

# **VALLIAMMAI ENGINEERING COLLEGE**

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## **Department of Electronics and Instrumentation Engineering**

### **ET7104- DESIGN OF EMBEDDED SYSTEMS**

#### **UNIT-I- EMBEDDED DESIGN WITH MICROCONTROLLER**

##### **PART-A**

- 1.Tabulate the difference between microprocessor and microcontroller
- 2.What are the issues in selecting the processor for an application
- 3.List the different phases involved in the embedded system design life cycle
- 4.What is embedded system
- 5.Name the specific suites of benchmark organization
- 6.What is meant by inline assembly code
- 7.Name the hardware and software debugging tools
- 8.What is an embedded system
- 9.What is EEMBC
- 10.What is the use of device drivers
- 11.What is meant by Time to Market factor
- 12.Name the performance measuring tools
- 13.What is Dhrystone benchmark
- 14.Name any four factors for selecting the RTOS
- 15.Name any four features for the selection of compiler
- 16.What are the issues in selecting a processor
- 17.What is meant by SoS
18. What do you understand by the term memory substitution
- 19.What are the three broad categories available to evaluate tool chain
- 20.Why do we need RTOS for embedded application

##### **PART-B**

- 1.Explain hardware /software portioning process with an example
- 2.How the performance tools helps in analyzing the performance of the system
- 3.What are the challenges in product integration and how to test the product
- 4.Explain the product specification process with an example
- 5.Discuss the various factors to be considered for the selection of RTOS
- 6.Explain about various bench marking
- 7.Explain various issues in the selection process
8. Explain the Hardware/Software integration process with an example
- 9.Explain in detail about embedded design life cycle
- 10.Explain in detail about tool chain availability

## **UNIT-II- PARTITIONING DECISION**

### **PART-A**

- 1.How to optimize the code and speed density
- 2.What is firmware
- 3.Define the term linker
- 4.Define reentrant function
- 5.What is coverification process
- 6.What do you mean by HW/SW duality
- 7.What is the key part of creating an embedded system
- 8.What is silicon compilation process
- 9.What is the importance of ASIC in embedded system
- 10.Draw the block diagram of hardware and software duality
- 11.What is meant by code space
- 12.What is meant by unpopulated memory space
- 13.Define the term data space
- 14.Write the design steps for code the hardware
- 15.Give some examples of ASIC Technology
- 16.Write steps while asserting an interrupt signal
- 17.Define the term start up code
- 18.State the advantages of relocatable module
- 19.What is virtual HW/SW integration
- 20.What is meant by ASIC revolution

### **PART-B**

- 1.Illustrate how to code the hardware in the view of HW/SW duality
- 2.Write briefly about nested interrupts and reentrancy
- 3.Write briefly about object placement
- 4.How to write the coding for both hardware and software development
- 5.With example explain how the risk management is achieved
- 6.Explain in detail about memory organization and enhancement
- 7.Explain how coverification is done
- 8.Explain in detail about the memory organization of 68k microprocessor and how it is started up
- 9.Explain in detail about silicon compilation process
10. Describe the memory access procedure What is the use of chip select function

## **UNIT-III-FUNCTIONALITIES FOR SYSTEM DESIGN**

### **PART-A**

- 1.How does the host based debugging perform
- 2.What is meant by shadow register
- 3.How watch dog timers protect the system
- 4.What are the advantages of logic analyzer
- 5.What is watch dog timer
- 6.Draw the watch dog timer flow diagram
- 7.Name the run control services provided by debugger
- 8.Name the advantages of debug kernel
- 9.What are the elements of ROM Emulator
- 10.State the limitations of ROM Emulator
- 11.What is the use of logic analyzer
- 12.What are the modes of operation of logic analyzer
- 13.Draw the schematic representation of logic analyzer trace and trigger system
- 14.Define the term In System Programming
- 15.State the difference between In System Programming and In Application Programming
- 16.What is meant by symbolic triggering
- 17.Write the advantages of ROM Emulator
- 18.State the uses of ROM Emulator
- 19.What is meant by break point
- 20.What is meant by state mode

### **PART-B**

- 1.Write short notes on symbolic triggering
- 2.With functional block diagram of typical ROM emulator explain its operation
- 3.Explain in detail on the JTAG Emulator
- 4.Explain how timers and counters are useful in system design
- 5.Explain the flash memory and RAM organization in a controller
- 6.What is in system programming what are the advantages of ISP
- 7.Explain how ROM emulators helps in debugging operation
- 8.Explain logic analyzers in detail
- 9.Explain Host based debugging and remote debugging in detail
10. With functional block diagram of watch dog timers explain its operation

## **UNIT-IV-IN CICUIT EMULATORS**

### **PART-A**

- 1.What does ISS stands for
- 2.Listout the details provided by the statistical profiling
- 3.Compare the features of simulator and emulator
- 4.Why do we use overlay memory during emulation
- 5.What are the key capabilities necessary for HW/SW integration
- 6.What is an Emulator
- 7.Name the key blocks in the emulator
- 8.Define the term overlay memory
- 9.What is wait state
- 10.What are the advantages of emulator
- 11.State the reasons why emulators are not used more
- 12.Compare the NMI and RESET signal
- 13.What is meant by ICE
- 14.What are the issues in using the emulator
- 15.What is meant by hardware break point
- 16.State the use of NMI signal
- 17.What is meant by real time trace
- 18.State the limitations of ICE
- 19.State the necessity for bullet proof run control
- 20.What is the use of RESET signal

### **PART-B**

- 1.With neat block diagram explain Emulation Control System with real time trace
- 2.Discuss briefly on memory management of overlap memory on cache replacement techniques
- 3.Explain why bullet proof run control is necessary while testing the system
- 4.With an example explain how to fix a hardware break point in a system
- 5.Explain how do we achieve the real time trace in a system
- 6.Explain in detail about the various timing constraints in In-Circuit emulation
7. Explain about setting the trigger and distributed emulators
- 8.Explain the architecture of run control system
9. Explain in detail about hardware break points
- 10.In detail explain overlay memory

## **UNIT-V-EMBEDDED DESIGN LIFE CYCLE AND TESTING PERIODS**

### **PART-A**

1. Write the features of functional test and coverage test
2. What do you mean by data dominated system
3. Name the two coverage test techniques available
4. What is meant by regression testing
5. Define the term test case design
6. Name the types of functional test
7. Say some examples of white box test
8. What is meant by Gray Box Testing
9. What is meant by data dominated systems
10. What is meant by unit testing
11. Draw embedded system design life cycle
12. Define the term PCB
13. State the methods of measuring test coverage
14. What are the various issues involved in real time failure modes
15. What is meant by hardware respin
16. How will you avoid hardware respin
17. State the reasons for testing
18. State the steps in PCB Design
19. State the methods for tracking the bug
20. What is time critical failure

### **PART-B**

1. Explain in detail about the modeling of EDLC
2. Tabulate the system design process in host machine and in target machine
3. How PCB assembly works. Explain how to trace a bug
4. Explain how to trace embedded software. How to choose test cases
5. Discuss in detail the different methods of measuring test coverage
6. Explain the various issues involved in real time failure modes
7. Write short notes on functional tests
8. Explain HW/SW integration and product testing in detail
9. Explain control and data dominated systems in detail
10. Explain in detail performance testing and maintenance