INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	**EMBEDDED C**
Course Code	:	BES001
Class	:	I - M. Tech
Branch	:	EMBEDDED SYSTEMS
Year	:	2016 – 2017
Course Coordinator	:	Dr M.RAMESH BABU
Course Faculty	:	

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
PROGRAMMING EMBEDDED SYSTEMS IN C

Group – A (Short Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	Mention typical examples of embedded applications?	Knowledge	
2.	Identify the major application areas of embedded systems?	Knowledge	
3.	Describe the memory issues with respect to 8051 microcontroller?	Knowledge	
4.	Explain the interrupt sources present in 8051 microcontroller?	Understand	
5.	Describe the timers and counters in 8051 microcontroller?	Knowledge	
6.	Define an embedded system?	Knowledge	
7.	Develop an embedded C program for simple super loop?	Create	
8.	Discuss about input /output pins, serial interface and timers?	Knowledge	
9.	Relate oscillator frequency and machine cycle period?	Understand	
10.	Discuss about embedded applications with real time examples?	Knowledge	

11.	List out the features of 8051 micro controller?	Knowledge	

Group - B (Long Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	Identify the suitable programming language for designing embedded system by making different observations?	Understand	
2.	Elaborate the process of a central heating controller and develop an embedded C program for central heating system?	Understand	
3.	List out the features of 8051 micro controller? Design and discuss the external interface of the standard 8051 micro controller with a neat sketch?	Knowledge	
4.	Discuss in detail about embedded applications with real time examples? Compare software development for desktop and embedded systems with suitable diagrams?	Knowledge	
5.	Summarize the process of developing embedded software with suitable examples? Develop an embedded C program for simple super loop?	Understand	
6.	Explain the architecture of 8051 microcontroller along with the pin diagram of 8051 microcontroller?	Understand	
7.	Define embedded system and also specify the background history o embedded systems?	Knowledge	
8.	Discuss the design process of Embedded System with an example? Discuss the characteristics and Quality Attributes of Embedded Systems?	Knowledge	
9.	Differentiate Embedded Systems with General Computing Systems?	Understand	
10.	Construct the block diagram of 8051 external memory interface and explain the clock frequency and performance in 8051 microcontroller?	Apply	

Unit-II
SWITCHES

Group – A (Short Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	Discuss detail the basic techniques available for reading from port pins?	Knowledge	
2.	List out C bit wise operators and describe their usage with an example?	Knowledge	
3.	Explain the interfacing of LED with 8051 microcontroller?	Understand	
4.	Explain the condition of switch bounce with simple example?	Understand	
5.	Explain the generic version of reading bits in 8051 microcontroller?	Understand	
6.	Discuss how we read and write a byte in 8051 microcontroller?	Knowledge	
7.	Discuss the basic techniques for interfacing I/O pins with microcontrollers?	Knowledge	
8.	Explain the simple version of writing bits in 8051 microcontroller?	Understand	

Group – B (Long Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	Discuss in detail the basic techniques available for reading from port pins? Develop an example program for super loop application which copies the values from Port1 to Port2?	Knowledge	

2.	Construct the schematic representation of a switch connected to a port with and without internal pull-up resistors and differentiate them?	Apply	
3.	Develop an Embedded C program based on 8051 Microcontroller for the following i) Reading and Writing bits (simple version) ii) Reading and Writing bits (generic version)	Create	
4.	Describe the various techniques available for reading from port pins? Develop an embedded C program based on 8051 microcontroller for reading and writing bits (generic version)?	Knowledge	
5.	Illustrate the need for pull-up resistors in 8051 microcontroller with a schematic representation? Develop an embedded C program for reading switch inputs?	Apply	
6.	"Embedded systems usually use switches as part of their user interface" demonstrate the above statement with suitable examples?	Apply	
7.	Discuss about the dealing of 8051 microcontroller when the switch is in bounce in counting goats condition?	Knowledge	
8.	Explain the role for the need of pull-up resistors in 8051 microcontroller?	Understand	
9.	Explain with basic code how the switch is bounced when we read the switch inputs about the dealing of 8051 microcontroller when the switch is in bounce in reading switch inputs condition?	Understand	
10.	Explain with interfacing diagram how a 8051 microcontroller Interfaces with Keyboards?	Understand	

Unit-III
ADDING STRUCTURE TO THE CODE

Group – A (Short Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Develop an embedded C program for the project header (main.h)?	Create	
2	Develop an embedded C program for restructuring the goat-counting example?	Create	
3	Construct the block diagram of project header file and discuss various components available in it and mention their applications?	Apply	
4	Describe port header(port.h) with a schematic representation?	Knowledge	
5	Develop an embedded C program for the port header(port.h)?	Create	
6	Design and Develop an embedded C program for restructuring the 'Hello, embedded world'?	Apply	
7	Discuss about file based C class?	Knowledge	
8	Develop an embedded C program for file based C class using 8051 microcontroller?	Create	
9	Describe the key aspects of hardware environment using header file with a schematic representation?	Knowledge	
10	Discuss about the process of port access from the embedded system using port file?	Knowledge	

Unit-III
ADDING STRUCTURE TO THE CODE

Group – A (Short Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Develop an embedded C program for the project header (main.h)?	Create	

