



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

TUTORIAL QUESTION BANK

Course Title	EMBEDDED SYSTEMS				
Course Code	AEC016				
Programme	B.Tech				
Semester	VII	ECE			
Course Type	Core				
Regulation	IARE - R16				
Course Structure	Theory			Practical	
	Lectures	Tutorials	Credits	Laboratory	Credits
	3	-	3	3	2
Chief Coordinator	Mr. MD Khadir, Assistant Professor				
Course Faculty	Ms. Anusha N, Assistant Professor Ms. M Lavanya, Assistant Professor Mr. MD Khadir, Assistant Professor Mr. B Naresh, Assistant Professor				

COURSE OBJECTIVES

The course should enable the students to:	
I	Imbibe knowledge about the basic functions, structure, concepts and applications of Embedded Systems.
II	Understand Real time operating system concepts.
III	Analyze different tools for development of embedded software.
IV	Be acquainted the architecture of advanced processors.

COURSE OUTCOMES (COs):

CO 1	Understand the basic concepts of embedded system and various applications and characteristics, formalisms for system design of embedded system design
CO 2	Discuss the concepts of C and develop the C programming examples with Keil IDE, and understand the concepts of interfacing modules using embedded C.
CO 3	Understand the fundamentals of RTOS and its programming and task communication, Task synchronization with its issues and techniques.
CO 4	Develop an examples using embedded software and understand the debugging techniques
CO 5	Discuss the concepts of advanced processors like ARM and SHARC and protocols of I2C and CAN bus.

COURSE LEARNING OUTCOMES (CLOs):

Students, who complete the course, will have demonstrated the ability to do the following:

AEC016.01	Understand basic concept of embedded systems.
AEC016.02	Analyze the applications in various domains of embedded system.
AEC016.03	Develop the embedded system and Design process and tools with examples.
AEC016.04	Understand characteristics and quality attributes of embedded systems, formalisms for system design.
AEC016.05	Understand the basic programming of c and its looping structure.
AEC016.06	Analyze the embedded C programming in Keil IDE, and compiling and building the hardware.
AEC016.07	Understand different concepts of display and keyboard interfacing using embedded C.
AEC016.08	Understand different concepts of serial communication using embedded C and user interfacing
AEC016.09	Remember the basics of operating system and its commands.
AEC016.10	Understand and analyze the RTOS concepts for firmware development.
AEC016.11	Remember how to choose an RTOS, task scheduling, semaphores and queues, hard real-time scheduling considerations.
AEC016.12	Understand the task communication, its programming and Task synchronization with its issues and techniques.
AEC016.13	Develop host and target machines for linking to embedded software.
AEC016.14	Develop debugging techniques for testing on host machine with examples.
AEC016.15	Remember the advanced processors such as ARM and SHARC.
AEC016.16	Understand the bus protocols such as I2C and CAN bus.
AEC016.17	Design an application based on advanced technological changes.

