INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	**EMBEDDED NETWORKING**
Course Code	:	**BES204**
Class	:	I - M. Tech
Branch	:	EMBEDDED SYSTEMS
Year	:	2016 – 2017
Course	:	Dr M.RAMESH BABU
Course Faculty	:	Mrs Anitha .P

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		
EMBEDDED COMMUNICATION PROTOCOLS		
Group – A (Short Answer Questions)		
S. No	**Questions**	**Blooms Taxonomy**	**Course Outcome**

S. No	**Questions**	**Blooms Taxonomy**	**Course Outcome**
1.	Define embedded system	Knowledge	1
2.	Give the summary of I/O devices used in embedded system	Understand	1
3.	What are the classifications of I/O devices?	Understand	1
4.	Define bus.	Knowledge	2
5.	Give some examples for serial input I/O devices.	Knowledge	2
6.	What do you meant by bus arbitration?	Understand	2
7.	Expand a) SPI b) SCI	Understand	2
8.	What is I2C?	Knowledge	1
9.	What are the bits in I2C corresponding to?	Knowledge	1
10.	What are the features of SPI?	Understand	2

11.	List the important communication interfaces used in embedded systems	Understand	2
12.	Mention logic behind firewire?	Knowledge	2

Group - B (Long Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1.	Describe the need and importance of networking in an embedded system and detail description about serial/parallel communication	Knowledge	1
2.	Explain parallel port programming in a personal computer with a suitable example and mention logic behind fire wire	Understand	2
3.	Specify the situation in which serial interface is preferred, why? Discuss generic bus structure and	Understand	1
4.	List the commonly adopted network communication standards and explain their basic features and state the use of descriptors	Knowledge	1
5.	Draw Peripheral Component Interconnect (PCI) bus architecture and explain PCI read/write ,addressing	Knowledge	1
6.	Draw the Timing diagram for a bus protocol in handshake,non addressed and Transfer 8 bits of data over 4 bit data bus	Knowledge	1
7.	Design DMA using ISA bus protocol. With a kneat diagram explain System architecture DMA write cycle & Read cycle	Understand	2
8.	DiscussInter integrated circuits (I2C) signals, addressing and Transactions	Understand	1
9.	Compare serial communication protocols RS232 standard and RS485	Knowledge	1
10.	Illustrate ISA/PCI bus protocol read bus & write bus timing diagram& Design Basic memory protocol to interface 8k of data & 32k of program memory	Knowledge	2

UNIT-II USB AND CAN BUS			
Group – A (Short Answer Questions)			
S. No	**Questions**	**Blooms Taxonomy Level**	**Course Outcome**
1	What is a CAN bus? Where is it used?	Knowledge	2
2	What is USB? Where is it used?	Understand	2
3	What are the features of the USB protocol?	Understand	2
4	What are the four types of data transfer used in USB?	Knowledge	2
5	Mention some advanced bus standard protocols	Understand	1
6	10 users plugged into a hub running 10Mbps half-duplex. There is a server connected to the switch running 10Mbps half-duplex as well. How much bandwidth does each host have to the server?	Understand	1
7	What are the two interfaces provided by protocols?	Understand	1
8	Explain the synchronous and asynchronous communications from serial devices	Understand	1

S. No	Group – B (Long Answer Questions)		
	Questions	Blooms Taxonomy Level	Course Outcome
1.	Assuming a clock freq of 20MHz a baudrateprescalar value of 1,a nominalbit of $T_{bit}=8*T_Q$. Determine the nominal baudrate of CAN bus	Apply	1
2.	A PIC microcontroller is interfaced to a PC through a USB cable. A visual basic Program runs on the PC & sends commands to microcontroller through the USB bus asking microcontroller to set/reset I/O bits of portB. Develope USB Based microcontroller output port	Apply	1
3.	With a kneat diagram discuss USB interfacing with PIC microcontroller. PortC pins RC4 & RC5 are used for USB interface.RC4 is used for USB data D+ pin.		3
4.	Assuming a microcontroller clock freq of 20MHz and required CAN bitrate is 125KHz.Calculate Timing Parameters.	Apply	1
5.	Draw basic Controller Area network (CAN) controller block diagram and explain each block and list CAN controller modes .		1
6.	Explain in detail about USB connector pin diagram and list out the various kinds of USB signaling schemes and data packets		1
7.	Write a PIC micro controller programming for Universal Serial Bus (USB) based atmospheric pressure display on personal computer.		3
8.	Discuss in detail about CAN bus frames, bit stuffing, nominal bit timing		2
9.	Explain how CAN bus modules communicate with other devices.		2
10.	Write a PIC micro controller programming for CAN Bus based atmospheric pressure display on personal computer.		1

