Eighth Semester B.E. Degree Examination, December 2011

Wireless Communication

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. Mention the differences between 1G and 2G cellular systems.   (06 Marks)
   b. Explain CDMA 2000.   (04 Marks)
   c. Briefly explain the technique employed in an early AM wireless transmitter system, with a diagram.   (10 Marks)

2 a. Explain common cellular network components.   (10 Marks)
   b. Explain mobile terminated call operation in AMPS (advanced mobile phone system).   (10 Marks)

3 a. Mention the cellular capacity expansion techniques.   (10 Marks)
   b. Explain the concept of frequency reuse for cellular systems. For a mobile system of cluster size of 7, determine the frequency reuse distance if the cell radius is 5km. Repeat the calculation for a cluster size of 4.   (10 Marks)

4 a. Explain GSM logical channel concept.   (10 Marks)
   b. Mention the GSM identities.   (10 Marks)

PART – B

5 a. Explain the steps for call setup in GSM.   (10 Marks)
   b. How call handoff is done in GSM technology?   (10 Marks)

6 a. Compare FDMA, TDMA and CDMA air interfaces.   (08 Marks)
   b. Explain the CDMA spectrum spreading operation.   (12 Marks)

7 a. Briefly explain the different types of coding technique used in wireless telecommunications.   (10 Marks)
   b. Explain rake receiver for a diversity technique, with a block diagram.   (10 Marks)

8 a. Explain the architecture of a Bluetooth/WPAN, with a diagram.   (10 Marks)
   b. Describe the basic wireless MAN and its four antenna scheme.   (10 Marks)

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Eighth Semester B.E. Degree Examination, December 2011
Embedded System Design

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. What is market window? Why is it important for products to reach the market early in window? Justify. **(08 Marks)**
   b. Explain how the top-down design process improves the productivity. **(06 Marks)**
   c. Using the revenue model of Fig.Q1(c), derive the percentage revenue loss equation for any rise angle, rather than just for 45 degrees. **(06 Marks)**

Fig.Q1(c)

2 a. Write a simple algorithm for finding the GCD of two integer numbers. Write the FSMD for this algorithm. Explain how it can be optimized. Write the optimized FSMD and its advantages. **(10 Marks)**
   b. Briefly explain the purpose of the data path and controller, in a single purpose processor. **(10 Marks)**

3 a. Explain how stepper is controlled using driver. Give relevant hardware and software details. **(10 Marks)**
   b. In successive approximation, ADC, calculate the correct encoding of 5V, given an analog signal whose voltage ranges from 0 to 15V and a 8-bit digital encoding. Also, determine the resolution of the ADC. **(10 Marks)**

4 a. What is memory hierarchy? How does the cache operate? Discuss the cache mapping technique. List its merits and demerits. **(10 Marks)**
   b. Describe the I^2C and IEEE 802.11 protocols. **(10 Marks)**

PART – B

5 a. Explain how the interrupt works in a microprocessor. With an example, explain the classic shared data problem, when the data is shared between an interrupt and a task. **(10 Marks)**
   b. Explain the real time OS architecture. **(05 Marks)**
   c. What is the interrupt latency? What factors affect it? **(05 Marks)**

6 a. Explain with an example, how round robin architecture works. What is its limitation? **(10 Marks)**
   b. What are the three different states of task in RTOS? How is the state of each task tracked? **(05 Marks)**
   c. How does a typically RTOS binary semaphore works? Explain. **(05 Marks)**

7 a. Mention the two rules of interrupt routine in an RTOS environment. With an example, briefly explain, what happens when each rule is violated. **(15 Marks)**
   b. Compare characteristics of the four software architectures for scheduling. **(05 Marks)**

8 a. Illustrate with suitable examples, the problems of 'delay embrace' and 'priority inversion' **(12 Marks)**
   b. Explain the methods to solve the memory space and methods to save power. **(08 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011

