GANPAT UNIVERSITY

B. Tech. Semester: V Electronics & Communication Engineering

Regular / Remedial Examination Nov – Dec 2015

2EC501 Microcontrollers & Interfaces

Time: 3 Hours   Total Marks: 70

Instructions:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

Que.-1	(A)	Draw external memory connections with 8051. Consider external RAM of 16Kbytes and EPROM with 32Kbytes.	4
	(B)	Write an assembly language program to multiply the numbers DEh by 1Ch using the technique of repeated addition.	4
	(C)	Assume that these registers contain the following: A=F0h, R1=90h. Perform the following operations. 1. ANL A, #45h 2. XRL A, #0EEh 3. ANL A, R1 4. ORL A, R1	4

OR

Que.-1	(A)	Draw timing diagram associated with an external memory access.	4
	(B)	Assuming that ROM space starting at 250h contains "Hindustan", write a program to transfer the bytes into RAM locations starting at 20h.	4
	(C)	If A=90h, what is the content of A after the following instructions, if CY=1? 1. RR A 2. RL A 3. RLC A 4. RRC A	4

Que.-2	(A)	Explain each bit of SCON and PCON register with net sketch.	4
	(B)	Discuss each Timer modes of 8051 with net sketch.	4
	(C)	Copy program bytes from external ROM locations 0901h to 0909h to internal RAM locations 31h to 39h.	3

OR

Que.-2	(A)	Explain each bit of TCON and TMOD register with net sketch.	4
	(B)	Discuss each serial communication modes of 8051 with net sketch.	4
	(C)	Count the number of 1s in any number stored in register R5 and put the count in R1.	3

Que.-3	(A)	Give the differences between RET and RETI instruction for 8051.	2
	(B)	Write a program to add first 10 natural numbers.	3
	(C)	Enlist differences between Interrupt and Polling.	3
	(D)	Give explanation how Port 0 configures as a GPIO, low-order address bus and data bus for external memory?	4

SECTION-II

Que.-4 **(A)** Write an assembly language program to generate a square wave with an ON time of 3ms and an OFF time of 10ms on pin P0.2. Assume XTAL of 12 MHz and use Timer 1 in mode 1. 4

(B) Write a program to transfer a letter 'Y' serially at 9600 baud rate continuously, and also to send a letter 'N' through port 0, which is connected to a display device. 4

(C) Two switches are connected to pins P3.2 and P3.3. When a switch is pressed, the corresponding line goes low. Write a program to 4
   (a) Light all LEDs connected to port 0, if the first switch is pressed.
   (b) Light all LEDs connected to port 2, if the second switch is pressed.

OR

Que.-4 **(A)** Write an assembly language program to generate a square wave with frequency of 100KHz on pin P2.3. Use timer 0. 4

(B) Write a program to receive the data which has been sent in serial form and send it out to port 0 in parallel form. Also save the data at RAM location 35h. 4

(C) Generate from pin P0.7, a square wave which has half the frequency of the signal applied at INT0 pin (pin P3.2). 4

Que.-5 **(A)** Write a program that displays a value of 'Y' at port 0 and 'N' at port 2 and also generates a square wave of 10KHz, with timer 0 in mode 2 at port pin P1.2. XTAL=22 MHz 4

(B) Write a program in which the 8051 reads data from P1 and write it to P2 continuously while giving a copy of it to the serial COM port to be transferred serially. Assume that XTAL=11.0592MHz. Set the baud rate at 9600. 4

(C) Write short note on I2C protocol. 3

OR

Que.-5 **(A)** Write a program to generate two square waves- one of 5KHz frequency at pin P1.3, and another of frequency 25KHz at pin P2.3. Assume XTAL=22MHz. 4

(B) Write a program in which the 8051 gets data from P1 and send it to P2 continuously while incoming data from the serial port is sent to Port 0. Assume that XTAL=11.0592MHz. Set the baud rate at 4800. 4

(C) Write short note on SPI protocol. 3

Que.-6 **(A)** Enlist and explain each data transfer mode in USB protocol. 4
(B) Explain function of each LCD pin. 3
(C) Enlist differences between microprocessor and microcontroller. 3
(D) List out highest to lowest priority assigned for 8051 upon RESET. 2

END OF PAPER