

# Microcontroller and Embedded Programming

[ REVISED COURSE ]

TV-8559

ON/3166-06.

( 3 Hours )

[ Total Marks : 100

- B. : (1) Question No.1 is compulsory.  
(2) Solve any four from remaining six questions.

- Q.1. a) Design a 8051 based single board computer having 14
- CPU working at 6MHz
  - Firmware of 8Kbytes using 4 KB Chips
  - Data memory of 16 KB using 8KB chips
  - ADC 0809 ( 8 Channel , 8 bit ADC)
- Discuss the design and give proper memory maps.
- b) What are different features available in microcontrollers as compared to 06  
microprocessors Explain their role in embedded system applications.
- Q.2 a) Write a 8051 program to send 'N' or 'H' to the serial port depending on 12  
the baud rate chosen as Normal or High speed. A switch is connected to  
port pin 2.0 to decide the baud rate as  
Sw = 0 , 28800-baud rate "Normal" speed  
Sw = 1 , 56K baud rate "High" speed  
Assume XTAL = 11.0592 MHz for both cases.
- b) Explain addressing modes of 80196 with suitable examples 08
- Q.3 a) Explain with the help of circuit diagram , how to interface 8 common 12  
anode type seven segment displays to 8051 microcontroller and write a  
program to display " Good day".
- b) Explain the following instructions in 8051 08
- MOV C , P0.7
  - XCHD A , TL0
  - CJNE A , 24H , Repeat
  - RETI
- Q.4 a) Draw and explain block diagram of 80196. Explain in details block 14  
diagram of core highlighting RALU and memory controller
- b) What are bit addressable locations in 8051? Which bit operations are 06  
available in 8051? Justify their use in applications.
- Q.5 a) Explain factors affecting interrupt latency. What are the methods to 10  
minimize interrupt latency?
- b) Discuss inter-task communication in RTOS with the help of 10  
semaphores, message queues, mailboxes and pipes.
- Q.6 Write short notes on 20
- a) Pre-emptive and Non pre-emptive multitasking
  - b) Task and Task states
  - c) Priority Inversion
  - d) Context Switching
- Q.7 a) Give details of following components of 80C196 10
- High Speed Output Unit
  - Pulse Width Modulator
- b) Explain important features of real time operating systems. 10