Network Security

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. List the examples of security attacks each of which has arisen in a number of real world cases. **(08 Marks)**
    b. Give the table showing relationship between security services and mechanisms. **(08 Marks)**
    c. Explain Gatekeeper function and security recovery. **(04 Marks)**

2   a. Explain block cipher design principles. **(08 Marks)**
    b. In S-DES, the plain text is 11110010 and key is 1011100110. Find cipher text. **(08 Marks)**
    c. Explain the strength of DES. **(04 Marks)**

3   a. Describe RSA algorithm and discuss the security of RSA. **(08 Marks)**
    b. Explain different techniques proposed for distribution of public keys. **(08 Marks)**
    c. In RSA system it is given $p = 7$, $q = 11$, $e = 17$, $M = 8$. Find the cipher text C. Also find M from decryption. **(04 Marks)**

4   a. Explain arbitrated digital signature technique. **(08 Marks)**
    b. Explain digital signature algorithm. **(08 Marks)**
    c. Users A and B use Diffie-Hellman key exchange technique with common prime $q = 71$ and primitive root $\alpha = 7$.
       i)   If user A has private key $X_A = 5$, what is A's public key Y_A?
       ii) If user B has private key $X_B = 12$, what is B's public key Y_A?
       iii) What is the shared secret key? **(04 Marks)**

PART – B

5   a. With a diagram, explain handshake protocol action. **(08 Marks)**
    b. Explain in detail the following transactions supported by SET :
       i) Purchase request   ii) Payment authorization. **(08 Marks)**
    c. Explain SSL protocol stack. **(04 Marks)**

6   a. Explain UNIX password scheme, with a diagram. **(08 Marks)**
    b. Explain the architecture of distributed intrusion detection, with a diagram. **(08 Marks)**
    c. Give examples of metrics that are useful for profile based intrusion detection. **(04 Marks)**

7   a. Give the logic for compression virus and with a diagram, explain its operations. **(08 Marks)**
    b. With a diagram, explain digital immune system. **(08 Marks)**
    c. Give the mechanisms of spreading Nimda. **(04 Marks)**

8   a. Give the capabilities and limitations of firewalls. **(08 Marks)**
    b. Give the common characteristics of Bastion Host. **(08 Marks)**
    c. Write note on screened subnet firewall. **(04 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
High Performance Computer Networks

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a.   Explain the innovations in telephone networks, with examples.   **(10 Marks)**
    b.   Explain the various networking principles.   **(10 Marks)**

2   a.   List and explain the different types of applications that are used for information transfer.
                                                                                           (10 Marks)
    b.   With a neat figure, explain the various layers of open data network models.   **(10 Marks)**

3   a.   Which algorithm is called as open shortest path first? Explain how to construct the spanning tree of the shortest path.   **(10 Marks)**
    b.   Explain the header format of TCP, in detail.   **(10 Marks)**

4   a.   Explain with the necessary diagrams, a SONET frame.   **(10 Marks)**
    b.   What are intelligent networks? Explain the INA model, in detail.   **(10 Marks)**

PART – B

5   a.   List the main features of ATM. Explain the PNNI routing in ATM networks.   **(10 Marks)**
    b.   Which layer is used to convert information stream into 48 byte data cell in ATM? Explain the same, in detail.   **(10 Marks)**

6   a.   List the goals of link level design. Explain how to achieve them.   **(10 Marks)**
    b.   Write short notes on, AdHoc wireless networks and IMT 2000,   **(10 Marks)**

7   a.   Explain the static and dynamic routing in datagram network.   **(10 Marks)**
    b.   Explain in detail, the model that is used to compare the behavior of ISPs and their customers.   **(10 Marks)**

8   a.   Explain the architecture of an optical cross connect.   **(10 Marks)**
    b.   Write short notes on single hop LANs and multiple hop LANs in optical local area networks.
                                                                                           (10 Marks)

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Eighth Semester B.E. Degree Examination, December 2011
Multimedia Communication

