22532

23124

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Figures to the right indicate full marks.

(3) Assume suitable data, if necessary.

(4) Use of Non-programmable Electronic Pocket Calculator is permissible.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

a) Define RISC and CISC.

b) List any two applications of Harvard architecture.

c) Illustrate any two data types used in C with their ranges.

d) Draw format of TMOD register.

e) State any two application of bluetooth.

f) List various temperature sensors used in industry.

g) Define the terms : scalability, predictability related to RTOS.

2. Attempt any THREE of the following : **12**

a) Compare Harvard and Von Neuman architecture.

b) State any two application for following

i) Small scale embedded system.

ii) Medium scale embedded system.

Marks

c) Write C language program to toggle all bits of P0, P1, P2 and P3 continuosly with certain delay.

d) Draw 9 pin RS 232C connector and state significance of DTR and DSK signals.

3. Attempt any THREE of the following : **12**

a) Write a C language program to transfer message "MSBTE" serially at 9600 band rate. Assume crystal frequency 12 MHz.

b) Compare between CAN and I^2C protocols on the following points.

i) Data Transfer rate

ii) Number of fields

iii) Addressing bits

iv) Applications

c) Draw interfacing of ADC with 89C51 and explain function of SOC, EOC and OE.

d) Compare general purpose operating system and RTOS (four points)

4. Attempt any THREE of the following : **12**

a) Describe how assembly language can be included in 89C51 C program. Give an example.

b) Draw and explain USB protocol.

c) State any four features of Zigbee.

d) Draw interfacing diagram of 4×4 matrix keyboard with 89C51.

e) Write a 'C' language program to rotate stepper motor by 90° clockwise. Assume step angle of 1.8° and 4 step sequence.

Marks

5. Attempt any TWO of the following : **12**

a) Explain watchdog timer and semaphore in detail.

b) Write a 89C51 C program to display 'WELCOME' on 16 × 2 LCD display.

c) Write C language program to generate square wave of 5 KHz on pin P1.5 of 89C51.

6. Attempt any TWO of the following : **12**

a) Explain six characteristics of embedded system.

b) Explain pre emptive and round robin scheduling algorithm in RTOS.

c) Draw interface diagram of 7 seg LED display to 89C51 and write a C program to display 0-9 continuously.