TUTORIAL QUESTION BANK

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
UNIT-I				
EMBEDDED COMPUTING				
Part - A(Short Answer Questions)				
1	Define an embedded system.	Understand	CO 1	AEC016.01
2	Distinguish between embedded system vs general purpose system.	Understand	CO 1	AEC016.01
3	Demonstrate any four application areas of embedded systems.	Understand	CO 1	AEC016.01
4	List out classification embedded systems based on generation.	Remember	CO 1	AEC016.01
5	Discuss in briefly the history of embedded systems.	Understand	CO 1	AEC016.01
6	Outline the classification of embedded systems based on triggering	Remember	CO 1	AEC016.01
7	Demonstrate the brake and stability control system of automobile example.	Understand	CO 1	AEC016.02
8	List out classification embedded systems based on and performance requirements	Remember	CO 1	AEC016.02
9	List the steps in embedded system design process.	Remember	CO 1	AEC016.02
10	Explain classification of embedded systems based on deterministic behavior.	Understand	CO 1	AEC016.03
11	Describe the typical characteristics of an embedded system?	Remember	CO 1	AEC016.03
12	Explain the main components of an embedded system?	Understand	CO 1	AEC016.04
13	Give examples for small, medium and sophisticated embedded systems.	Understand	CO 1	AEC016.04
14	Write short notes on formalism for the system design.	Understand	CO 1	AEC016.04
15	Draw the neat diagram of digital camera application.	Understand	CO 1	AEC016.02
16	Give the examples of formalism for the system design.	Understand	CO 1	AEC016.04
17	Define Operational Quality attributes of embedded computing.	Understand	CO 1	AEC016.04
18	Define Non-Operational Quality attributes of embedded computing.	Understand	CO 1	AEC016.04
19	List out classification embedded systems based on complexity requirements.	Remember	CO 1	AEC016.02
20	Define contrast top-down and bottom-up design in embedded systems.	Understand	CO 1	AEC016.03
Part - B (Long Answer Questions)				
1	Interpret the requirements for an embedded system design process.	Understand	CO 1	AEC016.01
2	Explain automatic chocolate vending machine with neat diagram.	Remember	CO 1	AEC016.01
3	Explicate in detail about formalism for the system design with an example.	Understand	CO 1	AEC016.04
4	Discuss the specifications for an embedded system design process.	Remember	CO 1	AEC016.02
5	Examine the classification of embedded systems based on generation with examples.	Understand	CO 1	AEC016.01
6	Demonstrate the digital camera application with neat diagram and explain how it works based on embedded design.	Understand	CO 1	AEC016.02
7	Examine the architecture for an embedded system design process.	Understand	CO 1	AEC016.02
8	Explain classification embedded systems based on complexity and performance requirements.	Understand	CO 1	AEC016.01
9	Analyze the components for an embedded system design process.	Understand	CO 1	AEC016.02
10	Describe major application areas of an embedded system with examples.	Remember	CO 1	AEC016.02

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
11	Explain the characteristics of embedded computing applications	Understand	CO 1	AEC016.03
12	Discuss the Operational Quality attributes of embedded computing applications	Understand	CO 1	AEC016.04
13	Discuss the Non- Operational Quality attributes of embedded computing applications.	Understand	CO 1	AEC016.04
14	Which are the components used as the core of an embedded system? Explain the merits, drawbacks, if any, and the applications/domains where they are commonly used	Remember	CO 1	AEC016.04
15	Give domain specific examples of embedded system design and explain in detail about one example with a neat diagram	Understand	CO 1	AEC016.02
16	Explain the classification of Embedded system based on: i) Generation ii) Complexity and Performance	Understand	CO 1	AEC016.01
17	Explain some system components for the proper functioning of the processor of the embedded system.	Understand	CO 1	AEC016.01
18	Discuss the steps involved in designing a model train controller and explain its working functionality based on embedded system.	Understand	CO 1	AEC016.02
19	Define embedded system and compare embedded system and general computing system.	Understand	CO 1	AEC016.01
20	Explain the digital signal processing in embedded system design continued digitization of signals increasing the role of DSP in ES.	Understand	CO 1	AEC016.02
Part - C (Analytical Questions)				
1	Briefly describe the distinction between requirements and specification.	Understand	CO 1	AEC016.02
2	Briefly describe the distinction between specification and architecture.	Understand	CO 1	AEC016.02
3	At what stage of the design methodology would we determine what type of CPU to use (8-bit vs. 16-bit vs. 32-bit, which model of a particular type of CPU, etc.)?	Remember	CO 1	AEC016.03
4	At what stage of the design methodology would we choose a programming language?	Understand	CO 1	AEC016.04
5	At what stage of the design methodology would we test our design for functional correctness?	Understand	CO 1	AEC016.04
6	Compare and contrast top-down and bottom-up design in embedded systems design process.	Understand	CO 1	AEC016.03
7	Provide a concrete example of how bottom-up information from the software programming phase of design may be useful in refining the architectural design.	Understand	CO 1	AEC016.04
8	Create a UML state diagram for the issue-command () behavior of the Controller class.	Remember	CO 1	AEC016.04
9	Draw a class diagram for the classes required in a basic microwave oven. The system should be able to set the microwave power level between 1 and 9 and time a cooking run up to 59 min and 59 s in 1-s increments. Include * classes for the physical interfaces to the telephone line, microphone, speaker, and buttons.	Understand	CO 1	AEC016.03
10	Show how a Set-speed command flows through the refined class structure described in Figure	Understand	CO 1	AEC016.03

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
	<p>moving from a change on the front panel to the required changes on the train:</p> <p>a. Show it in the form of a collaboration diagram. b. Show it in the form of a sequence diagram.</p>			

