

- N.B. (1) Question No 1 is compulsory and attempts any four out of remaining six questions.
 (2) Assume suitable data wherever required.
 (3) Figures to the right indicate full marks.

1. Design 8751 (EPROM version of 8051) based data monitoring system with following specifications; 20
- Microcontroller operating on 6MHz
 - 4KB EPROM for firmware support
 - Minimum 80 Bytes SRAM
 - ADC 0809 (8 bit 8 channel successive approximation type ADC)
 - serial port interface
 - Reset facility should be provided
- The system should send the data of all the channels with channel number, after every 2 seconds to the monitoring device. Monitoring device is connected to the Rs 232 port of the designed system. Explain software aspect with the help of flow chart.
2. (a) Explain the interrupt structure of 8051 microcontroller. Explain how single stepping can be achieved. 10
- (b) List the most likely effect if the keyboard program does not accomplish the following: 10
- [i] Debounce keys when pressed down
 - [ii] Check for valid keycode
 - [iii] Wait for all keys up before ending keyboard routine
 - [iv] Debounce keys when released
3. (a) Suggest the scheme for generating square wave and triangular wave of frequency 1 KHz using 8051 microcontroller. Assuming microcontroller is operating on 6 MHz frequency, write a program for each of them. 14
- (b) After reset in 8051 microcontroller what will be the 6
- [i] Contents of Program counter register
 - [ii] Contents of Stack pointer register
 - [iii] Status of RS1 and RS0 flags
- What does it signify?
4. (a) Give the structural details of the following components of the 80C196 10
- [i] Analog to digital converter
 - [ii] Pulse width modulator
- (b) Explain addressing modes of 80C196 with instruction examples 10
5. (a) What is deadlock? Explain it with example. What are the different techniques to avoid deadlock? How deadlock is differ from livelock. 10
- (b) Compare methods of inter task communication in RTOS. 5
- (c) What are the parameters at TCB of the task? Why should each task have a distinct TCB. 5
6. (a) Differentiate between - 10
- [i] Hard and Soft RTOs
 - [ii] System tick and processor clock
 - [iii] Semaphore and event
- (b) What is the mailbox? How does mailbox passes a message during interprocess communication? Also list the difference between mailbox, queue and pipe. 10
7. Write a short notes on- 7
- (a) Power saving modes in 8051 7
 - (b) High speed output unit in 80C196 7
 - (c) Task and task states 6