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06EC81

Eighth Semester B.E. Degree Examination, June 2012

Wireless Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Compare 1G, 2G and 3G cellular systems. **(06 Marks)**
b. Explain the different steps involved in AMPS mobile-originated call. **(10 Marks)**
c. What are the basic characteristics of 4G cellular systems? **(04 Marks)**

2 a. Describe the home location register (HLP) implementation and its operation. **(06 Marks)**
b. With a neat sketch, explain the hardware view of a cellular network. **(08 Marks)**
c. Explain mobile station ISDN (MSISDN) Identification Number. Give an example. **(06 Marks)**

3 a. Explain the capacity expansion techniques: cell splitting and cell sectoring. **(08 Marks)**
b. What is mobility management? Explain location management of a mobile station. **(08 Marks)**
c. For a particular radio transmission technology, a minimum S/I ratio of 15 dB is needed for proper operation. What is the minimum required cluster size if the path loss exponent is $\alpha = 4$? Assume that there are six co-channel cells in the first tier and all of them are at the same distance from the mobile. **(04 Marks)**

4 a. With a neat sketch, explain GSM network architecture. **(10 Marks)**
b. Describe the GSM TDMA time slot. **(04 Marks)**
c. Contrast the GSM hyper frame, super frame, multi frame and TDMA frame. **(06 Marks)**

PART – B

5 a. With a neat sketch, explain the detailed steps required for radio resource connection establishment in GSM cellular systems. **(10 Marks)**
b. What is the basic difference between intra-BSC handover and inter-BSC handover? **(06 Marks)**
c. Why is a modified version of LAPD necessary for the Um interface? **(04 Marks)**

6 a. Explain the network nodes found in a 'Cdma 2000' wireless system. **(08 Marks)**
b. Describe the CDMA mobile operation known as access channel probing. **(06 Marks)**
c. Explain the following briefly in case of CDMA systems:
i) Soft handoff ii) Softer handoff
iii) Soft softer handoff iv) Hard handoff **(06 Marks)**

7 a. Explain the error detection and correction codes used for wireless telecommunications. **(08 Marks)**
b. Describe an OFDM modulation system. **(08 Marks)**
c. What is the received power in dBm for a signal in free space with a transmitting power of 10 Watts, frequency of 1900 MHz and distance from the receiver of 2 km if the transmitting antenna and receiving antenna have the same gain of approximately 1.6? What is the path loss in dB? **(04 Marks)**

8 a. What are the basic goals of the IEEE 802.11 wireless LAN standards? **(06 Marks)**
b. Explain the components of the Bluetooth architecture. **(08 Marks)**
c. How is system capacity typically increased for a wireless MAN? **(06 Marks)**

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06EC82

Eighth Semester B.E. Degree Examination, June 2012
Embedded System Design

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What is an embedded system? Why is it so hard to define? **(04 Marks)**

b. Define time-to-market and NRE cost matrics? The life time of a product is 58 weeks. If the product is delayed by 5 weeks, determine the percentage revenue loss? Determine the per product cost if NRE cost is Rs.500000.00 and unit cost is Rs.8000.00 and company produces 6000 units of that product. **(08 Marks)**

c. Explain how the top-down design process improves the productivity. **(08 Marks)**

2 a. Explain the purpose of controller and datapath in a single purpose processor. **(04 Marks)**

b. Write a simple algorithm to find GCD of two integer numbers. Write FSMD for this algorithm and explain how it can be optimized. Also write its optimized FSMD. **(08 Marks)**

c. Explain in brief, standard software development process used in embedded system. **(08 Marks)**

3 a. What is watch-dog timer? What is its use? A 16-bit timer operates at a clock frequency of 20 MHz. Determine the resolution and range of this timer. If a ÷ 4 prescalar is also used, what is the range and resolution of this design? **(06 Marks)**

b. Highlight the advantages of using data in digital form over its analog form. Explain the working of successive approximation type of analog to digital converter, with an example. **(10 Marks)**

c. Explain the features of flash memory and DRAM. **(04 Marks)**

4 a. Explain in brief, the memory hierarchy and cache operation. Given the following three cache designs, find the one with the best performance, by calculating the average cost of access.

i) 4 kbytes, 8-way set associative cache with 6% miss rate. Cache hit costs 1-cycle, cache miss costs 12-cycles.

ii) 8 kbytes, 4-way set associative cache with 4% miss rate. Cache hit costs 2-cycles, cache miss costs 12-cycles.

iii) 16 kbytes, 2-way set associative cache with 2% miss rate. Cache hit costs 3-cycles, cache miss costs 12-cycles. **(10 Marks)**

b. Design a 2k×16 ROM using 1k×8 ROM using an address decoder. **(04 Marks)**

c. Write the features of USB and IEEE 802.11 protocol. **(06 Marks)**

PART – B

5 a. With an example, explain shared data problem. Also explain how an interrupt facility can solve this shared data problem. **(10 Marks)**

b. Define interrupt latency. Mention the factors that affects interrupt latency. **(04 Marks)**

c. Explain in brief, Function-Queue-Scheduling architecture. **(06 Marks)**

6 a. Briefly compare the methods for intertask communication. **(10 Marks)**

b. Explain in brief, three different states of task in RTOS. **(05 Marks)**

c. Briefly compare the three methods of protecting shared data. **(05 Marks)**

7 a. What are the two rules, that interrupt routines in most RTOS environment must follow, that do not apply to task codes? **(05 Marks)**

b. Illustrate with suitable examples and explain what happens when each rule of question no.7a is violated. **(15 Marks)**