UNIT - II
INTRODUCTION TO EMBEDDED C AND APPLICATIONS

Part – A (Short Answer Questions)

1	How many types of data types in C?	Remember	CO 2	AEC016.05
2	Develop an embedded c program for simple super loop?	Understand	CO 2	AEC016.05
3	What do you mean by C looping structure?	Understand	CO 2	AEC016.05
4	What do mean by register allocation?	Understand	CO 2	AEC016.05
5	What is pointer aliasing?	Understand	CO 2	AEC016.05
6	What is inline functions and inline assembly?	Understand	CO 2	AEC016.05
7	Examine the header file.	Remember	CO 2	AEC016.06
8	How to build the embedded c in keil IDE.	Understand	CO 2	AEC016.06
9	Discuss about code editor?	Understand	CO 2	AEC016.06
10	List the P0 bit registers addresses.	Remember	CO 2	AEC016.06
11	Explain compiler and cross compiler.	Understand	CO 2	AEC016.06
12	Demonstrate assembler and cross assembler.	Understand	CO 2	AEC016.06
13	What is switch bounce?	Understand	CO 2	AEC016.08
14	Discuss about disassembly.	Understand	CO 2	AEC016.07
15	What is mean by an Interrupt?	Understand	CO 2	AEC016.07
16	What are the portability issues?	Understand	CO 2	AEC016.05
17	Define register allocation	Understand	CO 2	AEC016.05
18	Write short notes on file based C class?	Understand	CO 2	AEC016.06
19	What are the technical issues concerned to embedded c?	Understand	CO 2	AEC016.06
20	What are the basic techniques for reading and writing from I/O port pins?	Understand	CO 2	AEC016.07

Part - B (Long Answer Questions)

1	Describe the functions of a typical parallel I/O interface with a neat diagram.	Understand	CO 2	AEC016.05
2	Explain the difference between “pointer to constant data” “ and “constant pointer to data” in Embedded C programming. Explain the syntax for declaring both.	Understand	CO 2	AEC016.05
3	Write an embedded c program for reading and writing bits in a simple version along with explanation.	Understand	CO 2	AEC016.05
4	Sketch the diagram of keyboard interfacing and explain each pin specifications?	Remember	CO 2	AEC016.07
5	Draw the diagram of display interfacing and explain in detail about the circuit diagram.	Remember	CO 2	AEC016.07
6	Sketch the diagram of D/A interfacing and explain in detail about the circuit diagram.	Understand	CO 2	AEC016.07

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
7	Draw the diagram of A/D interfacing and explain in detail about the circuit diagram.	Remember	CO 2	AEC016.07
8	Explain the Basic techniques for reading from I/O port pins for building the Embedded hardware.	Understand	CO 2	AEC016.08
9	Discuss in detail about pin TxD and RxD functionality in keyboard interfacing?	Understand	CO 2	AEC016.08
10	Explain the concept of switch bounce with example and develop an embedded C program for reading switch inputs?	Remember	CO 2	AEC016.07
11	Design and Develop an embedded C program for restructuring the 'Hello, embedded world'?	Understand	CO 2	AEC016.07
12	Write an embedded code for the following i. Simple super loop demonstration. ii. Simple central heating system.	Understand	CO 2	AEC016.05
13	Explain the process of developing embedded software with example? Develop an embedded C program for simple super loop?	Understand	CO 2	AEC016.05
14	Explain the concept of switch bounce with example and develop an embedded C program for reading switch inputs?	Understand	CO 2	AEC016.07
15	Discuss in detail the basic techniques for reading from port pins? Develop an embedded C program for reading and writing bits (generic version).	Understand	CO 2	AEC016.07
16	Define multiple interrupts? Explain in detail about the classifications of each interrupt with an example.	Understand	CO 2	AEC016.07
17	Design and Develop an embedded C program for LED interfacing.	Understand	CO 2	AEC016.07
18	Explain in detail about serial data communication using embedded C interfacing.	Understand	CO 2	AEC016.08
19	i. Write a Program to toggle all the bits of port P1 continuously with 250 ms delay ii. Write a Program to toggle only the bit P1.5 continuously with some delay	Understand	CO 2	AEC016.07
20	Write a Program for serial communication between Microcontroller to PC communication the data should be transfer from microcontroller to PC terminal	Understand	CO 2	AEC016.08
Part - C (Analytical Questions)				
1	Discuss in detail about the initial steps of embedded program development.	Understand	CO 2	AEC016.05
2	Explain in detail about the embedded C program in Keil IDE with example.	Remember	CO 2	AEC016.06
3	Analyze the basic flow of control construct in, i) Constant time statements ii) Sequence of statements iii) For loops iv) While loops	Understand	CO 2	AEC016.05
4	Interpret the inline functions and inline assembly in C structures with an example.	Remember	CO 2	AEC016.05
5	Develop an embedded C program in order to perform bitwise operations on specified data	Understand	CO 2	AEC016.06
6	Discuss in detail about the hardware simulator.	Understand	CO 2	AEC016.07
7	Write a program toggles P0 continuously between values of 0 and 0xFF.	Understand	CO 2	AEC016.07
8	Write a program in which P2 is given two different values. The values should be passed to P2 with a delay.	Understand	CO 2	AEC016.07
9	Develop an embedded C program for the following using 8051 microcontroller.	Understand	CO 2	AEC016.07

