Total number of printed pages: **Programme(D)/5th Semester/DECE 501**

2024

Embedded Systems

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1 a) Describe the functionality of a scheduler in RTOS? Mention the different types of algorithms used for scheduling. [5+3]

b) Explain the concept of Mailbox in the area of inter task communication [5]

c) Explain the concept of ZigBee and its operation, and supporting speed. [7]

2. a) Draw the CDFG for the following pseudo code in C. [5+5]

```
if (Condition1 == TRUE)
LED1 = ON ;
else
LED2 = ON ;
switch(Condition2)
case c1 : Buzzer1 = ON ;
break;
case c2 : Buzzer2 = ON ;
break;
```

```
for (i = 0; i < N*M; i++)
{
z[i] = a[i] + b[i];
}
```

b) What do you mean by a task, draw a diagram for a generic task control block? [2+6]

c) Draw a simplified view of the embedded system. [2]

3. a) Draw the block diagram showing the I2C interface. Explain the protocols for I2C bus. [4+6]

b) Mention the salient features of CAN. Draw the interface of CAN with an example and discuss its communication steps. [5+5]

4. a) What do you mean by embedded Firmware? Cite the differences between super loop architecture and RTOS in Microcontroller. [2+8]

b) Give a comparison between SRAM and DRAM used for data memory. [10]

5. a) Explain the different types of the FLASH Memories and compare their performance. [6]

b) Explain the SPI interface. Compare it with I2C protocol. [5+5]

c) Mention the features of real time kernels [4]

6. a) Write a short note on OTP memory and mention its merits-demerits [5+5]

b) [5+5]

Current State	Inputs	Outputs	Next State
State1	Clk=2	out=1	State2
State2	Clk=5	out=2	State3
State3	Clk=29	out=3	State2

I. Draw an FSM for the above table.

II. Write the pseudo code in C.