8 a. With suitable example, explain encapsulating semaphores. **(08 Marks)**

b. Briefly explain any six problems with semaphores. **(07 Marks)**

c. Give the hard real-time scheduling considerations. **(05 Marks)**

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06EC832

Eighth Semester B.E. Degree Examination, June 2012
Network Security

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Define passive and active security attacks. Discuss the functioning of following attacks with diagrams: i) Masquerade ii) Replay iii) Modification of messages iv) Denial of service. **(10 Marks)**

b. With a neat diagram, discuss the functioning of network security model. List four basic tasks of designing security model. **(10 Marks)**

2 a. Explain the operation of Caeser Cipher with an algorithm. Derive the cipher with an algorithm. Derive the Cipher text using Caeser Cipher for the following plain text message "WORK IS WORSHIP". **(06 Marks)**

b. With a block diagram, explain Feistel encryption and decryption algorithm. **(10 Marks)**

c. Write a note on one-time pad. **(04 Marks)**

3 a. Create a play fair matrix using key word "COMPUTER" and hence obtain the ciphertext for the plaintext message "Parrot". **(10 Marks)**

b. With a block diagram, explain DES encryption and key generation technique. **(10 Marks)**

4 a. Discuss Deffie Hellman key exchange algorithm. Explain how Deffie-Hellman algorithm is used to exchange secret key. **(10 Marks)**

b. Discuss RSA and DSS approaches of digital signature standards with diagrams. **(10 Marks)**

PART – B

5 a. Discuss SSL record protocol in terms of fragmentation, compression and encryption. **(10 Marks)**

b. Discuss Secure Electronic Transaction (SET) protocol with neat diagram. **(10 Marks)**

6 a. Describe following intrusion detection mechanisms:
i) Statistical anomaly detection.
ii) Rule-based detection. **(10 Marks)**

b. Explain the architecture of distributed intrusion detection system. **(10 Marks)**

7 a. Explain various phases of a virus that undergoes in its life time. Discuss various types of viruses. **(10 Marks)**

b. Discuss application level gateway and circuit level gateway configurations with neat diagrams. **(10 Marks)**

8 a. Explain three types of firewall configurations with diagrams. **(10 Marks)**

b. Discuss the concept of reference monitor with diagram. List security rules of reference monitor. **(10 Marks)**

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06EC835

Eighth Semester B.E. Degree Examination, June 2012

High Performance Computer Networks

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Make comparison between different computer networks. **(12 Marks)**

b. In two steps explain the CATV networks, how it will be improved? **(08 Marks)**

2 a. Compare CBR, VBR and messages. **(10 Marks)**

b. Explain link and switch. Calculate the time required to transmit (TRANS) a packet of size 10000 bit with a transmission speed of 1 Mbps. **(10 Marks)**

3 a. Suggest some improvements for TCP, RSVP. **(10 Marks)**

b. Give detailed note on window adjustment technique in TCP. **(10 Marks)**

4 a. Explain ADSL. **(10 Marks)**

b. Write a detailed note on the innovations made on CATV to transform from a video distribution system to one that can provide interactive and integrated service. **(10 Marks)**

PART – B

5 a. Explain PNNI routing. **(08 Marks)**

b. If the link speed of STS-3 signal is 155 Mbps, given cell size of 53 bytes, 90% loading and one cell per unit time as service rate, calculate:

i) Unit of time (per bit)

ii) Average number of cells in the buffer

iii) Queuing delay **(06 Marks)**

c. Explain VCI and VPI. **(06 Marks)**

6 a. Discuss the cellular system with frequency reuse. **(10 Marks)**

b. Write a note on the following:

i) Ad-hoc wireless networks

ii) IMT – 2000. **(10 Marks)**

7 a. Discuss QoS. **(08 Marks)**

b. Explain how the delay formula is used to design good routing strategies. **(12 Marks)**

8 a. Explain distributed-gradient algorithm. **(08 Marks)**

b. Write notes on the following:

i) DWDM

ii) Single hop LANs

iii) Hierarchical Mesh networks. **(12 Marks)**

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06EC841

Eighth Semester B.E. Degree Examination, June 2012
Multimedia Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With the help of a diagram, describe the main components of PSTN and show how a high speed modem provides multiple services in addition to basic telephony. **(10 Marks)**

b. Explain the working principle of circuit-mode and packet-mode of operation of multimedia networks. List out salient features of each type of networks. **(10 Marks)**

