



VALLIAMMAI ENGINEERING COLLEGE
S.R.M . NAGAR, KATTANKULATHUR-603203.



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EE6602- EMBEDDED SYSTEMS

QUESTION BANK

UNIT I - INTRODUCTION TO EMBEDDED SYSTEMS

PART A

1. Define Embedded system (BTL 1)
2. List the components of Embedded system (BTL 1)
3. Summarize the characteristic of embedded system. (BTL 2)
4. Classify the types of embedded system (BTL 3)
5. Compare embedded system and non embedded system with examples (BTL 4)
6. Summarize the important considerations when selecting a processor. (BTL 2)
7. Define DMA. (BTL 1)
8. Discuss about Watch dog timer (BTL 2)
9. Define real time clock (BTL 1)
10. Show the flowchart of build process for embedded systems (BTL 3)
11. Classify the various types of memory in embedded system (BTL 3)
12. Demonstrate the In circuit Emulator (BTL 3)
13. Define compiler and cross compiler (BTL 1)
14. Define software timer. (BTL 1)
15. Distinguish between Von Neumann and Harvard Architecture. (BTL 2)
16. Explain the functions of memory manager (BTL 4)
17. Compose the different ways to debug the hardware (BTL 5)
18. Distinguish between CISC and RISC. (BTL 2)
19. Classify the methods of memory manager? (BTL 3)
20. Justify the Need of debugging and types of debugging. (BTL 6)

PART B

1. Explain in detail about the build process for embedded systems. (16) (BTL 4)
2. Describe the structural units in embedded processor. (16) (BTL 1)
3. How to select the processor based upon its architecture and applications. (16) (BTL 6)
4. Explain the concept of DMA. (16) (BTL 4)
5. Discuss the methods in memory management. (16) (BTL 2)
6. Discuss in detail about the timer and counter. (16) (BTL 2)
7. Explain the classification of embedded systems with examples. (16) (BTL 1)
8. Describe the working principle of incircuit emulator. (16) (BTL 1)

9. Illustrate the concept of watch dog timer. (16) (BTL 3)
10. Discuss in detail about target hardware debugging. (16) (BTL 2)

UNIT II - EMBEDDED NETWORKING

PART A

1. Distinguish between Synchronous and Asynchronous communication. (BTL 2)
2. Show the structure of UART. (BTL 3)
3. Define half duplex and full duplex communication. (BTL 1)
4. Give examples of serial ports and parallel ports. (BTL 2)
5. Define BAUD Rate. (BTL 1)
6. Differentiate between RS232 and RS485. (BTL 2)
7. Give examples of Synchronous and Asynchronous communication ports. (BTL 2)
8. Analyze the concept of RS232 standard. (BTL 4)
9. Define synchronous communication. (BTL 1)
10. Define Protocol. (BTL 1)
11. Difference between RS422 and RS485. (BTL 2)
12. Justify the need for RS-485? (BTL 6)
13. Discuss about the limitations of I2C. (BTL 2)
14. Compare the buses used in serial communication. (BTL 4)
15. Define CAN bus. (BTL 1)
16. Discuss about SPI. (BTL 2)
17. Define device driver? (BTL 1)
18. Point out the frames in CAN. (BTL 4)
19. How do the following indicate the start and end of a byte or data frames? (a) (BTL 3)
 UART (b) CAN
20. Justify the need of device driver? (BTL 6)

PART B

1. Illustrate the synchronous and asynchronous communications from serial devices. (16) (BTL 3)
2. Describe the functions of a typical parallel I/O interface with a neat diagram. (16) (BTL 1)
3. Discuss the types of serial port devices. (16) (BTL 2)
4. (i) Compare the advantages and disadvantages of data transfer using serial and parallel port/devices. (8) (BTL 4)
 (ii) Discuss the RS-232C interface standard protocol. (8) (BTL 2)
5. Compare the various standards of communication protocol, UART, RS232, RS422 & RS485 (16) (BTL 4)
6. (i) Demonstrate the signal using a transfer of byte when using the I2C bus and also the format of bits at the I2C bus with diagram. (8) (BTL 3)
 (ii) Explain CAN bus. (8) (BTL 4)

