



MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

Department of Electronics and Communication Engineering Question Bank - Academic Year (2021-22)

Course Code & Course Name : 19ECC15 Embedded Systems and RTOS

Year / Sem / Sec : II / VI /

UNIT-I: INTRODUCTION

Part-A (2 Marks)

1. What is an Embedded system? What are the components of Embedded system?
2. Differentiate between a general purpose computing system and an Embedded System.
3. List the various application areas of Embedded systems and give examples for each application area.
4. Mention the quality attributes of Embedded systems.
5. Classify embedded systems.
6. Name some hardware parts of Embedded systems.
7. What are the advantages of Embedded systems?
8. List out the drawbacks of Embedded systems.
9. Depict the building blocks of the Hardware in an embedded system.
10. Classify processor in Embedded systems.

Part-B (16 Marks)

1. (i) Illustrate the various categories of embedded systems. (8)
(ii) Explain in detail about recent trends in Embedded System (8)
2. Explicate in detail about architecture of embedded system. (16)
3. Discuss the various quality attributes of embedded systems (16)
4. Discuss the major application areas of embedded systems in detail. (16)
5. (i) Explain the important characteristics of Embedded systems. (8)
(ii) Discuss the role of microcontrollers in Embedded systems in detail. (8)

UNIT-II: TYPICAL EMBEDDED SYSTEMS

Part-A (2 Marks)

1. Categorize the core of embedded systems.
2. Differentiate Harvard and Von-Neumann Processor/Controller Architecture.
3. Compare general purpose processor and application specific instruction processor (ASIP)
4. What do you mean by Big-endian and little-endian processors?
5. Define memory shadowing.
6. What are the two common Instruction Set Architecture (ISA) available for processor design? Write their important features.
7. List the advantages of ASIC.
8. Recall the types of programmable ASICs.
9. What is PLD? Brief its types.
10. What do you mean by COTs? List its advantages and drawbacks.

Part-B (16 Marks)

1. Illustrate the core of embedded systems in detail. (16)
2. Describe in detail about ASICs and PLDs (16)
3. Explain the various memories used in embedded systems (16)
4. Discuss on memory shadowing. Explain the factors that need to be considered for memory selection in embedded systems. (16)
5. (i) Write note on COTs. (8)
(ii) Discuss the role of sensors and actuators in Embedded systems in detail. (8)

UNIT-III: EMBEDDED FIRMWARE

Part-A (2 Marks)

- 1 What are advantages of high level languages?
- 2 Difference between macros and functions.
- 3 Mention the use of infinite loops.
- 4 Define Embedded Firmware.
- 5 List out the approach for the design and Implementation of Embedded Firmware.
- 6 What is Watchdog Timer?

- 7 Distinguish between Firmware and Embedded Software.
- 8 List out the Advantage and Disadvantage of Embedded Firmware Design approach.
- 9 What are the examples of firmware?
- 10 What are all the Embedded System Development Languages?

PART B (16 Marks)

- 11 Explain in detail about Embedded Firmware Design Approaches using the Super Loop Based Approach. (16)
- 12 Explain briefly about High Level Language based Embedded Firmware Development Languages (12)
- 13 Explain briefly about Embedded Firmware Development Languages – Mixing of Assembly with High Level Languages (16)
- 14 Explain briefly about Assembly Language based Embedded Firmware Development Languages (16)
- 15 Explain in detail about Embedded Firmware Design Approaches using Embedded OS Based Approach. (16)

UNIT-IV: REAL TIME OPERATING SYSTEMS

Part-A (2 Marks)

1. Define RTOS and its types.
2. Compare OS and RTOS.
3. What is Task scheduler? How does the scheduler know when a task has become blocked or unblocked?
4. Define task and Task state.
5. What are the goals of RTOS?
6. What is priority inheritance?
7. What is Semaphore? Mention its uses.
8. List the functions of Kernel.
9. What is priority inversion and Deadlock situations?
10. What is IPC? Mention the two different ways available for it.

PART B (16 Marks)

- 11 Explain any three types of inter process communication functions between the tasks (16)
- 12 List out various problems associated with semaphores. Discuss with suitable examples about priority inversion and dead lock situations. (16)
- 13 What is IPC? Mention the two methods available for it. Explain in detail about message queues. (16)
14. Discuss in detail about the following.
 1. Timer function events. (8)
 2. Memory management functions (8)
- 15 Explain in detail about semaphores and its applications. (16)

UNIT-V: RTOS BASED EMBEDDED SYSTEM DESIGN

Part-A (2 Marks)

1. Define Monolithic kernel and its drawbacks.
2. What are the benefits of Microkernel
3. Define the types of Operating Systems.
4. Compare GPOS and RTOS
5. Define Interrupts and its Types.
6. Define Timer Tick
7. What is State Transition?
8. Define Blocked State/Wait State.
9. Differentiate Thread and Process.
10. What are all the types of Multitasking?

PART B (16 Marks)

- 11 Explain in detail about How to chose a RTOS (16)

- 12 (i) Distinguish between the features of MicroC/OS –II and VxWorks RTOS (12)
- (ii) Describe Memory Related Functions of MicroC/OS- II (4)
- 13 Explain briefly about various design process in a Home Security System. (16)
- 14 Explain briefly about various design process in Automated Teller Machine. (16)
- 15 What are features of VxWorks and explain detail about different functions used in VxWorks RTOS? (16)