B. Tech.
(SEM. VI) EXAMINATION. 2006–07
MICRO CONTROLLER & EMBEDDED SYSTEM

Time : 3 Hours] [Total Marks : 100

Note : (1) Attempt all questions.
(2) All questions carry equal marks.

1 Attempt any four parts of the following:

a) What are embedded microcontrollers and external memory microcontrollers? Explain and differentiate.

b) What are the features of Harvard architecture and Von-Neumann architectures?

c) Explain RISC and CISC processors.

d) Give a list of microcontrollers commercially available indicating the following features of each – (i) on chip data memory (ii) on chip programme memory (iii) No. of 16 bit timers / counters (iv) I/o.

e) Discuss the criteria for selecting the microcontroller device.

f) Draw the generalised functional block diagram of a microcontroller specifying each block.
2 Attempt any four parts of the following:

a) Explain the following pin signals of 8051 family microcontroller:

(i) PSEN  (ii) EA

b) Explain the I/o port structure of part O of 8051.

c) Explain TMOD and TCON of 8051 microcontroller.

d) Describe addressing modes of 8051 giving an example of each.

e) What is the difference between long jump (LJMP) and short jump.

f) List the different assembler directives and explain their meaning for the assembler of 8051.

3 Attempt any two parts of the following:

a) What is flash memory? What is the basic difference between 8051 microcontroller and 89C51 microcontroller? Give the pin configuration of 89C2051.

b) Explain the basic features of an 8 bit PIC microcontrollers. What is the purpose of Watch Dog Timer (WDT).

c) Explain the architecture of 16 bit microcontroller 8096 with the help of block diagram.

4 Attempt any two parts of the following:

a) How will you connect the following components to 8051 ports:

(i) Push button

(ii) LEDs.

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b) How will you interface the external data memory to 8051 illustrating each signal clearly.

c) An 8 bit ADL 0809 is to interface with 8051 microcontroller. Draw the complete circuit diagram along with all necessary components. Write a program in assembly language for ADC operations.

5 Attempt any four of the following:

a) Write a programme in assembly language for 8051 to generate a square wave of 2 kHz. Assume crystal frequency is 12 MHz.

b) Suggest a method for measurement of power frequency using timer of 8051 with programme.

c) Explain microcontroller based measurement of angular speed of a shaft with the help of block diagram and flow chart of the algorithm.

d) Discuss the control of stepper motor using 8051 controller along with driver circuit and pulse generation.

e) A single phase load is connected to single phase AC source through TRIAC. How will you use 8051 to control firing angle to get variable voltage across the load.

f) Explain micrometer based PWM control of a DC motor.