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
	i. Project header (main.h) ii. Port header (port.h)			
10	Write a Program to toggle LEDES using simple interrupt using embedded C.	Understand	CO 2	AEC016.07
UNIT-III				
RTOS FUNDAMENTALS AND PROGRAMMING				
Part - A (Short Answer Questions)				
1	Define process.	Remember	CO 3	AEC016.09
2	Define Operating System.	Remember	CO 3	AEC016.09
3	Define task and task rates.	Understand	CO 3	AEC016.09
4	Outline about Semaphore.	Understand	CO 3	AEC016.09
5	Give the semaphore related functions.	Understand	CO 3	AEC016.09
6	Define Message Queue.	Remember	CO 3	AEC016.09
7	Define thread.	Understand	CO 3	AEC016.09
8	Explain the importance of queues in RTOS.	Understand	CO 3	AEC016.10
9	Explain hard Real Time scheduling.	Remember	CO 3	AEC016.10
10	What is meant by task scheduling?	Remember	CO 3	AEC016.10
CIE-II				
1	What is mean by task communication	Understand	CO 3	AEC016.11
2	Define shared memory in RTOS.	Remember	CO 3	AEC016.11
3	What are the synchronization issues in task communication?	Understand	CO 3	AEC016.11
4	What are the device drivers in RTOS?	Understand	CO 3	AEC016.11
5	Give the synchronization techniques in Task communication.	Remember	CO 3	AEC016.11
6	Give the importance of shared memory in Task communication.	Understand	CO 3	AEC016.11
7	Define message passing.	Remember	CO 3	AEC016.12
8	Explain the sockets in task communication.	Understand	CO 3	AEC016.12
9	Define State Diagram with an example.	Understand	CO 3	AEC016.11
10	write short notes on Deadlock	Understand	CO 3	AEC016.11
Part - B (Long Answer Questions)				
1	Explain in detail about the real time operating systems with an example.	Understand	CO 3	AEC016.09
2	Discuss in detail how thread and process are used in embedded system.	Remember	CO 3	AEC016.09
3	Define Semaphores? Explain in detail about types of Semaphores.	Understand	CO 3	AEC016.10
4	Discuss in detail about how to choose an RTOS with an example.	Understand	CO 3	AEC016.09
5	Define task scheduling? Discuss in deatail about the task states and scheduling?	Understand	CO 3	AEC016.10
6	Explain in detail about the semaphores with examples and write its specifications.	Understand	CO 3	AEC016.10
7	Write the examples of RTOS employed in embedded product development?	Remember	CO 3	AEC016.09
8	Explain in detail about the various states a task can be in during its execution life cycle under an RTOS Task State Transitions.	Understand	CO 3	AEC016.09
9	What are the situations under which a running task can go to the ready state and steady state?	Understand	CO 3	AEC016.10
10	What are the factors on which the execution time of a task depends on? While a task is executing, is the CPU continuously busy?	Understand	CO 3	AEC016.09
11	What is the need of an operating system? Explain the basics of an operating system.	Understand	CO 3	AEC016.10