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. With a neat diagram, explain how voice mail and teleconferencing is supported in relation to speech only interpersonal communication involving both public (PSTN/ISDN) and private network. Also, explain the role of voice mail server and audio bridge. **(10 Marks)**

b. Explain with neat diagrams, the interactive television application for both cable and satellite network. **(07 Marks)**

c. Determine the propagation delay associated with the following communication channels:
  i)   A connection through a private telephone network of 1 km.
  ii)   A connection through a PSTN of 200 km.
  iii)   A connection over a satellite channel of 50,000 km
  Assume that the velocity of propagation of a signal in the case of i) and ii) is 2×10^8 ms^{-1} and in the case of iii) is 3×10^8 ms^{-1}. **(03 Marks)**

2 a. With the neat diagram, explain the principle of operation of a PCM speech CoDEC. Also explain the compressor and expander. **(10 Marks)**

b. With the aid of a diagram, explain how an image produced by a scanner or digital camera is captured and stored within a computer memory? **(07 Marks)**

c. Assuming the bandwidth of a speech signal is from 50 Hz through to 10 kHz and that of a music signal is from 15 Hz through to 20 kHz, derive the bit rate that is generated by the digitization procedure in each case assuming the Nyquist sampling rate is used with 12 bits per sample for the speech signal and 16 bits per sample for the music signal. Derive the memory required to store a 10 minutes passage of stereophonic music. **(03 Marks)**

3 a. With a neat diagram, explain the JPEG encoder, in detail **(10 Marks)**
b. Compare the arithmetic coding and Huffman coding. A message comprising of a string of characters with probabilities e = 0.3, n = 0.3, t = 0.2, w = 0.1, · = 0.1 is to be encoded. The message is went·. Compute the arithmetic codeword. **(07 Marks)**

c. Explain the features of TIFF. **(03 Marks)**

4 a. Explain the video compression principles. With a neat diagram, explain the B frame encoding. **(08 Marks)**

b. Explain the error tracking procedures of H.263, with neat diagrams. **(07 Marks)**

c. A digitized video is to be compressed using MPEG-I standard. Assuming a frame sequence of IBBPBBPBBPBBI……. and average compression ratios of 10:1(I), 20:1(P) and 50:1(B), derive the average bit rate that is generated by the encoder for NTSC digitization format with y = 352×240 and c_b, c_r = 176×120. **(05 Marks)**

PART – B

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

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

6 a. Explain the operation of internet with a neat diagram of protocol associated networking components. Also, explain IP adjunct protocols, with a neat diagram. **(10 Marks)**

   b. What is QoS support for internet application? Explain the control mechanism used in each class to meet QoS requirement. **(08 Marks)**

   c. The administrator of a campus LAN is assigned a single class B IP address 150.10.0.0. Assuming the LAN comprises 100 subnets, each of which is connected to FDDI backbone network, using a subnet router, define a suitable address mask for the site if the maximum number of hosts connected to each subnet is 70. **(02 Marks)**

7 a. Explain the principles of routing in an ATM network, with a neat schematic. **(06 Marks)**

   b. Explain the unicast and multicast protocol architecture with reference to ATM. **(08 Marks)**

   c. Explain the general structure of ATM switch. **(06 Marks)**

8 a. Explain the real time transport protocol and real time transport control protocol usage and package format. **(10 Marks)**

   b. Explain the TCP connection establishment procedure for client server model and simultaneous model. List the difference in control procedure of TCP as compared to HDLC. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
Real Time Operating Systems

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. Define the loop and supervisor control.   (04 Marks)
    b. Compare:
        i)   Centralized and distributed systems
        ii) Hard and soft real time systems.   (08 Marks)
    c. Explain the hardware requirements of a real time application, with a block diagram.
                                                                       (08 Marks)

2   a. Mention the salient features of Ada language which is used for real time applications.
                                                                       (04 Marks)
    b. Discuss the standard and user defined data types available in C language, with examples.
                                                                       (08 Marks)
    c. Explain with examples:
        i)   Exception handling
        ii) Coroutines   (08 Marks)

