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Total Number of Pages : 02

MCA  
MCA406A

4<sup>th</sup> Semester Regular Examination 2018-19

EMBEDDED SYSTEM

BRANCH : MCA

Max Marks : 100

Time : 3 Hours

Q.CODE : F592

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1      **Only Short Answer Type Questions (Answer All-10)**      (2 x 10)

- a) State three characteristics of embedded system that distinguish it from other computing system.
- b) State and explain Moore's law.
- c) Distinguish between a combinational circuit and a sequential circuit.
- d) Explain the use of a watchdog timer.
- e) What role does the Memory Management Unit play?
- f) Define Interrupt latency. Mention two ways to keep this latency low.
- g) Name four characteristics of software architecture based on which one could select an appropriate architecture for a specific problem.
- h) Distinguish between cross compiler and cross assembler.
- i) State the utility of a ROM Emulator.
- j) What do you understand by Software-Only Monitors.

Part- II

Q2      **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)**      (6 x 8)

- a) What is a single purpose processor? What are the benefits of choosing a single purpose processor over a general purpose processor?
- b) Explain why NAND and NOR gates are more common than AND and OR gates.
- c) Describe what is meant by edge-triggered and explain why it is used.
- d) Create a table listing the address spaces for the following address sizes: (i) 8 bit, (ii) 16 bit, (iii) 32 bit, (iv) 64 bit
- e) Explain the principle of operation of an Analog to Digital Converter. Give two instances of its use in real life situation.
- f) Explain Cache Replacement Policy.
- g) What is ROM. Name three more variants of ROM and differentiate between them. State the general characteristics of RAM.
- h) Draw and explain the timing diagram of a Static RAM showing both a read cycle and a write cycle.
- i) What are the advantages and disadvantages of edge-triggered and level-triggered interrupts?
- j) Draw and explain the timing diagram of a NAND gate.
- k) What is a "critical section" in an assembly language program? Explain with a real life analogy (no need to write any program).
- l) Briefly explain how test instruments namely (i) Oscilloscope and (ii) Logic analyzer are used in testing of embedded system.

**Part-III**

**Only Long Answer Type Questions (Answer Any Two out of Four)**

- Q3** List and explain the design metrics of an embedded system. Out of these matrices identify one pair of metrics which compete with one another illustrating with an example. **(16)**
- Q4** What are the distinguishing features of a RTOS? Explain the role of “Tasks” and “Scheduler” in RTOS. How is Shared data problem dealt with under an RTOS environment? **(16)**
- Q5** Draw the basic diagram of a general purpose processor showing all inputs and outputs. Briefly explain each input and output. **(16)**
- Q6** Consider a Traffic light controller at a major intersection. It reads from sensors that notice the presence of cars and pedestrians, it has a timer, and it turns the lights red and green appropriately. What software architecture you would recommend for such a system and why? What other information might influence your decision in this case. **(16)**