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
CIE-II				
1	Define and explain in detail about the synchronization and task operation with examples?	Understand	CO 3	AEC016.11
2	Explain in detail about the about shared memory of task communication.	Understand	CO 3	AEC016.11
3	What are the techniques are present in task synchronization? Discuss in detail about each of the technique.	Understand	CO 3	AEC016.12
4	What is a device driver? Explain the role of device driver in an embedded OS.	Remember	CO 3	AEC016.12
5	Describe the terms message passing, remote procedure call and explain the functionality of message passing, remote procedure call.	Understand	CO 3	AEC016.11
6	Explain the different task communication synchronization issues encountered in inter process communication?	Understand	CO 3	AEC016.11
7	Explain in detail about the following terms with an example, i. Preemptive scheduling ii. Non-Preemptive scheduling	Understand	CO 3	AEC016.12
8	Explain in detail about the about device drivers of the task synchronization.	Understand	CO 3	AEC016.12
9	Write a short notes on the following terms, i. Message queues ii. Pipes iii. Shared memory	Understand	CO 3	AEC016.12
10	Explain about task communication and task scheduling of real time operating system.	Understand	CO 3	AEC016.12
Part - C (Analytical Questions)				
1	What is a process? With a neat representation explain the process states and state transition	Understand	CO 3	AEC016.09
2	Explain the different thread binding models for user and kernel level threads.	Remember	CO 3	AEC016.09
3	Write the basic design principles when using an RTOS to design of sample RTOS.	Understand	CO 3	AEC016.09
4	What is the difference between Hard and Soft real time systems? Give an example for Hard and Soft real time kernels?	Understand	CO 3	AEC016.10
5	Explain how Threads and process are related? What are the common to process and threads?	Understand	CO 3	AEC016.10
CIE-II				
1	Discuss in detail, the different task communication synchronization issues encountered in Inter Process communication.	Understand	CO 3	AEC016.11
2	Explain the architecture of device driver, with neat sketch and give the applications of device drivers.	Remember	CO 3	AEC016.11
3	Define and explain message-passing communication system in detail.	Understand	CO 3	AEC016.11
4	Discuss in detail about the critical section object for process synchronization? Why critical section object is based synchronization.	Understand	CO 3	AEC016.12
5	Differentiate the different functional and non-functional requirements that need to be evaluated in the selection of RTOS. explain in detail.	Understand	CO 3	AEC016.12
UNIT-IV EMBEDDED SOFTWARE DEVELOPMENT TOOLS				
Part - A (Short Answer Questions)				
1	Define host in embedded systems.	Understand	CO 4	AEC016.13
2	Define target machines in embedded systems.	Understand	CO 4	AEC016.13

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
3	Write short notes on logic analyzer.	Understand	CO 4	AEC016.13
4	Define debugging.	Understand	CO 4	AEC016.13
5	What are the main goals of software development for embedded systems?	Remember	CO 4	AEC016.13
6	Write various software development tools provided by a Host system	Understand	CO 4	AEC016.13
7	Explain linkers of embedded systems.	Understand	CO 4	AEC016.13
8	Why software testing is critical in Embedded Systems?	Understand	CO 4	AEC016.13
9	Define locators of embedded systems.	Understand	CO 4	AEC016.13
10	Explain how a host system meets these goals.	Remember	CO 4	AEC016.14
11	Write Lab debugging tools for embedded systems software.	Understand	CO 4	AEC016.14
12	Define compilers in embedded software developing process.	Understand	CO 4	AEC016.13
13	Define linkers in embedded software developing process	Understand	CO 4	AEC016.13
14	Write short notes on debugging tools.	Understand	CO 4	AEC016.14
15	List out the techniques for the debugging process.	Understand	CO 4	AEC016.14
16	What is mean by testing on host machine?	Understand	CO 4	AEC016.14
17	List out the laboratory instruments for testing the embedded system.	Understand	CO 4	AEC016.14
18	What are the hardware debugging tools used in embedded product development.	Understand	CO 4	AEC016.14
19	Describe the translation tools used in an Embedded system.	Understand	CO 4	AEC016.14
20	Write brief notes on the Emulators and Debugging.	Understand	CO 4	AEC016.14
Part – B (Long Answer Questions)				
1	Explain the differences between ‘Host Computer System’ and ‘Target System’ in terms of their hardware and software.	Understand	CO 4	AEC016.13
2	What are the main goals of software development for embedded systems? Explain how a host system meets these goals?	Understand	CO 4	AEC016.13
3	Discuss the goals of the typical testing process in embedded systems.	Understand	CO 4	AEC016.13
4	Write short notes on, i. Logic Analyzer ii. Lab debugging tools for embedded systems software.	Understand	CO 4	AEC016.13
5	Demonstrate the role of linkers / locators for embedded systems.	Remember	CO 4	AEC016.13
6	Compare the characteristics of various software architectures for embedded applications.	Understand	CO 4	AEC016.13
7	What are the main issues of Embedded Software design and explain.	Understand	CO 4	AEC016.14
8	Define and Explain in detail about the debugging and target hardware debugging.	Remember	CO 4	AEC016.14
9	Discuss in detail about the testing on host machine related to embedded systems design technology.	Understand	CO 4	AEC016.14
10	Explain in detail about Integrated development environment based on embedded systems.	Understand	CO 4	AEC016.14
11	What is compilation? Explain the types of files generated on cross compilation.	Understand	CO 4	AEC016.13
12	Discuss in detail about embedded software development process and tools.	Understand	CO 4	AEC016.13
13	Express the comparison and differentiate between the host and target machines.	Understand	CO 4	AEC016.13
14	Describe the role of in-circuit emulator in the design of embedded system.	Understand	CO 4	AEC016.13
15	What are simulators? What are the advantages and disadvantages of simulators?	Understand	CO 4	AEC016.13

