

**Time: 3 hours**

**Total Marks: 80**

- Note: 1) Question No.1 is compulsory.  
 2) Attempt any three questions from remaining five questions.  
 3) Assume suitable data if necessary.  
 4) Figures to the right indicate full marks.

Q.1) Answer the following questions.

- a) Compare the features of cortex R, cortex A and cortex M series. 5M
- b) Zig –Bee in wireless sensor networks 5M
- c) EDLC 5M
- d) uCOS-ii functions 5M

Q.2) a) Explain briefly register structure of Cortex M3 architecture along with the function of various special registers. 10M

b) Define FSM. Explain and draw FSM for G+ 2 elevator. 10M

Q.3) a) Design automatic chocolate vending machine. Give the proper details for this, 10M

- i. FSM which describes the functioning of the system
- ii. Hardware and software block diagram
- iii. List of components with justification
- iv. Design challenges and suggest solutions

b) Distinguish between Cortex M3 and M4 architecture and explain briefly the interrupt structure of M3 architecture. 10M

Q.4) a) What is an inter process communication? Explain the various IPCs used in RTOs. 10M

b) Three periodic processes scheduled using EDF, will processes meet the deadlines? 10M

Process	Execution Time = $e_i$	Period = $p_i$
P1	1	10
P2	2	4
P3	4	12

Q.5) a) Give the comparison details between black box and white box testing. 10M

b) What are the different data types? What is shared data problem? Explain the solutions to avoid shared data problem. 10M

Q.6) a) Explain various design metrics. Explain the various optimization challenges for embedded system. 10M

- b) Write short note on 10M
  - i. CPLD
  - ii. FPGA

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