22532

22223

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

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

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(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) State any four design metrics of an embedded system.

b) Write down any four salient features of ARM micro controller.

c) Explain duplex mode of communication and write any two applications.

d) Illustrate any four data types in Embedded C language with their range in bits and data range.

e) Describe the concept of Round-robin scheduling with suitable schematic diagram.

f) State any four logical operations in Embedded C language with one example using C language syntax.

g) List any four code with description to write in command register of 16×2 LCD.

Marks

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

a) Classify Embedded systems based on performance of Microcontroller and explain any one.

b) Utilize inverting operator in C language program to toggle all bits of port O of 89C51 Microcontroller with looms delay.

c) Draw the frame format of I^2C and explain fields therein.

d) Identify which type of microcontroller is applicable for smart phones and why ?

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

a) Draw labeled diagram to interface a switch to pin $P_{0\cdot0}$ and relay to pin $P_{2\cdot0}$ of 89C51 used to turn ON/OFF bulb connected to it.

b) Describe inter task communication with reference to RTOS.

c) What is USB serial protocol? Which signals it uses?

d) Find the contents of port after execution of following code

i) $P_2 = 0 \times 74 >> 3;$

ii) $P_3 = 0 \times 04 \mid 0 \times 68;$

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

a) Estimate hex data values of THO and TLO if 89C51 microcontroller operating at crystal frequency of 11.0592 MHz and need to generate delay of 5 milliseconds.

b) Explain architecture of IrDA protocol.

c) Interface 7-segment LED to P2 of Microcontroller 89C51 and write a program to display number TWO.

d) Demonstrate how L2CAP, SDP and RFComm protocol plays vital role in bluetooth based adhoc network.

e) List down any four features of LM35 and draw its pin diagram.

Marks

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

a) Sketch architecture of RTOS and explain function of kernel and device drivers.

b) Sketch interfacing diagram to control stepper motor connected to port 2 through IC ULN 2003 and write C language program to rotate stepper motor in clockwise direction continuously with certain delay.

c) Write 89C51 'Embedded C' program to transfer string 'MSBTE' serially at 9600 baud rate continuously, use 8 bit data and 1 stop bit. Assume crystal frequency of 11.0592 MHz.

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

a) Differentiate between general purpose operating system and real time operating system.

b) Draw block schematic of Embedded system and explain about all types of available ports on it.

c) Sketch the diagram to interface DAC 0808 to port O of microcontroller 89C51 and write a Embedded C language program to generate square wave to 50% duty cycle.
