USN | | | | | | | | | | 06EC81

Eighth Semester B.E. Degree Examination, December 2010
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. With a neat block diagram, explain different components of SS7 system and their functions. **(10 Marks)**
   b. Explain AMPS handoff operation using various control messages, with the help of message sequence chart. **(10 Marks)**

2. a. Explain the following terms: **(10 Marks)**
   i) MSISDN   ii) IMST   iii) CGI   iv) RBSIC   v) GTT
   b. Explain mobile originated call operations in a cellular network, with a neat diagram showing the components and steps. **(10 Marks)**

3. a. Explain the following capacity expansion techniques : cell splitting, cell sectoring and overlaid cells. **(10 Marks)**
   b. A service provider wants to provide cellular communication to a particular geographic area. The total bandwidth the service provider licensed is 5 MHz and system subscriber requires 10 KHz of bandwidth. Determine the system capacity, if the service provider implements a cellular system with 35 transmitter sites and cluster size of 7. **(06 Marks)**
   c. Determine frequency reuse distance for a cell radius of 2 kilometers and cluster size of 8. **(04 Marks)**

4. a. Discuss the frame format of GSM hyper frame, super frame, multi frame and TDMA frame. **(10 Marks)**
   b. Draw a neat diagram for GSM signaling model. Explain the different protocols used in the diagram. **(10 Marks)**

PART – B

5. a. Explain the steps needed for setting up a call in GSM using MSRN, with a neat diagram. **(10 Marks)**
   b. Explain GAM intra BSC handover, with a neat diagram. **(10 Marks)**

6. a. Describe generation of CDMA reverse traffic channel, with a neat diagram. **(10 Marks)**
   b. How does the use of spreading codes increase the bandwidth? What is the length of CDMA burst PN spreading code? **(10 Marks)**

7. a. Describe operation of RAKE receiver, with a neat diagram. **(06 Marks)**
   b. If transmitted power is 600 mw at a frequency of 850 MHz, determine the path loss at a distance of 5000 meters and received signal power in dBm. Use free space path loss model. **(10 Marks)**
   c. If an OFDM system transmits 32 Kbps over each carrier and uses 16 carriers, what is the overall data rate? **(04 Marks)**

8. a. Discuss the design issues of IEEE 802.11 and also provide the working of BSS, DS and ESS networks. **(10 Marks)**
   b. List three fundamental ways in which wireless LANs and wireless PANs differ from each other and explain them. **(05 Marks)**
   c. What kind of wireless network can be used to connect buildings in a city to exchange information? Name the IEEE standard and explain a typical network based on the standard. **(05 Marks)**

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Eighth Semester B.E. Degree Examination, December 2010
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. Prove that for any rise angle the percentage revenue loss is
$$\left\{\frac{D(3W-D)}{2W^2}\right\}*100\%$$ **(10 Marks)**

   b. Explain the main characteristics of embedded systems, with examples.   **(10 Marks)**

2   a. What is a single-purpose processor? What are the benefits of choosing a single purpose processor over a general purpose processor?   **(10 Marks)**

   b. Design a single purpose processor that outputs Fibonacci numbers upto 'n' places. Start with a function computing the desired result. Translate it into a state diagram and sketch a probable data path.   **(10 Marks)**

3   a. Explain the software design tools that are used to design, test and debug the embedded software.   **(10 Marks)**

   b. Compute the hexadecimal value that need to be loaded onto duty cycle register of 8-bit PWM module in order to run the motor at a speed of 8050 rpm, which needs 4.375 volts.   **(05 Marks)**

   c. Write a short note on watch dog timer by writing function in pseudocode.   **(05 Marks)**

