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RAMAIAH Institute of Technology
(Approved by NBA & (Autonomous Institute, Affiliated to VTU)
by AICTE, New Delhi & Govt. of Karnataka) Accredited
NAAC with 'A' Grade

# SEMESTER END EXAMINATIONS – JULY 2020

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| **Program** | : | **B.E. : Computer Science Engineering** | **Semester** | : | **IV** |
| **Course Name** | : | **Microprocessors and Microcontrollers / Introduction to Microprocessors and Microcontrollers** | **Max. Marks** | : | **100** |
| **Course Code** | : | **CS43/CS43(O)/CS1543** | **Duration** | : | **3 Hrs** |

**Instructions to the Candidates:**

- Answer one full question from each unit.
- Write the program in c or Assembly
- Write wherever diagram and syntax required.

## UNIT – I

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| 1. | a) | Explain the concept of Stored Program digital Computer. | CO1 | (06) |
| | b) | Discuss different ways of representing instruction format with examples. | CO1 | (08) |
| | c) | "How to improve the Processor computation", Justify your answer. | CO1 | (06) |
| 2. | a) | Describe low power low application of cortex M0 processor. | CO1 | (08) |
| | b) | Explain the System features and implementation features of Cortex M0 Processor? | CO1 | (07) |
| | c) | Define pipeline. Write a note on Read-after-write pipeline hazard. | CO1 | (05) |

## UNIT – II

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| 3. | a) | Find the Result and status of ALU Flags for the below operations:<br>0x80000005-0x80000004<br>0xA0000000-0xA0000000<br>0x80000000+0x80000000<br>0x70000000+0x70000000<br>0xFFFFFFFF-0xFFFFFFFC. | CO2 | (05) |
| | b) | Compare and contrast PSP and MSP. | CO2 | (05) |
| | c) | Illustrate the working of Microcontroller. | CO2 | (10) |
| 4. | a) | Describe the Program image of a microcontroller. | CO2 | (08) |
| | b) | With a neat diagram, explain the different ways of structuring the flow of Application processing. | CO2 | (12) |

## UNIT – III

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| 5. | a) | What is the output after executing the following instruction Assume all the instruction are independent. R0=0xFF87F983.<br>i) SXTB R1,R0<br>ii) SXTH R1,RO<br>iii) UXTB R1,R0<br>iv) UXTH R1,R0<br>v) REV16 R1,R0 | CO3 | (05) |
| | b) | Write a program to extract bits from 15 to 8. Given the content of register R0=0x87653425. Write a program to clear bits between 7 to 4 give the register content of R0. | CO3 | (08) |
| | c) | Explain memory barrier instructions with an example. | CO3 | (07) |

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| 6. | a) | With example explain instruction STMIA,BIC,ARS,MRS and ROR of Cortex M0. | CO3 | (10) |
| | b) | Write a program using assembly language to simulate the working of simple calculator. | CO3 | (10) |

**UNIT – IV**

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| 7. | a) | List out any six available exceptions in Cortex M0 processor with its priority levels? | CO4 | (06) |
| | b) | Illustrate the usage of each region in the memory map of a Cortex M0 Processor, with a neat sketch. | CO4 | (10) |
| | c) | Write the differences between APB and AHB. | CO4 | (04) |
| 8. | a) | Explain the following:<br>i) Program Memory ii) Boot Loader. | CO4 | (08) |
| | b) | Write an assembly code to set the priority level of interrupt#2 to 0xC0. | CO4 | (07) |
| | c) | Write a note on Late Arrival with Exception sequences. | CO4 | (05) |

**UNIT – V**

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| 9. | a) | List and explain different types of sensors. | CO5 | (10) |
| | b) | Implement a micropython code for the following:<br>i) Interrupt programming<br>ii) Soft reset<br>iii) Past mode. | CO5 | (10) |
| 10. | a) | Illustrate the working of stepper motor and describe the interfacing of stepper motor with an embedded microcontroller to rotate the stepper motor continuously. | CO5 | (10) |
| | b) | List and explain the different components of ESP8266. | CO5 | (10) |

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