7. Why we need device driver? How do you write a device driver? List the steps involved in writing a device driver. (16) (BTL 1)
8. Describe SPI protocol and its interface. (16) (BTL 1)
9. Justify the types and need for various bus communication standards.(16) (BTL 6)
10. Describe one type of serial communication bus with its communication protocol. (16) (BTL 1)

UNIT III - EMBEDDED FIRMWARE DEVELOPMENT ENVIRONMENT

PART A

1. What is EDLC? (BTL 1)
2. Discuss about model? (BTL 2)
3. Define Conceptualisation phase. (BTL 1)
4. Classify the 3 categories of product development. (BTL 3)
5. Define requirement analysis phase. (BTL 1)
6. Define Product design phase and development phase (BTL 1)
7. Compare the models used in EDLC? (BTL 5)
8. Define Spiral model (BTL 1)
9. Define Linear model (BTL 1)
10. Discuss about prototyping or evolutionary model. (BTL 2)
11. Define deployment phase. (BTL 1)
12. Explain data flow model (BTL 4)
13. What are the differences between data flow model and state machine model? (BTL 2)
14. Summarize the objective of EDLC. (BTL 6)
15. What are the advantages and disadvantages of Linear or Water fall model? (BTL 2)
16. Analyze the issues of hardware-software co-design? (BTL 4)
17. List the drawbacks of prototyping model (BTL 2)
18. Discriminate the different phases of EDLC? (BTL 6)
19. Justify the quality of products. (BTL 6)
20. Define productivity. (BTL 1)

PART B

1. Explain the embedded software development process. (16) (BTL 4)
2. Discuss in detail about the different phases of EDLC. (16) (BTL 2)
3. Generalize the various computational models in embedded design. (16) (BTL 5)
4. Discuss the issues in hardware – software codesign of embedded system.(16) (BTL 2)
5. Compare the various modeling of EDLC. (16) (BTL 6)
6. (i) Illustrate sequential flow model with example. (16) (BTL 3)
(ii) Illustrate Concurrent process model with example. (16) (BTL 3)
7. (i) Describe object oriented model with example. (8) (BTL 1)

- (ii) Differences between Data flow model and state machine model. (8) (BTL 2)
- 8. (i) Describe Data Flow Graph model with example. (8) (BTL 1)
- (ii) Describe State Machine model with example. (8) (BTL 1)
- 9. (i) Describe in detail the Waterfall or Linear model. (8) (BTL 1)
- (ii) Describe in detail the Iterative/ Incremental or Fountain Model. (8) (BTL 1)
- 10. (i) Explain in detail the Prototyping Model. (8) (BTL 4)
- (ii) Explain in detail the Spiral Model. (8) (BTL 4)

UNIT IV - RTOS BASED EMBEDDED SYSTEM DESIGN

PART A

- 1. Define process and threads. (BTL 1)
- 2. Discuss about the different thread states? (BTL 2)
- 3. Define real time operating system? (BTL 1)
- 4. Point out the consequences of context switching. (BTL 4)
- 5. When is an RTOS necessary and when it is not necessary in embedded systems? (BTL 3)
- 6. Explain multi-rate embedded system? Give 3 examples. (BTL 4)
- 7. Compare the release time and deadline. (BTL 4)
- 8. Define period and rate. (BTL 1)
- 9. Compare initiation time and completion time. (BTL 4)
- 10. Classify the three basic scheduling states in OS? (BTL 3)
- 11. Define scheduling policy. (BTL 1)
- 12. Define utilization. (BTL 1)
- 13. Discuss about the two major styles of inter process communication? (BTL 2)
- 14. Explain the mechanism of priority inversion? (BTL 4)
- 15. Discuss about the context switching? (BTL 2)
- 16. Demonstrate the interrupt latency. (BTL 3)
- 17. Describe about the concept of dead lock situation? (BTL 1)
- 18. Examine the various performance issues in RTOS based embedded system design? (BTL 3)
- 19. Illustrate the concept of message passing? (BTL 3)
- 20. Define shared data problem? (BTL 1)