2 a. Explain the principle of operation of a PCM speech codec, with a block diagram. **(06 Marks)**

b. With the aid of diagrams, describe the following digitization formats, i) 4 : 2 : 2 ii) QCIF. For each format, state the temporal resolution. Spatial resolution, bit rate and give an example application for each format. **(10 Marks)**

c. Find out the time taken to transmit the following digitized images at both 64 Kbps and 1.5 Mbps :
   i) A $640 \times 480 \times 8$ VGA compatible image.
   ii) A $1024 \times 768 \times 24$ SVGA compatible image. **(04 Marks)**

3 a. With the help of a diagram, identify the main stages of operation of JPEG and explain each stage in detail. (Encoder and decoder) **(14 Marks)**

b. Code the given string "ABACADABACADABACABAB" using Huffman coding. Derive Huffman code tree. Determine the savings in transmission band width over normal ASCII and binary coding. **(06 Marks)**

4 a. Explain MPEG-4 coding principles with the help of a neat diagram. **(10 Marks)**

b. With the help of a neat diagram, explain LPC encoder and decoder. **(10 Marks)**

PART – B

5 a. Explain in detail, with diagrams, the token ring wiring configurations, frame formats, frame transmission and reception with priority operation. **(10 Marks)**

b. Explain in detail, with diagrams LAN protocols and protocol frame work. **(10 Marks)**

6 a. Explain datagram, format of IPV6. **(10 Marks)**

b. With example, explain fragmentation and reassembly in the internet. **(10 Marks)**

7 a. Write the cell format of ATM. With the help of cell switching schematic, explain how cells are routed through ATM switch. **(12 Marks)**

b. Explain classical IP over ATM (IPOA) LAN. **(08 Marks)**

8 a. Explain TCP/IP protocol suite. **(10 Marks)**

b. Explain RTP and RTCP. **(10 Marks)**

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06EC844

Eighth Semester B.E. Degree Examination, June 2012
GSM

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With relevant figures explain GSM PLMN structure. Explain its general objectives and services. **(08 Marks)**

b. Write a short note on MS subsystem. **(06 Marks)**

c. With a neat diagram, explain the mapping of GSM layers on to OSI layers. **(06 Marks)**

2 a. List the radio link measurements used in GSM. Discuss the current techniques used in GSM to reduce interference. **(12 Marks)**

b. Write a short note on channel borrowing. **(08 Marks)**

3 a. Explain the logical channel structure of GSM, discussing the functionalities of each. **(10 Marks)**

b. With a flow diagram, explain mobile identification process. **(06 Marks)**

c. Give the structures of various bursts used in GSM. **(04 Marks)**

4 a. What are the attributes of a speech codec? Explain. **(10 Marks)**

b. What are vocoders? Explain the working of a full-rate vocoder with relevant figure. **(10 Marks)**

PART – B

5 a. Discuss the message flow between MS and BSS, listing the primitives and types of messages. **(10 Marks)**

b. What is handover? Explain intra MSC handover, using a flow diagram. **(10 Marks)**

6 a. What are wireless security requirements? **(08 Marks)**

b. Explain the file structure of a SIM card. **(06 Marks)**

c. What is token based challenge? **(06 Marks)**

7 a. Discuss teletraffic models. **(10 Marks)**

b. Explain planning of a wireless network. **(10 Marks)**

8 a. What are the management requirements of a wireless network? **(08 Marks)**

b. What are the five TMN layers? Explain the pertinent three layers briefly. **(12 Marks)**

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06EC845

Eighth Semester B.E. Degree Examination, June 2012

Ad-hoc Wireless Networks

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the differences between cellular and ad-hoc wireless networks. **(08 Marks)**

b. Explain the following issues of ad-hoc wireless networks:
   i) Medium access schemes
   ii) Routing
   iii) Energy management **(12 Marks)**

2 a. Classify MAC protocols of ad-hoc networks. **(10 Marks)**

b. Explain five phase reservation protocol. **(10 Marks)**

3 a. Explain distribution wireless ordering protocol. **(10 Marks)**

b. Explain directional busy tone based MAC protocol. **(10 Marks)**

4 a. What are the characteristics of an ideal routing protocol for ad-hoc networks? **(08 Marks)**

b. What are proactive and reactive routing protocols? Mention their advantages and disadvantages with example of each. **(06 Marks)**

c. Explain Route establishment and Route maintenance in AODV. **(06 Marks)**

PART – B

5 a. Explain zone routing protocol. Mention advantages and disadvantages. **(10 Marks)**

b. Explain Fisheye state routing protocol. **(10 Marks)**

6 a. Explain the issues in designing a transport layer protocol for ad-hoc wireless networks. **(10 Marks)**

b. Why does TCP not perform well in ad-hoc wireless networks? **(10 Marks)**

7 a. What are the issues and challenges in security provisioning? **(06 Marks)**

b. Classify network layer attacks in ad-hoc wireless networks. **(10 Marks)**

c. What are the requirements of a secure routing protocol for ad-hoc wireless networks? **(04 Marks)**

8 a. List the QoS parameters in ad-hoc wireless networks. **(04 Marks)**

b. Explain QoS enabled ad-hoc on-demand distance vector routing protocol. Mention advantages and disadvantages. **(08 Marks)**

c. Explain the issues and challenges in providing QoS in ad-hoc wireless networks. **(08 Marks)**

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