UNIT-III
ETHERNET BASICS

S. No	Group – A (Short Answer Questions)		
	Questions	Blooms Taxonomy Level	Course Outcome
1	What is bit stuffing? Give an example	Knowledge	3
2	What is the maximum length per segment of Twisted pair?	Understand	3
3	What is the maximum length per segment of Fibre optic?	Understand	3
4	What is the maximum length per segment of coaxial cable?	Knowledge	3
5	What do you mean by frame check sequence?	Knowledge	3
6	Explain Ethernet frame struture	Understand	3
7	Discuss need for Ethernet controllers	Understand	3
8	Define media systems in IEEE 802.3 standard	Knowledge	3
9	Justify the statement, "Ethernet does't guarantee real time transfers".	Understand	3
10	State the use of descriptors	Understand	3

UNIT-III
ETHERNET BASICS

S. No	Group – B (long Answer Questions)		
1	Why Ethernet is popular for networks of embedded systems.?	Knowledge	3

2	What are the limitations of Ethernet?	Understand	3
3	Discuss the characteristics of Ethernet .	Understand	3
4	Mention the cable types allowed for Ethernet & Summarize the features of each cable type.	Knowledge	3
5	Expalin the specification for any three type of Ethernet interfaces with varying speed	Knowledge	3
6	With a typical example explain the design choices for ethernet network	Understand	3
7	Demonstrate connection between Ethernet to personal computer using repeater hubs, Ethernet Switches and routers.	Understand	3
8	Elaborate IEEE 802.3 Ethernet frame structure ,each field length and its purpose	Knowledge	3
9	Explain about addressing information, synchronizing bits, error checking sequence in the frame structure.	Understand	3
10	Discuss need for Ethernet controllers and show the location of Ethernet hardware and driver in a network stack .	Understand	3

UNIT-IV
EMBEDDED ETHERNET

Group – A (Short Answer Questions)

1	Differentiate Internet protocol with User Datagram Protocol.	Knowledge	4
2	Interpret how an embedded system function as web server	Understand	4
3	List out elements in HTTP message	Understand	4
4	Name any four software tools used for designing webpages with dynamic data	Knowledge	4
5	What do you mean by frame check sequence.	Knowledge	4
6	Distinguish Transfer control protocol & User Datagram Protocol.	Knowledge	4
7	Write technical note on network security	Understand	4
8	Which protocol is better for message exchange TCP or UDP? Why	Understand	4
9	Write limitations of IPV4 over IPV6	Knowledge	4
10	List out types of connectors used in LAN networking		4

Group – B (long Answer Questions)

1	Describe how UDP does encapsulation and decapsulation and draw user datagram format.	Understand	4
2	Discuss minimum configuration required to establish internet communication for embedded systems.	Knowledge	4
3	Explain design aspects of Transfer Control Protocol applicable in embedded Ethernet network.	Apply	4
4	Illustrate the requirements and importance of Email communication for embedded systems	Knowledge	4
5	Why Ethernet is popular for networks of embedded systems. Justify the statement, "Ethernet does't guarantee real time transfers".	Apply	4
6	Demonstrate Error Checking and Flow Control in TCP,UDP protocols	Knowledge	4
7	Explain how embedded system sends and receive e-mail , exchange file with File Transfer Protocol server.	Knowledge	4

8	Discuss Internet Protocol addressing & routing	Apply	4
9	Illustrate the requirements and importance of Email communication for embedded systems	Knowledge	4
10	Discuss about dynamic response of web server page for the user input.	Understand	4

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UNIT-V
WIRELESS EMBEDDED NETWORKING

Group – A (Short Answer Questions)

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1	State different communication topologies	Understand	5
2	Mention the various applications of Wireless sensor networks	Knowledge	5
3	Mention advantages of WSN for networking	Knowledge	5
4	Write short notes on Traffic Adaptive Medium Access	Knowledge	5
5	Write advantages of localization approach.	Knowledge	5
6	Describe energy efficiency in MAC protocol.	Knowledge	5
7	Write short notes on network topology.	Knowledge	5
8	Explain different types of topologies under wireless sensor netwok.	Knowledge	5
9	What is meant by localization.	Knowledge	5
10	What are different approaches for localization	Understand	5

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Group – B (long Answer Questions)

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1	Explain why the location information of nodes in the network is fundamental.	Understand	5
2	Categorize various localization approaches with detailed explanation	Knowledge	5
3	Explain Sensor MAC protocol ,Time out MAC protocols.	Apply	5
4	Draw super frame structure of IEEE 802.15 and how energy efficiency is obtained in MAC protocol.	Knowledge	5
5	Summarize the concept of data centric routing	Apply	5

6	Explain the connectivity by using power control of the following
	    i) Minimum energy connected network construction(MECN)
	    ii) Cone-based topology control
		Knowledge	5

7	Draw a schematic diagram of a basic wireless sensor network	Knowledge	5
8	Explain the concept of robust routing in detail.	Apply	5
9	Discuss the approaches used for time synchronization in wireless sensor network	Knowledge	5
10	Discuss the approaches used for time synchronization in wireless sensor network.	Understand	5

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