INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	**EMBEDDED SYSTEM ARCHITECTURE**
Course Code	:	BESB11
Class	:	I - M. Tech
Branch	:	EMBEDDED SYSTEMS
Year	:	2018– 2019
Course Coordinator	:	Mr K Ravi, Assistant Professor, ECE
Course Faculty	:	Mr K Ravi, Assistant Professor, ECE

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

Unit-I

INTRODUCTION TO EMBEDDED SYSTEMS

Group – A (Short Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	Define an embedded system?	Knowledge	1
2.	What is an ISA?	Knowledge	2
3.	Discuss the features of ISA ?	Knowledge	2
4.	Classify the embedded system standards ?	Understand	2
5.	Define four groups of Market specific standards?	Knowledge	2
6.	List and define four classes of general purpose standards?	Knowledge	2
7.	Where in the embedded system model does each layer of OSI model fall? Draw it?	Create	2
8.	List out the recent trends in embedded system?	Knowledge	1
9.	What is the difference between a compiler and an assembler?	Understand	2

10.	Discuss six sources that can be used to gather embedded system design information?	Knowledge	1
11.	Why is a modular architecture representation useful?	Knowledge	1

Group - B (Long Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1.	List and describe four development models in which most embedded projects based upon?	Understand	1
2.	List and describe five different markets under which embedded systems commonly fall? Provide examples of four devices in each market.	Understand	1
3.	What is the embedded systems design and development life cycle model? How many phases are in this model? Name and describe each of its phases?	Knowledge	2
4.	What structural approach does the embedded systems model take? Draw and define the layer of this model? Why is this model introduced?	Knowledge	2
5.	Explain the differences between all embedded JVM's? What is an element of ESA? Explain with examples of architectural elements?	Understand	1
6.	What is OSI model? Explain the layers of OSI model? Give two examples of protocols under each layer?	Understand	2
7.	List and describe three most common ISA models on which architectures ar based?	Knowledge	2
8.	What is Van Neumann model ? what are the main elements defined by VN model? Explain?	Knowledge	1
9.	List and describe two types of ISA that fall under each of three ISA models? Give four real world processors that fall under the types of ISA?	Understand	1
10.	Explain the instruction level parallelism with examples?	Apply	1

Unit-II PROCESSOR HARDWARE			
Group – A (Short Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1.	What are the types of memory that can be integrated into a processor?	Knowledge	3
2.	What is control unit?	Knowledge	2
3.	What is processor I/o?	Understand	2
4.	What is an interrupt?	Understand	2
5.	What are the active electrical elements that registers are made up of?	Understand	2
6.	Classify three main types of interrupts?	Knowledge	2
7.	Define system on chip with an example?	Knowledge	2
8.	What type of memory is typically used as main memory?	Understand	3

9.	List the different types of processor architecture	Knowledge	2
10..	State the importance of data register and status register?	Understand	2

Group – B (Long Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1.	Explain the internal design of a processor with reference to the Von Neumann?	Knowledge	1
2.	Define register? Describe the two most common types of registers?	Apply	2
3.	Explain the internal architecture of a Processor?	Create	2
4.	Discuss the Hardware components of embedded system and explain ?	Knowledge	2
5.	Illustrate and explain the factors to be considered while evaluating the processor for embedded system?	Apply	2
6.	Explain various I/o devices in detail ? Mention the signals used by I/o devices for interrupting?	Apply	2
7.	List and discuss the six logical units used to classify input/ output hardware?	Knowledge	2
8.	Explain the various interrupt handling mechanisms?	Understand	2
9.	Explain the differences between a level triggered interrupt and edge triggered interrupt ?what are some strengths and drawbacks of each?	Understand	2
10.	Explain the concepts of interrupts in detail?	Understand	2

Unit-III SUPPORT HARDWARE			
Group – A (Short Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1	What is the difference between cache hit and cache miss?	Create	3
2	What is auxillary memory?	Create	3
3	Define memory management?	Knowledge	3
4	Explain briefly about the segmentation?	Create	3
5	Define PCI bus with example?	Knowledge	3
6	What is RAM and ROM?	Knowledge	3
7	Explain briefly about the memory performance?	Knowledge	3
8	What is the board memory?	Understand	3
9	What is memory map?	Apply	3
10.	Discuss about the bus performance?		3