3   a. List the features of VX works.   (04 Marks)
    b. With a task state transition diagram and task control block, explain the functions of the task states and transition.   (08 Marks)
    c. Explain the shared data problem. Discuss any one inter task communication scheme.
                                                                       (08 Marks)

4   a. Write a note on real time clock handler.   (04 Marks)
    b. What are the issues to be considered while designing a real time system? Give an example for a real time system.   (08 Marks)
    c. Describe multitasking approach for the design of a real time system.   (08 Marks)

PART – B

5   a. Explain the Yourdon methodology.   (04 Marks)
    b. Describe HATLEY and Pribhai method for developing a real time system. (08 Marks)
    c. Explain the PAISLEY system, for developing a real time system. (08 Marks)

6   a. Compare real time and general purpose databases.   (04 Marks)
    b. Describe the petrinets model for atleast two different examples. (08 Marks)
    c. Explain the any two disk scheduling algorithms.   (08 Marks)

7   a. Define: i) Error   ii) Fault latency   iii) Error latency   and iv) Hardware fault. (04 Marks)
    b. Explain the any two fault types.   (08 Marks)
    c. Describe hardware redundancy, along with the various voter types. (08 Marks)

8   a. How device failure rates can be obtained? Explain with an equation. (04 Marks)
    b. Describe the reliability model for hardware redundancy and explain the same for series – parallel systems.   (08 Marks)
    c. Explain the software error models, with equations.   (08 Marks)

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Eighth Semester B.E. Degree Examination, December 2011

Ad-hoc Wireless Networks

Time: 3 hrs.   Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting*
at least TWO questions from each part.
2. *Draw topology diagram/graph wherever necessary.*

PART – A

1 a. Give any six differences between cellular networks and ad-hoc wireless networks. **(06 Marks)**
   b. List the issues in ad-hoc networks and explain any five of them in detail. **(12 Marks)**
   c. Name any four applications of ad-hoc networks. **(02 Marks)**

2 a. Explain dual busy tone multiple access (DBTMA) and media access with reduced handshake (MARCH) MAC protocols. **(10 Marks)**
   b. Explain five phase reservation protocol (FPRP). **(10 Marks)**

3 a. Briefly describe :
   i)   Distributed priority scheduling MAC protocol.
   ii) Distributed wireless ordering MAC protocol. **(12 Marks)**
   b. Discuss directional MAC (D-MAC) protocol using DMAC-1 and DMAC-2 mechanisms. **(08 Marks)**

4 a. List any six characteristics of routing protocol for ad-hoc wireless networks. **(04 Marks)**
   b. Explain any one table driven routing protocol. **(08 Marks)**
   c. Explain location aided routing (LAR) protocol with LAR1 algorithm. **(08 Marks)**

PART – B

5 a. Discuss core extraction distributed ad-hoc routing (CEDAR) protocol. **(10 Marks)**
   b. Explain any one hierarchical routing protocol. **(10 Marks)**

6 a. Discuss the issues and design goals of a transport layer protocol for ad-hoc wireless networks. **(08 Marks)**
   b. Explain ad-hoc TCP (ATCP) and Split-TCP protocols. **(12 Marks)**

7 a. Give the classification of security attacks in ad-hoc wireless networks and explain any two network layer attacks. **(06 Marks)**
   b. Briefly explain the following key management strategies :
   i)   Shamir's three-pass protocol
   ii) Threshold cryptography. **(06 Marks)**
   c. Discuss security-aware ad-hoc routing (SAR) protocol. **(08 Marks)**

8 a. Briefly discus the issues in QoS provisioning for ad-hoc wireless networks. **(06 Marks)**
   b. Explain access procedure and bandwidth reservation mechanism in DBASE protocol for MAC layer QoS. **(07 Marks)**
   c. Explain ticket-based QoS routing protocol to support network layer QoS. **(07 Marks)**

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