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
16	Describe the debugging strategies used in embedded systems in detail.	Understand	CO 4	AEC016.14
17	Distinguish between the linker and loader for embedded software.	Understand	CO 4	AEC016.14
18	Explain in detail about the getting embedded software into the target system.	Understand	CO 4	AEC016.14
19	Discuss the Quality assurance and testing of the embedded system design.	Understand	CO 4	AEC016.14
20	Explain how testing is possible on Host machine including steps during testing.	Understand	CO 4	AEC016.14
21	Describe the problems faced in designing an RTOS. What techniques are used to overcome it	Understand	CO 4	AEC016.13
Part - C (Analytical Questions)				
1	Demonstrate the tools used to download the embedded software into the target system.	Understand	CO 4	AEC016.13
2	Explain in detail about the uses of compilers and Linkers in embedded software.	Understand	CO 4	AEC016.13
3	Why in general Host machine is used for the developments of embedded system software. Explain various software development tools provided by a Host system?	Understand	CO 4	AEC016.13
4	Explain the function and use of the following test equipment for embedded system development, i. Oscilloscope ii. Ohm-meters	Understand	CO 4	AEC016.14
5	Embedded System software design is an art as much as it is science. Discuss.	Remember	CO 4	AEC016.14
6	Explain the features of assemblers, compilers and cross-compilers used in Embedded systems.	Understand	CO 4	AEC016.13
7	Explain the boundary Scanning technique for Testing the interconnections.	Understand	CO 4	AEC016.14
8	Explain the differences between an 'Host Computer System' and a 'Target System' in terms of their hardware and software.	Understand	CO 4	AEC016.14
9	What is the role of linkers / locators for embedded systems? Explain by taking address relocation into account?	Understand	CO 4	AEC016.14
10	What are the main goals of software development for embedded systems? Explain how a host system meets these goals?	Understand	CO 4	AEC016.13
UNIT-V				
INTRODUCTION TO ADVANCED PROCESSORS				
Part - A (Short Answer Questions)				
1	Discuss about I2C?	Understand	CO 5	AEC016.17
2	What are the bits in I2C corresponding to?	Remember	CO 5	AEC016.17
3	Explain about CAN bus? Where is it used?	Understand	CO 5	AEC016.17
4	Describe about the instruction length of ARM processor	Understand	CO 5	AEC016.15
5	Draw the data frame format of CAN?	Remember	CO 5	AEC016.17
6	Define the address space in ARM processor?	Remember	CO 5	AEC016.15
7	What are disadvantages of I2C?	Understand	CO 5	AEC016.17
8	Demonstrate the important embedded processor chips?	Understand	CO 5	AEC016.15
9	What are the two essential units of a processor on an embedded system?	Remember	CO 5	AEC016.15
10	State the special features on SHARC?	Remember	CO 5	AEC016.16
11	Write the features of I2C	Understand	CO 5	AEC016.17
12	Write about SHARC	Understand	CO 5	AEC016.16
13	Give the size of ARM flash memory	Remember	CO 5	AEC016.15
14	Describe networking for embedded system	Remember	CO 5	AEC016.15
15	Explain briefly Memory organization of ARM processor	Understand	CO 5	AEC016.15