PART B

- 1. Describe the services of UNIX based real time operating systems. Compare its features with window based real time operating systems. (16) (BTL 1)
- 2. Discuss about the contemporary real time operating systems VxWorks, Linux and RT Linux. (16) (BTL 2)
- 3. (i) Summarize Preemptive and Non-preemptive multitasking.(8) (BTL 6)
- (ii) Describe the three alternative systems in three RTOS for responding a hardware source call with the diagram. (8) (BTL 1)
- 4. (i) List out the goals of operating system services. (8) (BTL 1)

- (ii) Generalize the scheduler in which RTOS insert into the list and the ready task for sequential execution in a co-operative round robin model. (8) (BTL 6)
- 5. (i) Analyze the fifteen point strategy for synchronization between the processes, ISRs, OS functions and tasks for resource management. (8) (BTL 4)
- (ii) Discuss the critical section service by a preemptive scheduler. (8) (BTL 2)
- 6. (i) Summarize the Rate Monotonic Co-operative scheduling. (8) (BTL 2)
- (ii) Explain the features of Vx Works. (8) (BTL 4)
- 7. (i) List out the RTOS programming tool MicroC/OS-II (8) (BTL 1)
- (ii) Explain the use of semaphores for a Task or for the Critical Sections of a Task. (8) (BTL 4)
- 8. Show the appropriate diagrams explain multiple tasks and multiple processes. (16) (BTL 3)
- 9. Generalize the various scheduling policies with example. (16) (BTL 6)
- 10. Describe the following (BTL 2)
- (i) Inter process communication (8)
- (ii) Context Switching (8)

UNIT V - EMBEDDED SYSTEM APPLICATION DEVELOPMENT

PART A

- 1. Define smart card? (BTL 1)
- 2. Define RTC. (BTL 1)
- 3. Define device driver. (BTL 1)
- 4. Show the architectural hardware units needed in an automatic vending machine. (BTL 3)
- 5. What are the hardware units needed to design smartcard (BTL 5)
- 6. Integrate the various types of memory units that must be present in smartcard, ACVM and washing machine. (BTL 5)
- 7. Show the architectural hardware units needed in washing machine. (BTL 3)
- 8. Design the architectural hardware units needed in smartcard. (BTL 5)
- 9. What is the hardware units needed to design washing machine. (BTL 5)
- 10. What is the hardware units needed to design ACVM? (BTL 5)
- 11. Point out the various inter process communication methods required in implementing the washing machine. (BTL 4)
- 12. What is the software units needed to design ACVM? (BTL 5)
- 13. What is the software units needed to design washing machine. (BTL 5)
- 14. What is the software units needed to design smartcard? (BTL 5)
- 15. Justify the need for watchdog timer? (BTL 6)
- 16. Analyze the major function of timer device in an ACVM. (BTL 4)
- 17. Recommend the tasks for an ACVM. (BTL 6)
- 18. Recommend the tasks for smartcard. (BTL 6)
- 19. Recommend the tasks for washing machine. (BTL 6)
- 20. Explain the various inter process communication methods required in implementing the smartcard. (BTL 4)

PART B

1. Design architectural hardware and software units needed in an automatic chocolate vending machine (16) (BTL 5)
2. Design architectural hardware and software units needed in smart card. (16) (BTL 5)
3. Tabulate hardware units needed in each of the systems: Camera, Smart card, Automatic chocolate vending machine, Washing machine.(16) (BTL 1)
4. Demonstrate the hardware and software units that must be present in automatic chocolate vending machines (16) (BTL 3)
5. List various types of memories and the application of each in the following systems: Robot, Digital camera, Smart card, Washing machine. (16) (BTL 1)
6. Show and explain basic system of an Automatic chocolate vending system (16) (BTL 3)
7. Apply suitable hardware and software to develop the embedded system for a smart card. (16) (BTL 5)
8. List the various steps needed to design a smartcard (16) (BTL 5)
9. Examine the components of embedded system in automatic chocolate vending machines and smartcard(16) (BTL 3)
10. Identify the tasks for an ACVM. Explain the various interprocess communication methods required in implementing the application. (16) (BTL 1)

