

Subject: μ C & Embedded Systems
Code: EEE-413-F

Semester: VII
Branch: EEE

1. What is a Microcontroller? Explain in detail.
2. Differentiate between Microcontroller and Microprocessor.
3. Classify different types of microcontroller?
4. Compare embedded microcontroller with external memory microcontroller.
5. Define with the help of block diagram
MOV ACC, R0 executed in the Princeton Architecture.
6. Explain CISC VS RISC.
7. Explain Different Processor Architectures: Harvard V/S Princeton.
8. Explain different Microcontroller's memory types?
9. List out microcontroller's features in detail.
10. Explain program memories in details.
11. Explain how a microcontroller is interfaced to external memory with suitable diagram.
12. Explain different timers of microcontroller.
13. Explain the concept of clocking in microcontrollers.
14. What do you mean by Interrupts? Explain with suitable example.
15. What do you mean by external and internal interrupts?
16. Explain the features of PIC microcontrollers?
17. Explain the Low end and Mid Range PIC architecture.
18. Explain the architecture of PIC.
19. What is pipelining? Explain with reference to PIC microcontroller.
20. Explain the Program memory organization of PIC.
21. Explain the Direct and Indirect addressing mode in PIC.
22. Write a template for PIC microcontroller to explain "ASM" file.
23. Define an Embedded System with the help of different examples.
24. Explain the architecture of PIC microcontroller.
25. Discuss how instruction pipelining is implemented in PIC.
26. Discuss program memory map. Hence, discuss how program counter access program memory in PIC.
27. Explain the addressing modes of 8051 microcontroller.
28. Discuss the meaning with example, mode of addressing and status bit affected by the following instructions : incfsz, retfie, bsf, clrwtd, subwf.
29. What are CPU registers? Explain.

30. Explain PIC instructions for arithmetic and logic operations.
31. Explain interrupts and timers in PIC microcontroller.
32. Differentiate Capture and Compare mode.
33. Explain RAM/register file structure of PIC microcontroller.
34. Draw the architecture of 8051 microcontroller.
35. Explain the features for 8051 microcontroller.
36. What are timers in 8051 microcontroller? Explain.
37. What are external interrupts? Explain.
38. Explain timer interrupts. How are they used for various operations?
39. Explain TMOD register. What are ports and their bits? Explain.
40. Explain IE register used in 8051 microcontroller.
41. Explain Serial interrupt pin. How it is used for serial communication.
42. What are arithmetic operations in 8051? Explain in detail.
43. Explain the concept of memory banks in 8051.
44. Explain the structure of internal RAM of 8051.
45. Explain how stack is implemented in 8051 microcontroller.
46. List and explain the instructions related to stack with an example.
47. Write a program to create a delay of 1 ms. Assume that the oscillator frequency is 12 MHz.
48. WAP to compute square root of value on port 3 (bits 3-0) and output on port 1.
49. Draw 8051 pin diagram.
50. Explain various control signals available in 8051 microcontroller.
51. Describe baud rate for different modes.
52. Design a temperature measuring system with 8051 microcontroller.
53. Draw block diagram of connections and write code for PWM motor control with 8051 microcontroller.
54. Explain the interfacing of 8051 with ADC.
55. Design a project which includes a microcontroller unit, LCD display unit, Temperature and pressure unit.
56. Write an assembly language program for division of 8 bit number in 8051 microcontroller.
57. Write an assembly language program to generate a square wave of 2 KHz frequency.
58. Write a program to rotate DC motor with different speeds in clockwise direction.
59. Interface an 8 bit DAC to the 8051 and write a program to generate negative ramp waveform.
60. Write a program to display ADC output value using an LCD.

- 61. Write a program to display 0 to 9 in a seven segment card.**
- 62. Write a program to toggle the bits of port 1 with a delay of 10ms.**
- 63. Write a program to store data FF H into RAM memory locations 50 H to 58 H using indirect addressing mode.**
- 64. Illustrate the features available in an embedded system.**
- 65. List out the different constraint while designing an embedded system.**
- 66. Draw the components of embedded system hardware.**
- 67. Explain different embedded processor available for the design.**
- 68. Define Processor and signify its importance as heart of the embedded system.**
- 69. Differentiate microprocessor and microcontroller from design view of an embedded system.**
- 70. List out the different constraint while choosing an embedded processor.**
- 71. Draw the various functional circuits available in a microcontroller chip.**
- 72. Explain single purpose processors with few examples.**
- 73. Illustrate the significance of system timers and real-time clocks in an embedded system.**
- 74. Explain different Reset Circuits available in embedded system hardware.**
- 75. Explain various types of memory constitutes for embedded system.**
- 76. Explain DAC working using PWM technique.**
- 77. Describe the process of conversion of assembly language program into machine codes.**
- 78. Illustrate the different program layers in the embedded software.**
- 79. Define Device Drivers and Device Management in operating systems.**
- 80. Illustrate the working of software modules and tools designing an embedded system.**
- 81. Define RTOS?**
- 82. Differentiate Hard-Time Real Systems and Soft-Time Real System.**
- 83. Classify different embedded system.**
- 84. Explain the design process in embedded system in detail.**
- 85. Explain design metrics used in the embedded systems.**
- 86. List out the challenges arises in embedded system design.**
- 87. Explain the specification and function of Automatic Chocolate Vending Machine (ACVM).**
- 88. Explain the hardware requirement and working of Smart Card.**
- 89. Explain the hardware and software components requirement for digital camera.**
- 90. List out the skills required for an embedded system designer.**

- 91. Explain interfacing I/O option examples available on an embedded hardware.**
- 92. Differentiate half duplex and full duplex ports.**
- 93. Explain the specifications and hardware requirement for RS232 serial communication.**
- 94. Illustrate the working of UART communication.**
- 95. Illustrate serial bus communication protocols (I²C, CAN, USB, FireWire) in detail.**
- 96. Illustrate Parallel bus communication protocols (ISA, PCI, ARM, Advanced high speed) in detail.**
- 97. List out requirements of smart card communication system with host.**
- 98. Draw smart card hardware and software architecture.**
- 99. Draw task and synchronization model for smart card.**
- 100. List out the tasks, functions and IPCs followed in smart card.**