2	Develop an embedded C program for restructuring the goat-counting example?	Create	
3	Describe port header (port.h) with a schematic representation?	Knowledge	
4	Develop an embedded C program for the port header (port.h)?	Create	
5	Discuss about file based C class?	Knowledge	
6	What are the technical issues concerned to embedded c?	Knowledge	
7	Discuss about the Oscillator frequency and oscillations per instruction in main.h?	Knowledge	
8	Explain the both strengths and weaknesses of c++ program version?	Understand	
9	Illustrate is it possible to create 'file based-classes' in C without imposing a significant memory or CPU load, with an example?	Apply	

Group - B (Long Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Develop an embedded C program for file based C class using 8051 microcontroller?	Create	
2	Describe the key aspects of hardware environment using header file with a schematic representation?	Knowledge	
3	Construct the block diagram of project header file and discuss various components available in it and mention their applications?	Apply	
4	Develop an embedded C program for restructuring the goat-counting example?	Create	
5	Design and Develop an embedded C program for restructuring the 'Hello, embedded world'?	Apply	
6	Discuss about the process of port access from the embedded system using port file?	Knowledge	
7	Explain about the schematic representation of the port header file with the explanation of reliability and safety?	Understand	
8	Explain how a monolithic program is turned into object-oriented C program by using functions?	Understand	
9	List out programming languages in embedded c according to different generations?	Knowledge	

Unit-IV
MEETING REAL-TIME CONSTRAINTS

Group – A (Short Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Describe and differentiate TCON Special function Register and TMOD Special function register?	Knowledge	
2	Identify the potential problem using simple switch interface code?	Knowledge	
3	Develop a program for 15ms hardware delay for 12MHz 8051 microcontroller?	Create	
4	Differentiate between the loop timeout and the hardware timeout?	Understand	
5	List out the features of THx and TLx registers and compare with other special function registers?	Knowledge	
6	Elaborate the process of creating a portable hardware delay and summarize its applications?	Understand	
7	Identify the suitable programming language for creating hardware delay?	Understand	

8	Develop an embedded C program for a more reliable switch interface?	Create	
9	Illustrate the process of testing loop timeouts with an example?	Apply	
10	Discuss applications of portable hardware delay?	Knowledge	

Group – B (Long Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Construct the block diagram of simple autopilot system? Describe in detail individual blocks in it? Develop a program for identifying problems with simple switch interface?	Apply	
2	Elaborate the process of creating a portable hardware delay and design an embedded C program?	Understand	
3	Describe and differentiate the loop timeout and the hardware timeout with suitable examples? Mention the merits and de-merits of loop timeout and hardware timeout?	Knowledge	
4	Develop an embedded C program for testing a hardware timeout? Explain why we cannot use Timer 2 for generating delays in 8051?	Create	
5	Explain how can we create and test a loop time outs with the help of simple c programs?	Understand	
6	Design and develop a C Code for a more reliable switch interface by applying the loop timeout code to the problem of switch de bouncing of 10 sec?	Apply	
7	Discuss the creation of hardware timeouts along with the portable and easy usage delay code for the 8051 family?	Knowledge	
8	Describe the Testing of hardware timeout loop using incomplete list to avoid undue repetition?	Knowledge	
9	Explain the code used in Philips 8Xc552 Extended 8051 device with a number of on-chip peripherals and also discuss the hang out conditions in Philips 8Xc552?	Understand	

Unit-V
CASE STUDY: INTRUDER ALARM SYSTEM

Group – A (Short Answer Questions)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1	Explain the simple operation of intruder alarm system?	Understand	
2	Mention different operating states of control panel for alarm system?	Knowledge	
3	Design and discuss in detail the software architecture of intruder alarm system with a neat sketch?	Apply	
4	Discuss about keypad block in an intruder alarm system?	Knowledge	
5	Design a simple c program for creating Keypad.H file?	Apply	
6	Discuss about PC_O_T1.H and PC_O_T1.C files?	Knowledge	
7	Define embedded operating system(EOS) in detail?	Knowledge	
8	Design a simple c program for creating Keypad.C file?	Apply	
9	Discuss about PC_O.H and PC_O.C files?	Knowledge	
10	Explain about the hardware issues related to embedded C?	Understand	

Group – B (Long Answer Questions)

1	Discuss the working principle of main control panel for alarm system along with a block diagram and simple program?	Knowledge	

2	Describe in detail the key software components used in intruder alarm syster and also Mention its usages in intruder alarm system?	Knowledge	
3	Develop an embedded C program for keypad block and intruder block in an intruder alarm system using 8051 microcontroller?	Create	
4	Explain the working principle of main control panel for alarm system with a block diagram? Develop an embedded C program for project header file and port header file of an intruder alarm system using 8051 microcontroller?	Understand	
5	Design an intruder alarm system using a small art gallery which contains three statues?	Apply	
6	List out the key software components used in intruder alarm system along with its applications in an intruder alarm system?	Knowledge	
7	Design the software program for creating project header file and also port header file for intruder alarm system by listing all associated files for the project?	Apply	
8	Design an intruder alarm system software program for Simple_EOS.H and Simple_EOS.C by using embedded operating system?	Apply	
9	Design the software program for creating project main.C and intruder.H file for intruder alarm system by listing all associated files for the project?	Apply	

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