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
16	How many General purpose registers are there in the SHARC processor? mention it.	Understand	CO 5	AEC016.16
17	Write about ARM two stages Address translation.	Understand	CO 5	AEC016.15
18	Write short notes on Fixed point ALU in SHARC	Understand	CO 5	AEC016.16
19	Write the Architectural features of ARM.	Understand	CO 5	AEC016.15
20	Why we build network embedded systems.	Understand	CO 5	AEC016.17
Part - B (Long Answer Questions)				
1	Write short notes on SHARC processor and Internet enabled system.	Understand	CO 5	AEC016.16
2	Explain memory organization of ARM processor is different from conventional general purpose processors memory organization.	Understand	CO 5	AEC016.15
3	How the embedded systems are enabled with internet? Give some examples.	Understand	CO 5	AEC016.15
4	Compare and contrast ARM Bus and SHARC Bus and give its applications.	Understand	CO 5	AEC016.16
5	What is ARM? Explain the features of Advanced RISC machine Processor.	Remember	CO 5	AEC016.15
6	Explain in detail about the CAN Bus architecture and give its features and applications.	Understand	CO 5	AEC016.17
7	Describe networked embedded systems and explain about the Inter integrated circuit bus.	Understand	CO 5	AEC016.17
8	Explain in detail instruction level parallelism in networked embedded systems.	Remember	CO 5	AEC016.16
9	Discuss in detail about the serial communication programming with an example.	Understand	CO 5	AEC016.17
10	Describe networked embedded systems and explain about the controlled area network Bus.	Understand	CO 5	AEC016.17
11	Write a brief note on, i. Memory organization of ARM processor ii. Fixed point ALU in SHARC	Understand	CO 5	AEC016.16
12	Why we build network embedded systems? Explain in detail about networks for embedded systems.	Understand	CO 5	AEC016.17
13	Explain memory organization of ARM processor is different from conventional general purpose processors memory organization.	Understand	CO 5	AEC016.15
14	List out Fixed point ALU operations in SHARC processor and explain in detail.	Understand	CO 5	AEC016.16
15	Write two applications of ARM processor-based systems with functional block diagram for each application and explain its working.	Understand	CO 5	AEC016.15
16	Describe the various architectural features of one of the SHARC processors of your choice with its functional block diagram.	Understand	CO 5	AEC016.16
17	Write a brief notes on i. CAN Bus architecture ii. Programming model of ARM	Understand	CO 5	AEC016.17
18	Discuss in detail about the following terms, i. Internet-enabled systems. ii. CAN Bus architecture	Understand	CO 5	AEC016.17
19	Explain in detail about the instruction level parallelism.	Understand	CO 5	AEC016.17
20	Compare and contrast between the ARM Bus and SHARC Bus.	Understand	CO 5	AEC016.16
Part - C (Analytical Questions)				
1	List out Fixed point ALU operations in SHARC processor and explain.	Understand	CO 5	AEC016.16

S.No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
2	Write the program for the assignments in ARM instructions i. $x=(a+b)-c$ ii. $y=a*(b+c)$	Understand	CO 5	AEC016.15
3	Explain distributed embedded architectures and state why they are needed.	Remember	CO 5	AEC016.15
4	Describe an I2C bus at the following OSI-compliant levels of detail: i. Physical link ii. Data link iii. Network link	Understand	CO 5	AEC016.17
5	Give hardware and software at functional level for designing elevator controller using basic design principles using a RTOS.	Understand	CO 5	AEC016.16
6	Write two applications of ARM processor-based systems with functional block diagram for each application and explain its working.	Understand	CO 5	AEC016.15
7	Demonstrate the various architectural features of one of the SHARC processors of your choice with its functional block diagram.	Understand	CO 5	AEC016.16
8	Design Elevator controller system and explain in detail about the working model.	Understand	CO 5	AEC016.17
9	Explain in detail about the following terms along with its features, i. I ² C bus ii. CAN bus	Understand	CO 5	AEC016.17
10	Mention the similarities and differences between the ARM processor and SHARC processor based on architecture and memory organization.	Understand	CO 5	AEC016.16

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