheme to interface DAC with 8051 and using that interfacing scheme write an embedded 'C' program that generates a trapezoidal waveform continuously.
  - (iii) Draw an Interfacing scheme to Interface one 16 K EEPROM and one 4 K RAM with 8051 and specify address decoding. Also draw read-write timing diagram.
- 4 Attempt any two : 20**
- (i) A push button switch is connected with P3.2 pin that normally PULLs the pin high and when pressed, the level on pin goes low. Write a program that makes an emergency alarm connected with P1.0 pin ON when the switch is pressed. The alarm should automatically goes OFF after 30 seconds.

- (ii) Draw an interfacing scheme to interface ADC with 8051 and using that interfacing scheme write an embedded 'C' program that takes 25 samples per sec. from ADC and stores the digital count in memory.
- (iii) Draw an interfacing scheme to interface (20x2) LCD display with 8051 microcontroller and hence using that interfacing scheme write an embedded 'C' program that displays message "Welcome To 8051" in line-1 and "Programming" in line-2 in center.

5 Attempt any two :

20

- (i) Write an embedded 'C' program to transmit 20 character message at 9600 baudrate. Use serial mode-1.
- (ii) Write a program that provides given ON/OFF time to three traffic lights (Green, Yellow, Red) and two pedestrian signs (WALK DONT WALK) as per following :

Lights	Port Pin	Time
Green	P1.0	15 seconds
Yellow	P1.1	5 seconds
Red	P1.2	60 seconds
WALK	P1.3	15 seconds
DONT WALK	P1.4	60 seconds

The traffic and pedestrian flow are in the same direction; the pedestrian should cross the road when the Green light is ON.

- (iii) Write an embedded 'C' program for a digital frequency meter designed using 8051  $\mu$ C that continuously measure the frequency of the square wave and displays the measured frequency in decimal on LCD display. What is the maximum frequency that can be measured ?