Group - B (Long Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1	Construct and describe the memory hierarchy of an embedded system?	Create	3
2	Describe the main differences between ROM ,SRAM, DRAM memory cells?	Knowledge	3
3	List and describe the three types of ROM and RAM?	Apply	3
4	Explain board input/output that can transmit and receive data in parallel with example?	Create	3
5	Define and describe the three categories under which board buses typically fall?	Apply	3
6	List and describe three common bus arbitration schemes?	Knowledge	3
7	Explain the differences between level-1, level-2, level-3 cache? How do they all work together in a system?	Understand	2
8	List and describe three data accessibility schemes commonly implemented in auxillary memory? provide a real world example that falls under each scheme?	Understand	3
9	Explain the differences between memory management unit and a memory controller? can one embedded system incorporate both why or why not?	Knowledge	3
10.	List and describe the atleast four cache swapping schemes ?	Understand	3

Unit-IV SOFTWARE			
Group – A (Short Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1	What is middleware?	Knowledge	2
2	Differentiate between the market-specific middleware and general-purpose middleware?	Knowledge	2
3	Where in the embedded system model is application software located?	Create	4
4	List two real-world and Java examples in application software?	Understand	4
5	Which layer would TCP fall under?	Knowledge	4
6	What is application software ?	Understand	4
7	Why is Java mostly used in embedded system?	Understand	4
8	Where in the OSI model is networking middleware located?	Create	4
9	List the discuss the four subcomponents that make up ppp software?	Apply	4
10	What is an IP address?	Knowledge	4

Group – B (Long Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1	Differentiate between the UDP and TCP ? Explain in detail?	Apply	4
2	Discuss the differences between the FTP client and FTP server ?what type of embedded devices would implement each?	Understand	4
3	List and describe the four sub components that make up ppp software? What RFCS are associated with each?	Knowledge	4
4	Define application layer ?Explain the application layer protocol with two examples that can either be implemented as stand-alone application or as sub component of a larger multi-function application?	Create	4
5	Explain three embedded JVM standards that can be implemented in middleware? List two real-world JVMS that support each of the standards?	Understand	4
6	Explain the SMTP protocol in detail?	Apply	4
7	Define HTTP ? Discuss what types of applications would incorporate an HTTP client or server?	Knowledge	4
8	Discuss what type of programming languages would introduce a component at the application layer? Explain them?	Knowledge	4
9	Explain the middleware with embedded system model?	Understand	4
10.	Explain the TCP/IP model relative to OSI model in detail with block diagram?	Knowledge	4
Unit-V **ENGINEERING ISSUES OF SOFTWARE**			
Group – A (Short Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1	List and define the four steps of stage 2 of creating the architecture?	Understand	5
2	Mention four types of influences on the design process of an embedded System?	Knowledge	5
3	What is a prototype?	Apply	5
4	Differentiate between the architectural pattern and a reference model?	Knowledge	5
5	Discuss the five steps introduced in the text as a method by which to review an architecture?	Apply	5
6	What is debugging?	Knowledge	5
7	Discuss five of the cheapest techniques used in debugging?	Knowledge	5
8	What is an interpreter?	Apply	5
9	Discuss the differences between testing –to-pass and testing-to-fail?	Knowledge	5
10	Explain briefly the differences between a host and a target?	Understand	5
Group – B (Long Answer Questions)			
1	Construct and describe the four phases of the embedded system design and development life cycle model ?	Knowledge	5

2	Discuss which phase in embedded system design is considered as most difficult and important ?Explain why?	Knowledge	5
3	Mention the six stages in creating an architecture ?Explain them?	Create	5
4	Explain the process for documenting an architecture? How can a particular structure be documented?	Understand	5
5	Explain the process for analyzing and evaluating an architecture? Mention five real -world examples of each?	Apply	5
6	Discuss the main types of debugging tools? List and describe four real world examples of each type of debugging tool?	Knowledge	5
7	Define a preprocessor? Explain with real-world example of how a preprocessor is used in relation to programming language?	Apply	5
8	List some features that differentiate compiling needs in embedded systems versus in other types of computer systems? Explain in detail?	Apply	5
9	List and explain the four models under which testing techniques fall? within each of these models what are five types of testing that can occur?	Apply	5
10	Differentiate between the debugging and testing ?Explain in detail?	Understand	5

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