4   a. A 2-level cache design is given, where the hit rates are 88% for the smaller cache and 97% for the larger cache, the access costs for a miss are 12 cycles and 20 cycles respectively and the access cost for a hit is one cycle. Calculate the average cost of access.   **(10 Marks)**

   b. Explain I^2C and CAN protocol.   **(10 Marks)**

PART – B

5   a. Explain with codes, what is shared data problem and the method to overcome the same.   **(10 Marks)**

   b. Explain with the help of codes, round robin interrupt architecture.   **(10 Marks)**

6   a. Define the term reentrant function and on what rules the function is decided as reentrant function.   **(05 Marks)**

   b. Discuss the methods of protecting shared data.   **(06 Marks)**

   c. What are RTOS queues? Explain the use of queue, with sample codes.   **(09 Marks)**

7   a. Using pseudocodes, explain how to use events.   **(10 Marks)**

   b. Explain the need for encapsulating the semaphores. Write a pseudocode to encapsulate a semaphore.   **(10 Marks)**

8   a. Explain the techniques to save code space.   **(06 Marks)**

   b. Discuss the advantages and disadvantages of using large number of tasks.   **(10 Marks)**

   c. Write a short note on mailboxes.   **(04 Marks)**

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Eighth Semester B.E. Degree Examination, December 2010
High Performance Computer Networks

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from Part – A and Part – B.*

PART – A

1   a. Trace the evolution of telephone networks. Explain common channel signaling and its significance. **(10 Marks)**
    b. How are store and forward packet switched networks better than convectional telephone networks? What is statistical multiplexing? **(06 Marks)**
    c. What are the advantages offered by ATM networks? **(04 Marks)**

2   a. What is layered architecture? What are the strengths of layered architecture? How is message passed between the layers and what are the mechanisms used for message passing? **(10 Marks)**
    b. Let BER on a link between two nodes be P. Assume there is only error detection but no error correction. Packets of size P bits are exchanged between the nodes. What is the probability P_E that the packet is in error? A packet is acknowledged if it is error free. The acknowledgement arrives in a round trip time T. If an acknowledgement is not received in time T after sending the packet, it is retransmitted. Derive the expression for the average time taken to deliver the packet. Justify if there is an optimum packet size. Ignore transmission time. **(10 Marks)**

3   a. With a diagram, explain the IPV4 header and the various fields. How does DHCP help conserve IP addresses? **(06 Marks)**
    b. How does TCP flow control work? How does it ensure that individuals get a fair share of the bandwidth? What are the trade offs made by the window adjustment mechanism? **(08 Marks)**
    c. What is RSVP? How does it provide QoS? **(06 Marks)**

4   a. Explain the SONET frame structure, with a diagram. How does SONET accommodate both ATM and STM traffic? **(12 Marks)**
    b. Describe the intelligent network architecture. What are the various functional components of INA? **(08 Marks)**

PART – B

5   a. What is ATM? What are the main features of ATM? What are the QoS provisions in ATM. What are the various kinds of delay encountered by a cell? How is filter compensated? **(12 Marks)**
    b. Derive the expression for the average number of cells in the buffer for a M/D/I queue. **(08 Marks)**

6   a.   What is ISI? What are the commonly employed ISI countermeasures?   **(12 Marks)**

     b.   Consider a channel with a multipath delay spread of 10μs. Suppose a voice signal with a signal bandwidth of 10 kHz is transmitted over this channel. Will the channel exhibit flat fading? How about for a data signal with a 10MHz bandwidth?   **(04 Marks)**

     c.   What are the adhoc wireless networks?   **(04 Marks)**

7   a.   What is blocking? What determines the blocking probability?   **(08 Marks)**

     b.   Consider the transmission of messages over a line equipped with a buffer. The messages have lengths with exponential distribution and a mean of L bits. The transmitter has rate C bps. The messages arrive as a Poisson process with rate λ/sec.

        i)   Using the formula $T = \dfrac{1}{\gamma} \dfrac{\Sigma}{j} \dfrac{\lambda j}{\mu j - \lambda j}$, find the average delay per message. For λ = 10/s and L = 8× 10^6, find the min value of C, so that delay does not exceed 0/S.

