

Time: 3 Hours

Marks: 80

Note: Question No. 1 is compulsory.Attempt **any three** from the **remaining five** questions.

Figures to the right indicate full marks.

Draw **neat diagrams** and assume **suitable data wherever necessary**.

- Q.1 Answer the following: [20]
- Explain the PSW register of 8051 microcontroller.
 - Define an embedded system. Also, explain any two applications of embedded systems.
 - Write an assembly program to check whether the number is odd or even. If the number is odd save the result in R0 else save the number in R2
 - Explain interfacing LCD display with 8051 microcontroller.
- Q.2 a. Draw the diagram showing the 8051 microcontroller connection to DAC0808. Also, write a program to generate a square waveform at the output of the DAC. [10]
- b. Explain the various power saving modes of 8051 and Sketch the SFR's associated with them. [10]
- Q.3 a. Define the term interrupt. Explain the six interrupts of 8051 microcontroller. [10]
- b. Draw and explain the I2C, SPI and USB bus protocols. [10]
- Q.4 a. Draw and explain the TMOD register format. Also, explain various timer modes of 8051 microcontroller. [10]
- b. Write a program to continuously transfer "BIOMED" serially at 9600 baud, 8-bit data, and 1 stop bit. [10]
- Q.5 a. Explain the concept of RTOS. Also, explain interrupt latency and response time. [10]
- b. Write a "C" program to get bit P1.1 and send it to P2.2 after inverting it. [05]
- c. Draw the memory map (internal RAM only) of 8051. [05]
- Q.6 Write short notes on the following: (**Any Four**) [20]
- Scheduler
 - SCON and TCON SFRs
 - Power on reset circuit
 - Interfacing PC with RS232
 - Embedded system design constraints.