1T01034 - S.E.(Electronics and Telecommunication )(SEM-IV)(Choice Base Credit Grading System ) (R-19) (C Scheme) / 40822 - Microcontrollers QP CODE: 10041724 DATE: 12/12/2023

**Duration Three Hours** **Total marks 80**

**N.B.** **[i] Question No 1 is compulsory and attempts any three out of remaining five questions.**
**[ii] Assume suitable data wherever required.**
**[iii] Figures to the right indicate full marks.**

**1. Solve any four**

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| | **(a)** | Differentiate between Von Neumann and Harvard architecture with the help of a diagram. | **5** |
| | **(b)** | Explain the significance of all bits in the TCON register, used in the 8051 microcontroller. | **5** |
| | **(c)** | Explain the pipeline stages used in the ARM7 processor. | **5** |
| | **(d)** | Explain the features of Atmega 328P. | **5** |
| | **(e)** | Write an assembly language program for the 8051 to add two decimal numbers (BCD) 06 and 09. Store the result of this addition in register R2. Ensure that the result is also a decimal (BCD) number. | **5** |
| **2.** | **(a)** | What is the role of a microprocessor in a computer? Additionally, explain the functions of the program counter and stack pointer registers within the microprocessor. | **10** |
| | **(b)** | Explain semiconductor memories available in microprocessors and microcontrollers. | **10** |
| **3.** | **(a)** | Explain serial port communication and its operating modes in the 8051 microcontroller. | **10** |
| | **(b)** | Explain the autoreload mode of the 8051 timer and the significance of all registers used to configure the timer in the 8051 microcontroller. | **10** |
| **4** | **(a)** | Explain various addressing modes of the 8051 with two examples each. | **10** |
| | **(b)** | Describe the features of the ARM processor. Also, explain which features are accepted and which are rejected from the basic RISC machine. | **10** |
| **5.** | **(a)** | Write an assembly language program for the 8051 to transfer the message “HAPPY NEW YEAR” serially at a baud rate of 9600 in mode 1. Assume the 8051 is operating on 11.0592 MHz. | **10** |
| | **(b)** | Explain exception and interrupt handling in ARM. | **10** |
| **6** | **(a)** | Write a short note on delay subroutines. | **10** |
| | **(b)** | What are the factors that needs to be considered for selecting a microcontroller for an application? | **10** |

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