        ii)   How does the average delay per packet change if C and L are multiplied by the same constant?

        iii)   Let our queue model a server that answers requests. We decide to divide up the files in the server into sub files that are K times smaller. Now the rate of requests for the sub files is K λ. What is the average delay per sub file?   **(12 Marks)**

8   a.   How does a WDM system work? How does WDM offer protocol transparency?   **(10 Marks)**

     b.   How does an optical cross – connect work? What are the limitations imposed by wavelength conversion. What are the various approaches taken to build wavelength converters?   **(10 Marks)**

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Eighth Semester B.E. Degree Examination, December 2010
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. Define the term multimedia communication. State the basic form of representing different
        media types.   (04 Marks)
    b. Explain why most data networks operate in a packet mode. Hence, explain why services
        involving audio and video are supported.   (04 Marks)
    c. Identify and explain the meaning of the key QOS parameters associated with,
        i)   Circuit switching
        ii) Packet switching   (08 Marks)
    d. A web page of 10 Mbytes is being retrieved from a web server. Neglecting server and trunk
        delays, calculate the time to transfer the page over a
        i)   PSTN modem operating at 28.8 kbps.
        ii) Primary rate ISDN access line of 1.5 Mbps.
        iii) Cable modem operating at 27 Mbps.   (04 Marks)

2   a. Define three types of texts. Discuss the hypertext that enables integrated set of documents.
                                                                                      (08 Marks)
    b. Derive the memory required to store a 10 minute passage of stereophonic music. Assume
        bandwidth of music as 15 Hz through to 20 kHz and Nyquist sampling rate as 16 bits per
        sample.   (04 Marks)
    c. Describe 4 : 2 : 2 and 4 : 2 : 0 digitization formats.   (08 Marks)

3   a. Explain the meaning of the following terms, relating to compression:
        i)   Lossless and lossy compression.
        ii) Source and entropy encoding.   (04 Marks)
    b. Code the given string "ABACADABACADABACABAB" using Huffman coding. Derive
        Huffman code tree. Determine the savings in transmission bandwidth over normal ASCII
        and binary coding.   (06 Marks)
    c. With the aid of a diagram, identify the five main stages of operation of IPEG and explain
        each stage briefly.   (10 Marks)

4   a. With the help of a neat diagram, explain LPC encodes and decodes.   (06 Marks)
    b. Give the meaning of motion estimation and compensation, with respect to video
        compression.   (04 Marks)
    c. Explain MPEG-4 coding principles with the help of a neat diagram.   (10 Marks)

PART – B

5 a. Explain CSMA/CD MAC method, used in IEEE 802.3 standard.   (06 Marks)
   b. The FDDI ring configuration has 2 km ring with 20 stations:
      i) Derive the ring latency in both time and bits, assuming a usable bit rate of 100 mbps.
      ii) Maximum obtainable throughput.
      iii) Maximum access delay.
      Assume, station latency = 1 ms and TTRT = 4 ms   (04 Marks)
   c. Discuss the framework used for defining various LAN standards. Explain each layer briefly.
                                                                                  (10 Marks)

6 a. Write a protocol stack of various adjunct protocols, that is used by IP.   (05 Marks)
   b. Explain IP address classes, with the help of a neat diagram. Identify a particular application
      for each class.   (05 Marks)
   c. Describe the operation of ARP and RARP.   (10 Marks)

7 a. Write the cell format of ATM. With the help of cell switching schematic, explain how cells
      are routes through ATM switch.   (12 Marks)
   b. Explain classical IP over ATM LAN (IPOA).   (08 Marks)

8 a. Explain TCP socket interface. How the socket primitives are used to carry out active open
      and passive open connections, with the help of diagram.   (10 Marks)
   b. Give the packet format of RTP and describe its usage.   (10 Marks)

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